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1. Data Collection Tools

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Abstract:

Decision-making is an everyday process and for this we need correct data, therefore data is an integral part of our daily lives. However, data on which any decision is based needs to be collected in a strategic manner that it fulfills the desired outcome and aids in future decision-making. Data needs to be precise and clear for ambiguous data would lead to wrong ideas. Collection of data is a very systematic process and there are many ways of doing it, sometimes the researcher uses previously collected data and other times the researcher goes into primary ways of collection of data for the very specific research problem.

Keywords:

Data collection, observation, questionnaire, social scaling, psychological tests.

Objectives: In this chapter the following concepts are discussed.

- What is Data?
- Importance of Data.
- Various tools of Data Collection.
- Advantages and Disadvantages associated with each tool.

1.1 Definition of Data:

Data is defined as, "An information that has been translated into a form that is efficient for movement or planning." According to Cambridge dictionary, Data is defined as, " An information, especially facts or numbers collected to be examined and considered and used to help in decision- making".

1.2 Importance of Data:

- **Improve People's Lives -** Data helps to improve quality of life for people by improving quality is first and foremost among the reasons why organizations should be using data. By allowing measuring and taking action, an effective data system can enable organizations to improve the quality of people's lives.
- **Make Informed Decisions** - Data is equal to knowledge. Good data provides indisputable evidence, and with proper evidence or knowledge, decision-making can be done justifiably and timely.

- H**elps in responding to challenges before time** - Effective quality monitoring will allow organizations to be proactive rather than reactive and will support the organization to maintain best practices over time.
- **Measure the effectiveness of a given strategy** - A strategy's effectiveness can be identified on the data on which it is based. Timely gathered data can be very beneficial by overcoming any challenge faced by data.
- **Find Solutions To Problems -** Data allows organizations to more effectively determine the cause of problems. Data allows organizations to visualize relationships between what is happening in different locations, departments, and systems.
- **Back up Arguments -** Data is a key component to systems advocacy. Utilizing data will help present a strong argument for systems change.
- **Data increases efficiency.** Effective data collection and analysis will allow us to direct scarce resources where they are most needed. If an increase in significant incidents is noted in a particular service area, this data can be dissected further to determine whether the increase is widespread or isolated to a particular site. If the issue is isolated, training, staffing, or other resources can be deployed precisely where they are needed, as opposed to system-wide. Data will also support organizations to determine which areas should take priority over others.
- **Tools of Data Collection -** A well-conducted research program postulates sufficient, reliable and valid facts. Such facts are obtained through systematic procedure, which involves various devices. Each tool is particularly appropriate for a certain source of data, yielding information of the kind and in the form that would be most efficiently used.

Some of these devices merely identify the presence or absence of certain aspects of a situation. Some of the tools collect qualitative descriptions that may involve comparison or contradiction between elements present in the situation. Other devices yield quantitative measures.

1.2.1 Benefits of Data Collection:

Good data can help identify and verify issues, theories and perceptions. Good data can help to proactively address issues, measure progress and capitalize on opportunities. Good data can gain trust, develop effective, respectful consultations, and secure the support of key decision-makers and stakeholders. Good data can reduce exposure to possible legal action and human rights complaints.

1.3 Tools of Data Collection:

Many of the research tools have been designed to yield quantitative measures, others yield descriptions that may be refined by counts of frequency of appearance. While some data cannot be expressed in frequency counts, percentage of scores, most data are made more meaningful by quantification. The most frequently used tools of data collection are

- Observation
- Questionnaire
- Psychological Tests
- Social Scaling

1.3.1 Observation:

According to Merriam - Webster, the word 'observation' can be defined as "*an act of recognising and noting a fact or occurrence often involving measurement with instruments*", or "*a record or description so obtained".*

“A statement based on something one has seen, heard or noticed.”

“Observation, as the name implies, is a way of collecting data through observing.”

“Observation data collection methods may involve watching, listening, reading, touching, and recording behavior and characteristics of phenomena”

“A way to gather data by watching people, events, or noting physical characteristics in their natural setting.”

Observation is a **primary** research method. Primary research involves personally collecting the data or information being studied. Observations can be overt (subjects know they are being observed) or covert (do not know they are being watched).

In overt observation research subjects are aware that they are being observed. In covert observation, on the other hand, the observer is concealed and sample group members are not aware that they are being observed.

Covert observation is considered to be more effective because in this case sample group members are likely to behave naturally with positive implications on the authenticity of research findings. Observation is very important when using scientific methods to investigate phenomena.

Observation involves using the senses to gather information about the natural world. Science depends on keeping records of observations for later interpretations. These interpretations may lead to the development of scientific theories or laws. Without accurate observations, scientists cannot make any interpretations and therefore cannot draw conclusions.

A. Quantitative and Qualitative Observations:

- **Quantitative observations** involve measurements or estimates that yield meaningful, numerical results.
- **Qualitative observations** yield descriptive, nonnumeric results. Although all the observations made on a phenomenon are valuable, quantitative observations are often more helpful than qualitative ones. Qualitative observations are somewhat vague because they involve comparative terms. Quantitative observations, on the other hand, have numbers and units associated with them and therefore convey more information. Even an estimated number is more valuable than no number at all.

B. Characteristics of Observation:

a. **Use of Senses The** five senses either to see or hear are involved in the process of observation. For specific data collection, mental and physical elements should be used.
b. **Systematic and Relative- The** observer cannot observe each thing. He studies only those things, which fall, in his direct observation. For example, an inspector of traffic observes only those vehicles driven in the wrong way or fast. In the same way a researcher takes notice of those things which & are the object and relative to his study.
c. **Quantity based on Quality** Observation is an efficient way to draw facts as quantitative based on his nature and quality. Efficient conclusions should be drawn, if qualitative techniques and tools are used in observation methods.
d. **Specific Objectives** A researcher having some purpose and objectives behind a study. To collect correct facts, he studies phenomena, which are related to his study and have specific objectives.
e. **Dominant Interest** Without a researcher interest, no observation is possible. For this purpose the observation method is the outcome of a researcher's personal interest and involvement.
f. **An Eye Affairs** Observation depends on all senses but mostly an eye is used for this method to observe the happening events.
g. **Direct Method of Study -** Observation is a direct method of study. An observer goes into the field and observes all the problematic situations.
h. **Direct Cause-effect Relationship -** An observation is a direct method to the study of cause and effect relationship. Hypothesis may also be developed in the field due to keen study of cause and effect.

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C. Types of Observation:

- **Participant observation** - Participant observation is an observational research method involving the researcher integrating themselves into the group they're studying. They join the community, either as a researcher whose presence is known (overt), or as a member in disguise (covert).
- **Non-participant observation** - Non-participant research is generally cheaper and quicker to do. It doesn't require time and resources for the researcher to integrate into an unfamiliar community. Subjects of non-participant observation aren't able to give informed consent - they are essentially deceived about the occurrence or nature of the study. For instance, a researcher studying young children's behavior in classrooms might want to discern how often they speak without raising their hands. The researcher would mark this behavior on their schedule every time they saw it.

Advantages of Observation Data Collection Method:

- direct access to research phenomena,
- high levels of flexibility in terms of application and generating a permanent record of phenomena to be referred to later.

Disadvantages of Observation Data Collection Method:

- Longer time requirements,
- high levels of observer bias, and
- impact of observer on primary data, in a way that presence of observer may influence the behavior of sample group elements.

D. Validity and Reliability of Observation Method:

A common way of assessing the reliability of observations is to use inter-rater reliability. This involves comparing the ratings of two or more observers and checking for agreement in their measurements. Another way of improving the reliability of an observational study is to ensure that the categories are clearer.

The more observers agree, the greater reliability. Second, even with perfectly reliable observers, the target person being observed may vary in their behaviors from occasion to occasion. The variability of the coded behaviors across time may also influence the results of prediction models.

In observational research, reliability of data refers to the degree of agreement between sets of observational data collected independently from the same scene by two different observers (interobserver agreement) or by the same observer at different times in the data collection process (intraobserver agreement).

1.3.2 Questionnaire Method:

A questionnaire is a list of questions or items used to gather data from respondents about their attitudes, experiences, or opinions. Questionnaires can be used to collect quantitative and/or qualitative information. Questionnaires are commonly used in market research as well as in the social and health sciences. For example, a company may ask for feedback about a recent customer service experience, or psychology researchers may investigate health risk perceptions using questionnaires. Designing a questionnaire means creating valid and reliable questions that address research objectives, placing them in a useful order, and selecting an appropriate method for administration.

A. Questionnaire Methods:

- Self-administered
- Researcher-administered. Self-administered questionnaires are more common because they are easy to implement and inexpensive.

B. Self-Administered Questionnaires:

Self-administered questionnaires are more common because they are easy to implement and inexpensive. Self-administered questionnaires can be delivered online or in paper-and-pen formats, in person or through mail. All questions are standardized so that all respondents receive the same questions with identical wording.

Self-administered questionnaires can be:

- cost-effective
- easy to administer for small and large groups
- anonymous and suitable for sensitive topics
- self-paced

But they may also be:

- unsuitable for people with limited literacy or verbal skills
- susceptible to a non response bias (most people invited may not complete the questionnaire)
- biased towards people who volunteer because impersonal survey requests often go ignored.

C. Researcher-Administered Questionnaires:

Researcher-administered questionnaires allow deeper insights. Researcher-administered questionnaires are interviews that take place by phone, in-person, or online between researchers and respondents.

Researcher-administered questionnaires can:

- help researcher ensure the respondents are representative of your target audience
- allow clarifications of ambiguous or unclear questions and answers
- have high response rates because it's harder to refuse an interview when personal attention is given to respondents

But researcher-administered questionnaires can be limiting in terms of resources.

They are:

- costly and time-consuming to perform
- more difficult to analyze if you have qualitative responses
- likely to contain experimenter bias or demand characteristics
- likely to encourage social desirability bias in responses because of a lack of anonymity

D. Open-Ended Vs. Closed-Ended Questions

Questionnaires can include open-ended or closed-ended questions or a combination of both.

Using closed-ended questions limits responses, while open-ended questions enable a broad range of answers. You'll need to balance these considerations with available time and resources.

E. Closed-Ended Questions

Closed-ended, or restricted-choice, questions offer respondents a fixed set of choices to select from. Closed-ended questions are best for collecting data on categorical or quantitative variables.

Categorical variables can be nominal or ordinal. Quantitative variables can be interval or ratio. Understanding the type of variable and level of measurement means researchers can perform appropriate statistical analyses for generalizable results.

F. Advantages of Questionnaire:

- **Economical:**

It is an economical way of accumulating information. It is economical both for the sender and for the respondent in time, effort and cost. The cost of conducting the study with the help of a questionnaire method is very low. In the questionnaire the researcher has to spend for paper printing and postage only. There is no need to visit each and every respondent personally. So it does not require a high cost for conduct of the research.

- **Wide Coverage:**

It is probably the best method to collect information, compared to the other methods like interview or observation, when the sample population is spread over a large territory. It permits nationwide or even international coverage.

Questionnaire makes it possible to contact many people who could not otherwise be reached. It can cover a large group at the same time. Goode and Hatt say that when the researcher has to cover the group of respondents who are widely scattered, lie can use the questionnaire in order to minimize the cost.

For example, if the researcher wishes to poll the membership of the American Sociological Society, transportation costs for interviewing would be excessive, both in terms of money and time. There may not be enough time to make the necessary interview. However, questionnaires could be distributed to all those members and information could be collected from them. This can be done by a single researcher without the large funds otherwise required to hire an interviewing staff to carry out the interview.

- **Rapidity:**

Replies may be received very quickly in the questionnaire method. In this case there is no need to visit the respondent personally or continue the study over a long period. Thor "fore in comparison with other methods, the mailed questionnaire is the quickest method.

- **Suitable in Special Type of Response:**

The information about certain personal, secret matters can be best obtained through questionnaire methods. For example, information about sexual relationship, marital relationship, secret desires etc. can be easily obtained by 'keeping the names of the respondents anonymous.

- **Repetitive Information:**

Compared to other methods like schedule, interview or observation, the questionnaire method is regarded as more useful and cheap, where the repetitive information has to be collected at regular intervals.

- **An Easier Method:**

Questionnaire is comparatively an easier method to plan, construct and administer. It does not require much technical skill or knowledge.

- **It Puts Less Pressure on the Respondents:**

It puts less pressure on the respondents for immediate response. He can answer it at his own leisure, whereas interview or observation demands specific fixation of time and situation,

- **Uniformity:**

It helps in focusing the respondent's attention on all the significant items. As it is administered, in a written form, its standardized instructions for recording responses ensure some uniformity. Questionnaire does not permit much variation.

- **Useful Preliminary Tool:**

Questionnaire may be used as a preliminary tool for conducting a depth study later on by any other method.

- **Greater Validity:**

Questionnaire has some unique merits as regards validity of information. In methods like interview and observation, the reliability of responses depends on the way the investigator has recorded them. Here they may present biased or prejudiced information of their own.

But in the questionnaire method, the responses given by the subjects are available in their own language and version. Therefore, it cannot be wrongly interpreted by the researcher.

- **Anonymity:**

Questionnaire ensures anonymity to its respondents. The respondents have a greater confidence that they will not be identified by anybody for giving a particular view or opinion. They feel more comfortable and free to express their view in this method.

- **Most Flexible Tool for Data Collection:**

Questionnaire is no doubt the most flexible tool in collecting both quantitative and qualitative information.

G. Disadvantages of Questionnaire:

- **Limited Response:**

One of the major limitations of the questionnaire is that it can be applicable only to those respondents who have a considerable amount of education. It can neither be used for illiterate nor for semi-literate persons. The questionnaire quite often fails to cover very busy and preoccupied persons among the respondents, lazy and indifferent type of persons, the type of respondents who need to conceal a lot about themselves, the easy-going and shirkers among the respondents, the persons who have a unreasonable contempt for research and reform and the persons who unnecessarily doubt the research worker's intentions, sincerity, devotion and commitment. These are the people who constitute a very important segment of the respondents to be covered in the collection of data, but they can be seldom caught. Thus questionnaires are hardly appropriate for a larger section of this type of population.

- **Lack of Personal Contact:**

As in case of questionnaire the researcher does not go to the field, he is not able to establish a proper personal relationship with the respondents. If the respondent fails to understand some of the technical terms or he has any doubt, there is nobody to clarify these technical terms or doubts. Even though the researcher tries in the best possible manner to make the questionnaire a simple, precise and convenient one, the aim and objective of the questionnaire can be much better explained personally than through any other means. Without the proper personal contact it is very difficult to motivate the respondent to fill up the questionnaire.

- **Poor Response:**

In case of a mailed questionnaire method, the proportion of return is usually low. The factors which are likely to affect the returns are: the layout of the questionnaire, its size, the organization conducting the research work, the nature of appeal, the kind of respondents chosen for research, inducement for response etc.

- **Unreliability:**

The information collected through questionnaires cannot be said to be very much reliable or valid. If the subject misinterprets a question or gives an incomplete or indefinite response very little can be done to connect such response. As against this, in an interview there is always the possibility of rephrasing questions for further clarification. The questions can be repeated with adequate elaboration if it is so required. But in the questionnaire method there is no opportunity for repeating questions, explaining them or clarifying the doubts for a particular response. Therefore, in it the validity of the respondent's response can hardly be examined. The investigator here is not in a position to observe the gestures and expressions of the respondents. He cannot cross check the inconsistencies or misrepresentation of the replies. So in the questionnaire method, the reliability of responses is very low.

- **Illegibility:**

Illegible handwriting of the respondent sometimes creates much difficulty for the researcher to understand the responses. Sometimes the respondents erase and overwrite too much. These create many difficulties in reading the answers.

- **Incomplete Entries:**

Often most of the respondents fill up the questionnaire form very poorly. They sometimes leave out many questions altogether or fill in such a way that it becomes very difficult on the part of the investigator to follow those responses. Other than this, there may be the problem of language, use of abbreviations and ambiguous terms etc. All these make a questionnaire an incomplete one.

- **Possibility of Manipulated Entries:**

In case of interview the investigator directly interacts with the respondents personally and intensively in a face to face situation. He can judge a respondent, his attitude, understanding of the research topic and, if necessary, can ask some cross questions to correct various errors. So usually the respondent cannot manipulate his answer. But in questionnaires it is very difficult to detect the errors of the respondents. Here the investigator does not have any facility to check the validity and reliability of the information. In the absence of the researcher, the respondents may supply manipulated information.

- **Useless in Depth-Studies:**

In the questionnaire method, it is not possible on the part of the researcher to conduct an intensive or in-depth study of the feelings, reactions and sentiments of the respondents. All these require a healthy interaction of the researcher with the respondents. But in the questionnaire method, the investigator is not present in the field, so nothing can be done to establish rapport with the respondent. Due to this lack of interaction with the respondent, the researcher cannot go into the details of the respondent’s life. So through questionnaire methods one cannot conduct an in-depth study.

- **Response from Improper Representative Section of People:**

The respondents who return the questionnaires may not constitute a representative section of the entire group. Only mere responsible, research minded or those in favor of the issue may prefer to respond. Some of the important sections of the group may totally remain silent. This vitiates the final conclusions and findings.

- **Lack of Rapport with the Subject:**

There are many people who would not like to share any important information unless and until they are impressed about the rationale of the study and personality of the investigator. The questionnaire does not provide for any opportunity to the investigator to establish rapport with the subject and this cannot attract the respondent for a better response.

- **Not Suitable for Delicate Issues:**

Some of the research areas are so delicate, sensitive, intricate and confidential in nature that it becomes difficult to frame questions on them. It is impossible to put down certain delicate issues in writing.

1.3.3 Psychological Test:

A Psychological test is a standardized measure of a sample of a person's behavior that is used to measure the individual differences that exist among people. A psychological test is an objective and standardized measure of an individual's mental and/or behavioral characteristics.

A Psychological test is a systematic procedure for observing a person's behavior or performing, describing it with the aid of a numerical scale or category system. Most tests are used as a way of measuring differences between people or differences in the same person over time. Psychological tests are written, visual, or verbal evaluations administered to assess the cognitive and emotional functioning of children and adults.

A. Need For Psychological Test:

a. Identifies weaknesses and strength
b. Supports individualized lesson plans
c. Enables placement decisions
d. Monitors progress
e. Identifying disabilities
f. Helping the administrative and academic works
g. g. Vocational ability. For children, academic achievement, ability psychological tests may be used as tools in school placement, in determining the presence of a learning disability or a developmental delay in identifying giftedness, or in tracking intellectual development.

It may also be used with teens and young adults to determine vocational ability (e.g., in career counseling). Tests are administered for a wide variety of reasons, from diagnosing psychopathology (e.g., personality disorder, depressive disorder) to screening job candidates. They may be used in an educational setting to determine personality strengths and weaknesses.

B. Major Uses of Tests: - The basic use of tests is to provide information for decision makers.

- Selection or placement
- Diagnosis
- Accountability evaluations
- Judging progress and following trends
- Self- discovery

C. Main Characteristics of a Good Psychological Test: Five main characteristics are-

- **Objectivity**: The test should be free from subjective—judgment regarding the ability, skill, knowledge, trait or potentiality to be measured and evaluated.
- **Reliability**: This refers to the extent to which the obtained results are consistent or reliable. When the test is administered on the same sample for more than once with a reasonable gap of time, a reliable test will yield the same scores. It means the test is trustworthy. There are many methods of testing the reliability of a test.
- **Validity**: It refers to the extent to which the test measures what it intends to measure. For example, when an intelligent test is developed to assess the level of intelligence, it should assess the intelligence of the person, not other factors. Validity explains to us whether the test fulfills the objective of its development. There are many methods to assess validity of a test.
- **Norms**: Norms refer to the average performance of a representative sample on a given test. It gives a picture of the average standard of a particular sample in a particular aspect. Norms are the standard scores, developed by the person who develops the test. The future users of the test can compare their scores with norms to know the level of their sample.
- **Practicability**: The test must be practicable in- time required for completion, the length, number of items or questions, scoring, etc. The test should not be too lengthy and difficult to answer as well as scoring.

D. Different Types of Test:

Psychological tests can be various types; designed to measure different elements of human brain development.

- **Intelligence Tests**: - These measure the level of intelligence present in the individual. It also assesses the person's ability to relate to its foreign environment.

- **Personality Tests:** - These tests measure the type and traits of the individual's personality. These tests are used for clinical purposes.
- **Attitude Tests**: - The individual's attitude towards the environment, other people or places is judged in this kind of test.
- **The Neuro-psychological tests** are usually conducted when an individual has suffered a traumatic stress or injury. To check the proper cognitive functioning of the brain.
- **Achievement tests** are also a type of psychological tests that measure ability to comprehend a specific topic; for example, mathematics.

The above-mentioned tests can either be used as assessments for screening at corporate or educational institutes, or they can be used for clinical purposes to diagnose the issue and then to prescribe the best possible treatment for the psychological problem.

1.3.4 Social Scaling:

"The process of increasing positive social impact to better correspond to the magnitude of the identified social need."

Social Need - The gap between reality and ideal conditions, as defined by human society.

Likert Scale

Likert scales are one of the most commonly used scales in social science research. They offer a simple rating system that is common to surveys of all kinds. The scale is named for the psychologist who created it, Rensis Likert. One common use of the Likert scale is a survey that asks respondents to offer their opinion on something by stating the level to which they agree or disagree. It often looks like this:

a. Strongly agree
b. Agree
c. Neither agree nor disagree
d. Disagree
e. Strongly disagree

Within the scale, the individual items that compose it are called Likert items. To create the scale, each answer choice is assigned a score (for instance, 0-4), and the answers for several Likert items (that measure the same concept) can be added together for each individual to obtain an overall Likert score.

For example, let's say that we're interested in measuring prejudice against women. One method would be to create a series of statements reflecting prejudiced ideas, each with the Likert response categories listed above. For example, some of the statements might be, "Women shouldn't be allowed to vote," or "Women can't drive as well as men." We would then assign each of the response categories a score of 0 to 4 (for example, assign a score of 0 to "strongly disagree," a 1 to "disagree," a 2 to "neither agree or disagree," etc.). The scores for each of the statements would then be totaled for each respondent to create an overall

score of prejudice. If we had five statements and a respondent answered "strongly agree" to each item, his or her overall prejudice score would be 20, indicating a very high degree of prejudice against women.

Semantic Differential Scale:

The semantic differential scale asks respondents to answer a questionnaire and choose between two opposite positions, using qualifiers to bridge the gap between them. For instance, suppose we wanted to get respondents' opinions about a new comedy television show. First decide what dimensions to measure and then find two opposite terms that represent those dimensions.

For example, "enjoyable" and "unenjoyable," "funny" and "not funny," "relatable" and "not relatable." Then create a rating sheet for respondents to indicate how they feel about the television show in each dimension. The questionnaire would look something like this:

	Very Much	Somewhat	Neither	Somewhat	Very Much	
Enjoyable		X				Unenjoyable
Funny					X	Not Funny
Relatable	X					Not relatable

The four types of scales are:

- Nominal Scale.
- Ordinal Scale.
- Interval Scale.
- Ratio Scale.

Nominal Scale:

A nominal scale is the 1st level of measurement scale in which the numbers serve as "tags" or "labels" to classify or identify the objects. A nominal scale usually deals with the non-numeric variables or the numbers that do not have any value.

Characteristics of Nominal Scale:

- A nominal scale variable is classified into two or more categories. In this measurement mechanism, the answer should fall into either of the classes.
- It is qualitative. The numbers are used here to identify the objects.
- The numbers don't define the object characteristics. The only permissible aspect of numbers in the nominal scale is "counting."

Example:

An example of a nominal scale measurement is given below:

What is your gender?

M- Male

F- Female

Here, the variables are used as tags, and the answer to this question should be either M or F.

Ordinal Scale:

The ordinal scale is the 2nd level of measurement that reports the ordering and ranking of data without establishing the degree of variation between them. Ordinal represents the "order." Ordinal data is known as qualitative data or categorical data. It can be grouped, named and also ranked.

Characteristics of the Ordinal Scale

- The ordinal scale shows the relative ranking of the variables
- It identifies and describes the magnitude of a variable
- Along with the information provided by the nominal scale, ordinal scales give the rankings of those variables
- The interval properties are not known
- The surveyors can quickly analyse the degree of agreement concerning the identified order of variables

Example:

- Ranking of school students – 1st, 2nd, 3rd, etc.
- Ratings in restaurants
- Evaluating the frequency of occurrences
- Very often
- Often
- Not often
- Not at all
- Assessing the degree of agreement
- Totally agree
- Agree
- Neutral
- Disagree
- Totally disagree

Interval Scale:

The interval scale is the 3rd level of measurement scale. It is defined as a quantitative measurement scale in which the difference between the two variables is meaningful. In other words, the variables are measured in an exact manner, not as in a relative way in which the presence of zero is arbitrary.

Characteristics of Interval Scale:

- The interval scale is quantitative as it can quantify the difference between the values
- It allows calculating the mean and median of the variables
- To understand the difference between the variables, you can subtract the values between the variables
- The interval scale is the preferred scale in Statistics as it helps to assign any numerical values to arbitrary assessment such as feelings, calendar types, etc.

Example:

- Likert Scale
- Net Promoter Score (NPS)
- Bipolar Matrix Table

Ratio Scale:

The ratio scale is the 4th level of measurement scale, which is quantitative. It is a type of variable measurement scale. It allows researchers to compare the differences or intervals. The ratio scale has a unique feature. It possesses the character of the origin or zero points.

Characteristics of Ratio Scale:

- Ratio scale has a feature of absolute zero
- It doesn't have negative numbers, because of its zero-point feature
- It affords unique opportunities for statistical analysis. The variables can be orderly added, subtracted, multiplied, divided. Mean, median, and mode can be calculated using the ratio scale.
- Ratio scale has unique and useful properties. One such feature is that it allows unit conversions like kilogram – calories, gram – calories, etc.

Example:

An example of a ratio scale is:

What is your weight in Kgs?

- Less than 55 kgs
- 55 – 75 kgs
- 76 – 85 kgs

- 86 – 95 kgs
- More than 95 kgs

1.3.5 Implementation:

After finalizing the tool of data collection, following steps are identified to be followed for effective research work.

a. Step 1: Identify Goals and Performers.
b. Step 2: Create Investigative Questions.
c. Step 3: Develop a Data Collection Plan.
d. Step 4: Create Data Collection Instruments.
e. Step 5: Collect Data.
f. Step 6: Analyze Data and Identify Gaps.
g. Step 7: Summarize Findings & Prioritize Actions.

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