

DATA COLLECTION INSTRUMENTS

Designing Questionnaires

OBJECTIVES/RATIONALE

Accurate data collection is critical to conducting scientific research. The student will collect, organize, and evaluate qualitative and quantitative data.

TEKS: 121.12 7A, 7B, 7C, 7D

TAKS ELA 1, 6
Mathematics 1, 10
Science 1

KEY POINTS

Methods of data collection include: observation, questioning, measuring, or a combination of these. The sampling process is crucial in the research design, but the method by which the data is collected varies. Observation is the basic method of collecting data. When the phenomenon being studied cannot be observed, the research must ask questions, either by personal interviews or by questionnaires. Measuring is the set of rules that assigns numbers or values to subjects.

An experiment observes and measures two groups (experimental and control). The survey involves questioning and measurement, and the record review requires asking questions of data. The researcher may observe, question, or measure – the most frequently used method - and they may use instruments to help perform these measures. In addition, classification is a means of data collection. This method required that categories be developed into which observations will fall. A data sheet containing these categories enables the researcher to fill in the information quickly and efficiently.

To collect data using a specific method, careful description of the data collection instrument is required. A precise description of the data collection procedure is vital for consistent and reliable data. Keep the instrument as short as possible. A short, to-the-point document will yield a much higher rate of return than one that is lengthy. A well-designed questionnaire is kept to one side of a sheet of paper.

For laboratory experiments, establish a clear labeling procedure, check any equipment for proper maintenance, and make use of duplicate or multiple trials. Collect only the data required by the study. Design data forms that are pre-coded, self-explanatory, clearly formatted with boxes for data entry, esthetic and easy to read, and every page should be labeled with date and title. Appearance and readability are important. If the instrument looks sloppy and unorganized, people may be careless in filling it out. Make sure that each item responds to only one idea or question. Be precise in your choice of words.

All entries should be legible and there should be no missing data entries. If a computer program is being utilized, consider programming to flag missing entries. Also, check with the person who will be doing the data processing for ease of data entry. A poorly designed questionnaire can make data entry difficult and lead to errors.

Always give a due date. Asking for the form “as soon as possible” may result in you never receiving it! Make sure the subjects know how, when, and where to return your questionnaire.

Once the data collection phase is completed, the phase of data analysis and interpretation begins.

DESIGNING A QUESTIONNAIRE

Questionnaires are utilized by all areas of the healthcare industry. If designed properly, they are considered to be scientific measuring instruments. It is important to carefully think through the purpose of the research before rushing into the field with a questionnaire. Your questionnaire should be more than a mere inventory of what you would like to know. Consideration must be given to some of the problems involved in what you hope to get and to the best method of gathering that information.

In the laboratory, instruments used for measuring are thoroughly tested before being utilized. Likewise, a good questionnaire should be tested prior to using in the field. There are four items to consider before designing a questionnaire:

1)*Hypothesis*: What hypothesis is being tested?

Can the Hypothesis be tested by the questions being asked?

2)*Sample*: What is the population from which the sample will be taken?

Sample selection is a critical stage of planning your study. The questionnaire should be appropriate for the subjects being studied.

3)*Questions*: What kind and how many questions should be asked?

Questions should be concise - without ambiguities.

4)*Administration*: How will the instrument be administered?

- A. Yes-No....This simplifies tabulation, but does not give the subject a wide range of choice. Adding a *maybe* or *do not understand* choice may be appropriate here.
- B. Multiple Choice....This allows for some scaling of answer choices. However, it is difficult to include all possible responses as choices.
Example: How many times have you seen the patient for this problem in the last year?
___None ___ 1-4 times ___ more than 4 times
Also, beware of the pitfall of “leading” your target population in a certain direction by the way you state a question.
- C. Numerical Answers/Likert Scale....Provides a range of responses, usually 1 to 4 or 5, indicating “strongly disagree” to “strongly agree”. Variables that are measures on a continuous scale, like weight, should be obtained in the measured units. Be sure to specify units you desire. If necessary, the measurements can be grouped later.

Example: What is your current weight? _____lbs.

- D. Open-ended....The subjects are expected to answer using their own language. You may receive a wide range of responses. These questions are time-consuming and very difficult to analyze. They can yield valuable information but in most cases, should be limited to two or three.

Administering a Questionnaire

When mailing a questionnaire:

1. Include a cover letter that gives an unthreatening appeal for cooperation.
2. Enclose a stamped, self-addressed envelope or email address.
3. Devise a method for identifying non-respondents. People are often afraid to be identified. So don't ask for any information that would single them out of the group (such as name). Use color coding of forms for various groups. For example-student's forms are green and teacher's forms are blue.

Interviewers administering a questionnaire must:

1. Be trained and must employ the same techniques.
2. Be presentable and unthreatening.
3. Adhere to the questions and written statements explaining difficult questions.

Pre-testing the Questionnaire

1. The pre-test group should be a random sample from the population you are going to study.
2. The pre-test should match the final test. Consider it a dress rehearsal!
3. The results of the pre-test can be used to determine whether the subjects understand each question. You may be amazed to find out that what was clear to you is confusing to someone else. This will help you to identify and correct possible problems before your document is utilized for data collection.

Sources of Error

Sampling Error – error that occurs because data was gathered from only the responsive portion of the population.

Conceptual Error – error due to survey instrument design and/or specifications, such as target population not clearly defined and therefore sample is not representative of desired target population.

Non-response Error – error due to not covering, lack of respondent cooperation or recall, collecting agent omission, illegible responses, or lost records.

Measurement Process Error – badly worded questions, poor interviewer who influences the responses of the subject.

Processing and Analysis Error – coding error, computation error, presentation error, or interpretation error.

ACTIVITIES

Students will collect questionnaires from various sources to share with the class. The class will then discuss and critique the questionnaires for design, method of administration, and possible sources of error.

MATERIALS

Questionnaires from various sources

ASSESSMENT

Class Participation Rubric