

Ideas for Developing and Testing Questionnaires/Instruments

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Background

Questionnaires are the most frequently used data collection method in educational and evaluation research. Sixty-four percent of 748 research studies conducted in agricultural education used questionnaires for collecting data (Radhakrishna, Leite, and Baggett, 2003). Further, Radhakrishna et al., found that a third of the research did not report procedures for establishing validity (31%) and reliability (33%). Development of a valid and reliable questionnaire involves several steps and takes considerable amount of time. Need exists to develop systematic procedures for developing and testing questionnaires. The overall purpose of this poster abstract is to describe and walk-through the sequential steps involved in the development and testing of questionnaires used for collecting data. It is hoped that this abstract contributes to understanding of the process involved in questionnaire design, development, and testing.

Steps

As indicated in Figure 1, questionnaire development and testing involves five sequential steps. Each step depends on fine tuning and testing of previous steps and is completed before the next step. Each of the five steps is briefly described below.

Step 1 – Background

In this initial step, the purpose, objectives, research questions, and hypothesis of the proposed research study are examined. Who the audience is, their background, especially their educational/readability levels, access, and the process used to select the respondents (sample vs. population) are also examined. In step 1, a thorough understanding of the problem through literature search and readings is a must. Good preparation and understanding of step1 provides a solid basis for initiating step 2.

Step 2 – Questionnaire Conceptualization

Once the researcher has a thorough understanding of the problem and has clearly outlined the objectives, research questions, and hypothesis for the study, the next step is to generate statements/questions for the questionnaire. In this step, researcher translates content (from literature/theoretical framework) into questions/statements. In addition, a link between the objectives of the study and translation of the content is established. For example the researcher must indicate what the questionnaire is measuring, that is, knowledge, attitudes, perceptions, opinions, recalling facts, behavior change, etc. Major variables (independent, dependent, and moderator variables) are identified and defined in this step.

Step 3 – Format and Data Analysis

In step 3, the focus is on: scales of measurement, questionnaire layout, format, writing questions, question ordering, font size, front and back cover and proposed data analysis. Scales are devices used to quantify subject’s response on a particular variable. It is very important to keep in mind the scale of measurement and analysis of data. There is a relationship between the level of measurement and the appropriateness of data analysis. For example, if you want to use ANOVA, make sure that the independent variable is measured on a nominal scale (yes/no) with two or more levels and the dependent variable is measured on a interval/ratio scale (strongly agree to strongly disagree).

Step 4 – Establishing Validity

As a result of step 3 a draft questionnaire is ready for establishing validity. Validity is the amount of systematic or built in error in measurement. Validity is established using a panel of experts and a field test. Which type of validity (content, construct, criterion, and face) to use depends on the objectives of the study. The following questions are addressed in establishing validity: 1) is the questionnaire valid? Does it represent the content? Is it appropriate for the sample/population? And does it look like a questionnaire? Addressing these questions coupled with carrying out a readability test enhances questionnaire validity. Approval from the Institutional Review Board (IRB) should be obtained in this step. After IRB approval, the next step is to conduct a field test using subjects not included in the sample. Make changes, as appropriate, based on expert opinion and field test. Now the questionnaire is ready for pilot test.

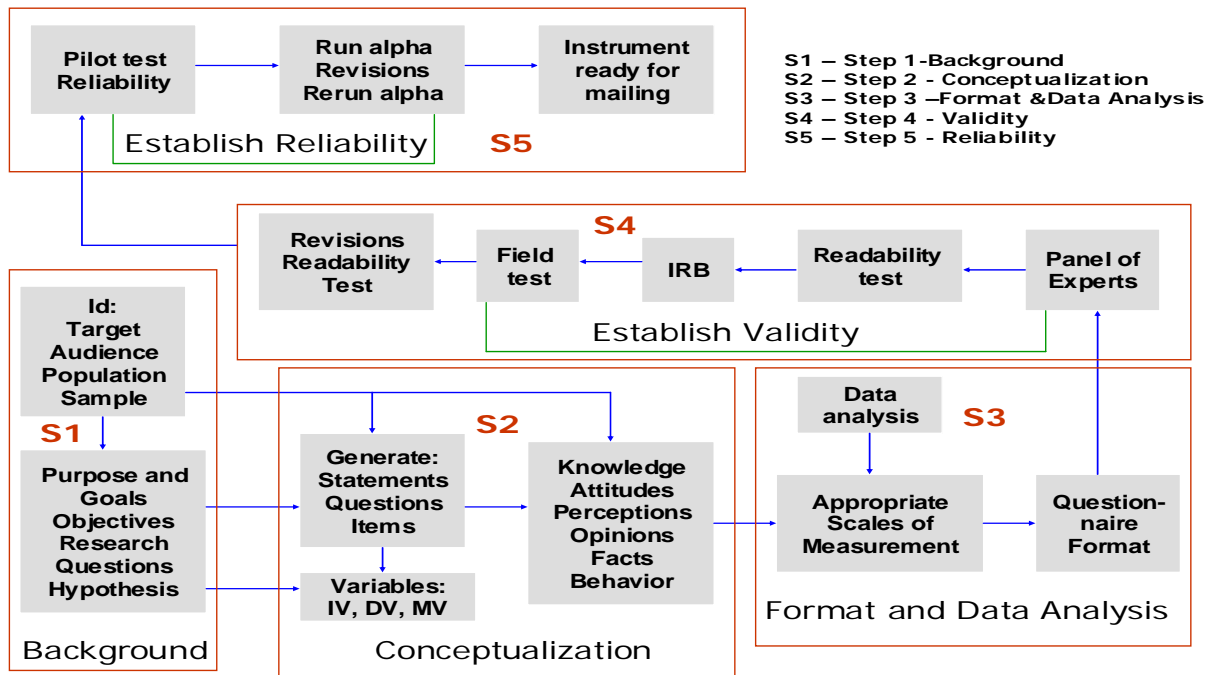


Figure 1: Sequence for Instrument/Questionnaire Development

Step 5 – Establishing Reliability

In this final step, reliability of the questionnaire using a pilot test is carried out. Reliability refers to random error in measurement. It indicates the accuracy or precision of the measuring instrument. The use of reliability types (test-retest, split half, alternate form, internal consistency) depends on the nature of data. Reliability is established using a pilot test by collecting data from 20-30 subjects not included in the sample. Then, the data collected is entered into SPSS for analysis. Two key pieces of information from the analysis are important in establishing reliability. These are “correlation matrix” and “view if alpha item is deleted column.” Make sure that items that have 0s, 1s and negatives are eliminated. Then view alpha if item deleted column, if alpha can be raised by deletion of items. Delete items that substantially improve the reliability.

Conclusions

Systematic development of the questionnaire for data collection is very important to reduce measurement errors (questionnaire content, questionnaire design and format, and respondent). Careful attention to detail and understanding of the process (five steps) involved in developing a survey are of immense value to graduate students and faculty alike. Graduate students and faculty, at the minimum, should follow the five steps to develop a valid and reliable questionnaire to enhance the quality of a research study.