

Basic Principles of Questionnaire Design

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ABSTRACT

Thirty basic principles of questionnaire design are presented covering the content, wording, format, and testing of questionnaires. The extent to which the questionnaire is an integral part of the survey is emphasized as is consideration of its relationship with other aspects of survey design.

KEY WORDS: Survey; Questionnaire; Methodology.

1. INTRODUCTION

Most surveys make use of a questionnaire which is to be completed by either a respondent or an official representative of a survey organization (by personal contact or telephone). Since the questionnaire is the means by which the objectives of a survey are transformed into measurable variables, successful achievement of those objectives requires an effective questionnaire. In addition, the questionnaire may help structure, standardize, and control the data collection process so that the required information is obtained in a satisfactory manner. Effective questionnaire design is a combination of basic principles and common sense, adapted to the particular needs of each individual survey.

Although thirty separate principles of questionnaire design are presented, they are not intended to be seen as independent of each other or of the survey environment in which they operate. The extent to which the questionnaire is an integral part of the survey process cannot be sufficiently emphasized. As the questionnaire *cannot* be designed in isolation from the various other aspects of the survey, the reader is also advised to consider *during* questionnaire design its relationship with survey objectives, population, data collection, coding and data capture, editing, imputation, confidentiality, and testing.

Since this paper is not intended to be a comprehensive discussion of either survey or questionnaire design, alert readers, depending on their own perspectives of the various aspects of a survey, may identify omissions in the principles or may wish to exclude particular principles as more appropriate to a survey component other than questionnaire design.

The basic principles of questionnaire design as presented cover the content, wording, format, and testing of questionnaires. The questionnaire has a major impact on whether or not the survey objectives are met. Unlike other major survey components such as sample design or data processing procedures, the questionnaire directly involves the respondent. Therefore, it is essential that the content, wording, and format ensure the collection of reliable, valid, and relevant information from the respondent.

The author recognizes that although some of the principles appear obvious when stated, they are usually not so in practice. Also, some of the principles are measurable; some are not.

In the principles which follow, the term *questionnaire* is consistently used to refer to the various types of forms used to obtain information. In the literature and in practice, distinctions are often made among:

(a) a questionnaire (completed by a respondent);

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- (b) an interview schedule (completed by an interviewer);
- (c) an administrative form (completed by a respondent or an official representative of the survey organization);
- (d) a form used to record observations or measurements (completed by an official representative of the survey organization);
- (e) a form used when transcribing information from existing administrative records (completed by an official representative of the survey organization).

For simplicity, the term *questionnaire* is used herein to represent all such forms. In addition, the term *questionnaire item* is used to represent the particular question or statement requesting information, including the response categories or space for response.

The term *survey* is used generally to represent any data collection activity, including sample surveys, censuses, and administrative data collection.

2. CONTENT

1. All questionnaire items should be directly related to the objectives and uses of the survey.

It is a reasonable goal that the collection of information be designed to minimize response burden by techniques such as reducing the number of questions. Exclusion of questionnaire items only remotely related to the objectives and uses of the survey is a means of satisfying this goal.

In addition, questionnaire items that ask for irrelevant information unnecessarily contribute to the overall length of a questionnaire and may provoke suspicion in respondents, factors which may lead to increased non-response rates (a possible source of bias), to a poorer quality of data because of fatigue or lack of concentration by interviewers or respondents, and to increased costs, both financial and temporal, to the survey sponsor and to the respondents.

For the questionnaire designer, the very act of relating each questionnaire item to the survey objectives and uses helps ensure that these objectives and uses are well defined and will indeed be satisfied by the questionnaire.

2. If a questionnaire contains items that, although relevant to the survey, may not appear so to respondents, then an explanation of the reason for their inclusion should be provided to respondents.

Classification variables such as age, sex, marital status, size of organization, number of employees and variables such as name, address, and telephone number (used for follow-up procedures or for editing purposes) are possible examples where an explanation to respondents should be considered for inclusion (at least at a general level).

3. Only those questionnaire items for which responses can be provided easily and with sufficient reliability should be included.

Where information is requested through recall by respondents, the events should be sufficiently recent or familiar to the respondents; where the request can be satisfied from available records maintained by respondents, the effort (including both time and cost) required to obtain the information should not exceed the benefits to be gained by acquisition of the information.

Because of potential definitional ambiguities, increased response burden, and processing errors, it may be advisable that respondents not be asked to process information to complete a questionnaire item. It may be easier and more accurate for respondents to be asked for the specific information already available to them, to be processed later by the survey organization.

4. Respondents should not be asked questionnaire items for which they cannot be expected to provide any response.

Questionnaire items should not presume that the respondent has knowledge or awareness of a specific topic or engages in a particular activity. Filter questions can be used to exclude a respondent from a subsequent questionnaire item or sequence of items if those items are irrelevant because of the respondent's own particular characteristics, circumstances, or opinions.

Should respondents encounter many irrelevant items, they may feel that the survey questionnaire had been given to them in error. This could contribute to non-response or to poor relations with respondents.

The use of a filter question also serves to identify clearly whether or not a respondent is required to answer a subsequent questionnaire item or sequence of items. This is useful during survey processing and subsequent analysis. If a response to a questionnaire item is blank, it may be difficult to distinguish between the situation in which the reason for the blank is non-response (a refusal or an accidental omission), and that in which it is because the question does not apply (in the case of a numerical answer, the question may seem not to apply when the answer is legitimately zero). A filter question helps resolve this problem by identifying which respondents should have answered the questionnaire item.

Complex skip patterns, however, should be avoided, especially for those questionnaires completed by respondents themselves. Also, the number of filter questions should be minimized.

For items requiring a numerical answer, an alternative to a filter question is the inclusion of a *None* category.

3. WORDING

1. The phrasing of a questionnaire item should be appropriate to the respondent.

If a respondent does not understand a questionnaire item, it is probable that the response to that item will be inaccurate or not be given. Words, phraseology, and sentence structure familiar and appropriate to those providing the information should be used.

Abbreviations should be avoided unless they are understood by respondents.

2. Where there is sufficient demand, questionnaires should be translated into other languages.

Steps should be taken to ensure that the translated version corresponds adequately to the original version with respect to the intended meaning.

3. The questionnaire designer should choose the type(s) of questionnaire items most appropriate to obtain the required information while minimizing the response error and response burden in obtaining that information.

The types of questionnaire items for consideration are the open-response or free-answer type, the closed-response or fixed-answer type, and the fill-in-the-blanks type. Closed-response types are those items for which answer categories are provided. Fill-in-the-blanks types, although they appear to be open-response because no answer categories are explicitly provided,

are actually implicitly closed from the respondent's point of view in that the choice of answers is usually limited to a number, a day of the week, a province, etc.

Generally, closed-response questions entail less respondent and/or interviewer burden, since they do not require respondents to formulate and answer in their own words nor do the answers have to be recorded verbatim.

4. When a decision among two to more well-defined alternatives is required, a closed-response or fill-in-the-blanks type of questionnaire item should be used.

When all the alternatives are too numerous to be listed, then the use of the category *other* to represent a number of infrequently occurring responses, the use of an open-response or fill-in-the-blanks type of questionnaire item, or the collapsing of alternatives into fewer categories is recommended. In fact, it may be appropriate to use a fill-in-the-blanks type, where the response categories and numerical codes are included in a separate instruction booklet accompanying the questionnaire. In business, agriculture and institutional surveys, fill-in-the-blanks types of items are frequently used for questions that require a numerical response. The choice and number of categories in a closed-response type depends on the complexity of interpretation of the concept, the uses to which the data will be put, and the prior information available to the questionnaire designer.

5. When the alternatives to a question are not well-defined, an open-response type of questionnaire item should be used.

Open-response types of questionnaire items are frequently used in preliminary research or exploratory studies to generate specific hypotheses and to structure items for subsequent questionnaires. The open-response type of questionnaire item may also be used as a means of probing for additional or qualifying information, for purposes of verification of other questionnaire items, for use in interpreting data, as a change of pace, or as an introduction to a new topic.

6. If ease, timeliness, and cost of processing the data for capture are important considerations, closed-response types of questionnaire items should be used.

Open-response types of questionnaire items require coding of the information provided, an operation which can be both costly and time-consuming and is also subject to errors of interpretation and procedure.

In addition, with open-response types of questionnaire items, no specific frame of reference is provided, leading to the choice of varying frames of reference on the part of respondents. These varying frames of reference and the provision of varying amounts of information by respondents cause difficulty in the recording, coding and analysis of responses. On the other hand, a closed response provides a specific frame of reference, which although avoiding the above problems, may artificially induce a response. This is especially true when the respondent has little or no information or opinion about a particular topic. The questionnaire designer must therefore be aware of the possible frames of reference of respondents before choosing a type of questionnaire item.

Once the type and wording of a questionnaire item have been decided upon, restrictions are placed on the uses to which the information can be put, the specific hypotheses which can be tested and the analyses that will be applied to the item. This implies that the determination of objectives, uses, hypothesis testing and analyses is a prerequisite to the final version of the item. This determination does not preclude that the data will suggest additional analyses and uses within the limits imposed by the questionnaire items themselves.

In addition to the above considerations, the past experience of the questionnaire designer will contribute to the choice of suitable type(s) of questionnaire items in particular situations.

7. Response categories for closed-response types of questionnaire items should be non-overlapping and exhaustive (that is, mutually exclusive and comprehensive).

The response categories of a particular questionnaire item should be distinct and include all possibilities.

The distinctiveness of response categories does not preclude the applicability of more than one response to a particular questionnaire item. In such a case, a note such as *check as many as apply* should be included as part of the question.

Where response categories are such that only one response is to be provided to a particular questionnaire item, a note such as *check one item only* should be included as part of the question (except in the most obvious cases, for example, where the response categories are *Yes* and *No*). In those cases where more than one response can be applicable but where the designer wishes that only one item be checked in order to restrict responses, a note such as *check the most appropriate item* should be provided.

8. The units of response should be specified.

Either the units of response (e.g., kilograms, tons, per cent, hours per week) should be included in the questionnaire item or the respondent should be asked to specify them. Otherwise, there may be ambiguity as to which units were actually used.

9. Standardized concepts and definitions should be used.

To facilitate comparison of survey data with other sources of information (publications, other surveys) and to maximize the usefulness of the data (including secondary analysis), standardized (commonly understood and used) definitions should be used where they exist, and are well-defined, appropriate and up-to-date. Statistics Canada publishes standards related to occupational classes, industrial classes, commodities, geography and specific social concepts. In addition, Census concepts and categories are frequently used as standards.

10. The wording of questionnaire items should be specific, definitive, consistent, brief, simple and self-explanatory.

Survey concepts and terms that are new to respondents or subject to misinterpretation should be explained, defined, or avoided. To ensure consistent interpretation, the proper frame of reference (e.g., time reference, location, category of expenditure) should be provided. If consistency is required (e.g., different time references for different items), the change should be highlighted in the questionnaire.

Where several words can be used interchangeably, one of these should be selected and used throughout the questionnaire. If a synonym of a word already encountered is used in its place, respondents and others may assume that a different meaning is intended.

11. Double-barreled questions should be avoided.

A double-barreled question allows the respondent to make only one response although it is actually two questions in one. From the response, it is not possible to discern which

of the two ideas was answered or whether both were answered. The two issues should be asked separately except in specific circumstances where two issues necessarily have to be asked together to convey the proper meaning. In such a case, it should be made clear to respondents that the two issues are both to be considered together.

12. Leading questionnaire items should be avoided.

A leading questionnaire item is one that is worded or formatted in such a way as to induce a respondent to choose a particular alternative or set of alternatives.

Some questions can be considered to be leading if they present options that may be perceived by respondents as socially unacceptable without an assurance that the respondent is made to feel that there would be no stigma attached to their response.

In attitudinal surveys, two basic principles have evolved to reduce (but not necessarily eliminate) response bias. The distribution of alternative answers should balance to provide approximately as many positive answers as negative to avoid leading respondents in one direction. Secondly, where there exists a series of items that have the same response alternatives, the sequence of items should either contain a mixture of positive and negative statements, be broken up, or be presented in a varied order to reduce the incidence of respondents answering in the same manner throughout the sequence (even though it may be inappropriate), without thinking very carefully about the particular responses.

4. FORMAT

1. Every questionnaire or questionnaire package should contain explanatory introductory material.
2. The introductory material should state the title of the survey, the name(s) of the sponsoring institution(s), and the purposes(s) of the survey.
3. An assurance to respondents of the confidentiality of the data that they provide should be considered.
4. The name (if appropriate) and telephone number or postal address of a contact within the sponsoring institution(s) should be included on the questionnaire in order that respondents may obtain additional information related to the survey, should they require it.

Generally, the introductory material may be in the form of a letter or brochure sent to the respondent; it might be a prepared statement made by an interviewer; or it can appear on the questionnaire itself. The introduction contains essential background information to respondents for the purposes of identification, legitimacy and notification of legal rights (if applicable).

5. Suitable identification should appear on the questionnaire.

For the purposes of estimation, field control, linkage with other records or follow-up on non-respondents, appropriate identification (numerical or otherwise) should be included on the questionnaire.

6. Questionnaire items and pages should be numbered.

To facilitate administration by interviewers, completion by respondents, and coding operations and instructions, questionnaire items and pages should be numbered consecutively (using either letters or numbers) throughout the questionnaire. If questions are written on

both sides of a page, an instruction (e.g., *over*) should appear at the bottom of the first side to ensure that the questions on the second side are completed.

7. The print on the questionnaire should be such that it can be easily read by the average respondent.

The person completing the questionnaire must be considered when determining the size of the type face (for example, small print could cause problems for those with poor eyesight) and the colours and contrasts of paper and type to be used. It is usually advisable to have different type face (size or type of characters) used for questions and instructions so that they can be easily distinguished.

8. Instructions for completion should be included on or with the questionnaire.

To help ensure that the questionnaire is completed properly by respondents, interviewers or other officials, brief but clear instructions should appear on or with the questionnaire (e.g., in an interviewers' manual or an instruction manual). However, questionnaire items should be as self-explanatory as possible to avoid complex sets of instructions.

For questionnaires being read by an optical character reader, clear instructions should be provided to help ensure their proper completion.

Instructions to respondents or interviewers for skipping items following filter questions should be sufficiently obvious and easy to follow. The use of arrows and directions may be appropriate. Complex skip patterns should be avoided, especially for questionnaires completed by respondents themselves.

9. The instructions for return procedures should be included on the questionnaire.

For a questionnaire which is to be returned by mail, the name and address of the person (or organization) to whom it is to be returned should be included on the questionnaire itself. Introductory letters and return envelopes can easily be mislaid or separated from the main body of the questionnaire.

The deadline by which respondents are to return completed questionnaires should also be stated.

For a questionnaire which is to be picked up by a field representative, space for the name and telephone number or postal address where the representative can be contacted and the date and approximate time of pick-up should be included on the questionnaire.

10. The numerical fields and codes used for data capture purposes should appear on the questionnaire (when capture is to be directly from the questionnaire).

When appropriate, data may be captured more quickly with fewer errors directly from the questionnaire itself. In such a case, the numerical fields and codes should be easily read by those performing the data capture but should not be a distraction to the respondent, interviewer or other official completing the questionnaire.

When data are to be coded before data capture, the coding boxes may appear on the questionnaire or on a separate sheet. When coding boxes do appear on the questionnaire, they should be clearly distinguished from answer boxes, perhaps with the *Office Use Only* designation or through appropriate shading.

Coding and data capture are often considered as steps that follow questionnaire design. It is essential for efficient implementation that they be considered during questionnaire design.

11. The format of answer spaces should be consistent throughout the questionnaire, with sufficient spacing for purposes of readability and accommodation of the responses to the questionnaire items.

Consistency of layout for response facilitates the task of a respondent, interviewer or official and aids in reducing error caused by inadvertent omission of a questionnaire item, an incorrect response, or a transposition of responses.

It may be useful to use different shapes for *check-off* type answers and numerical answers. One convention sometimes used is circles for the former and boxes for the latter.

There should be generous spacing on the questionnaire: to facilitate administration; to make the questionnaire more attractive and readable; and to provide the respondent, interviewer or official with sufficient space for the response to the questionnaire item.

12. Questionnaire items should be sequenced in a logical order for ease of completion and to provide the proper frame of reference.

The sequence of questionnaire items should appear logical to the respondent (a logic that may be different from that of the questionnaire designer), with questionnaire items related to one another grouped together. One sometimes recommended method is to have questions proceed from the most general questions to the most specific. Question ordering should try to anticipate the order in which respondents will supply information. The questionnaire designer should recognize that a question may prompt an answer not only to that question but also to another question which (hopefully) follows very shortly.

Transitions between sections of questions should be smooth. Section headings or introductory statements to sections should be used. For questionnaires used in transcription from other documents, a logical sequence would be that of the source document.

In attitudinal surveys, the questionnaire designer should avoid conditioning respondents in the early questioning to a frame of reference which could bias responses to later questions. For example, questionnaire items regarding the awareness of a concept should precede any other mention of that concept. Sensitive questions should be placed within the context of related questions so as to justify their inclusion as much as possible and desensitize the questions somewhat.

13. The final version of the questionnaire should contain no typographical or grammatical errors.

The inclusion of errors on the questionnaire may have an adverse effect on data quality in that the questionnaire may not be treated seriously or may be misunderstood by those completing it. In addition, errors may contribute negatively to the image of the survey organization in the eyes of the public.

5. TESTING

1. Questionnaires administered for the first time or containing substantial modifications should be tested prior to their use as a collection document.

Just because all principles described in the previous principles have been followed, there is no guarantee that the proposed questionnaire will fully satisfy the objectives of the survey no matter how conscientious the researcher has been in designing the questionnaire. There are almost always unforeseen problems that occur in the administration of a questionnaire.

As a result, it is essential that a pretest of the questionnaire be implemented for all new surveys and for already existing surveys on which substantial modifications have been made in order to determine whether the objectives are likely to be met by the proposed questionnaire.

Some aspects of the questionnaire that the designer may test are the following: the wording, sequence and layout of the questionnaire to determine whether the questions and their flow are understood by respondents and interviewers; the necessity for inclusion of particular questions; the choice of types of questions; the use of specialized questioning techniques such as ranking or rating questions; the structure and definition of response categories; the degree of usage of the "other" category in questions; the ease of administration of the questionnaire; the time to administer various sections of the questionnaire; translation of the questionnaire; the possibility of bias in the questions; the nature of ethnic, regional or linguistic differences; the reasonableness of the questionnaire with respect to its demands on the respondent; the suitability of the questionnaire for measuring the concepts on which measurement is required; letters of introduction or introductory procedures; and the suitability of the method of collection.

A pretest should be done on at least a small sample of respondents (usually twenty to thirty) from the target population. It is preferable that the respondents be selected from the various subpopulations of the target population where differences or problems are likely to occur. Possible variables for definition of the test subpopulations are geographic region, educational background, age, sex, language, size of firm and type of industry. Depending on the particular purposes of the pretest, either a probability or a non-probability sampling scheme may be required for the selection of respondents, although in most cases, the latter is employed. One possibility is to use a focus group discussion of the questionnaire as a part of the pretest procedure.

The method of collection used for the pretest should be identical to that planned for the main survey. However, a personal interview is recommended for at least a portion of the pretest respondents so that the interviewer can then record the respondents' reactions, both verbal and non-verbal, as well as their own suggestions and impressions. After each test interview, the interviewer can discuss difficulties that the respondent had, the interpretation of questions and response categories, and so on. These difficulties can then be discussed with the designer of the questionnaire, for example, in the context of a meeting among the questionnaire designer and the pretest interviewers to debrief them on the interviews. For some pretests, it may be preferable to use experienced, skilled interviewers in order to maximize the usefulness of the pretest.

The pretest is an often-neglected procedure. It will almost always suggest improvements or will at least give the designer some assurance that the questionnaire used in the main survey, a much more expensive proposition, will likely proceed fairly efficiently. Of course, there is never any guarantee that all problems will be solved, but most major ones should be. A pretest need not be expensive and need not require a great deal of time for implementation and is recommended for all new or modified questionnaires.

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