Users' Guides to Human Factors and Ergonomics Methods

Questionnaire Design:

How to Ask the Right Questions of the Right People at the Right Time to Get the Information You Need

By William F. Moroney and Joyce A. Cameron

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Preface

Anyone can write a questionnaire. To this commonly held belief we add the caveat, **but not necessarily well**. Our goal is to help you eliminate a respondent's reaction such as "Huh…What's this about?" "What are they asking me to do?" "Why are they asking *me*?" Why are they asking me about this topic?" To help you avoid these types of reactions, we provide a strategy for designing precise, comprehensible questionnaires that ask better questions—and ask questions better—by

- asking the right question
- of the right person
- at the right time
- while using an appropriate data collection process to get the data or information you need.

We know that there is no single recipe for designing questionnaires. But after reading this book, you'll be able to follow a systematic design process that will increase your success in developing quality questionnaires that meet your own unique requirements. Our objective is to make the steps that are implicit in the questionnaire design process explicit and readily accessible. Therefore, this manual is designed to be read in a linear fashion and used as a "guide at your side." However, readers with specific information needs can choose to go directly to the desired information and proceed from there.

In Chapter 1 we offer an overview of the challenges inherent in questionnaire design and development, as well as information about the structure and content of this manual. Chapter 2 introduces the idea of the questionnaire as a conversation. Chapters 3 and 4 outline the specific steps in the questionnaire design and development process. Chapters 5, 6, and 7 furnish guidance regarding writing questions, selecting response options, and testing and evaluating your nearly completed questionnaire. Chapter 8 provides six maxims that form the core of our guidance on designing and developing a quality questionnaire.

The supplemental Web site (https://sites.google.com/view/questionnaires-how-to) addresses questions frequently asked by questionnaire designers and developers. There we also provide a case study including examples of revising problematic questions, offer reproducible forms and templates, and supply links

to tools and sources that you may find useful when designing and developing your questionnaire.

Acknowledgments

We would be remiss if we did not recognize the contributions and encouragement of several individuals and express our gratitude to them. Our editor, Frank Durso, a professor in the School of Psychology at Georgia Tech, and eight anonymous reviewers contributed greatly to the quality of the book.

Norman Fogel, PhD, professor emeritus at the University of Dayton in political science, used his experience in research methods and as former director of the university's Survey Research Center to improve the quality and flow of our text. Jerry Timbrook, a PhD student specializing in survey methods within the Sociology Department at the University of Nebraska-Lincoln, reviewed parts of this book and developed Section 7.4.2 on computer-based evaluation. We also appreciate the support of Alvah Bittner, PhD, of Bittner Associates, and David Biers, PhD, professor emeritus from the University of Dayton, who reviewed our thinking on survey methodology and statistical issues.

Finally, we also acknowledge the support of friends and family. Bill acknowledges his wife, Kathy, for her support, encouragement, and sacrifices. In particular, he recognizes her flexibility in juggling schedules to accommodate the writing of this book. He also acknowledges the support and patience of his children and their families for those occasions when he was visiting and writing. (Internet access is a mixed blessing.) Joyce acknowledges the support of friends who were understanding and supportive of the time and effort needed to complete this book.

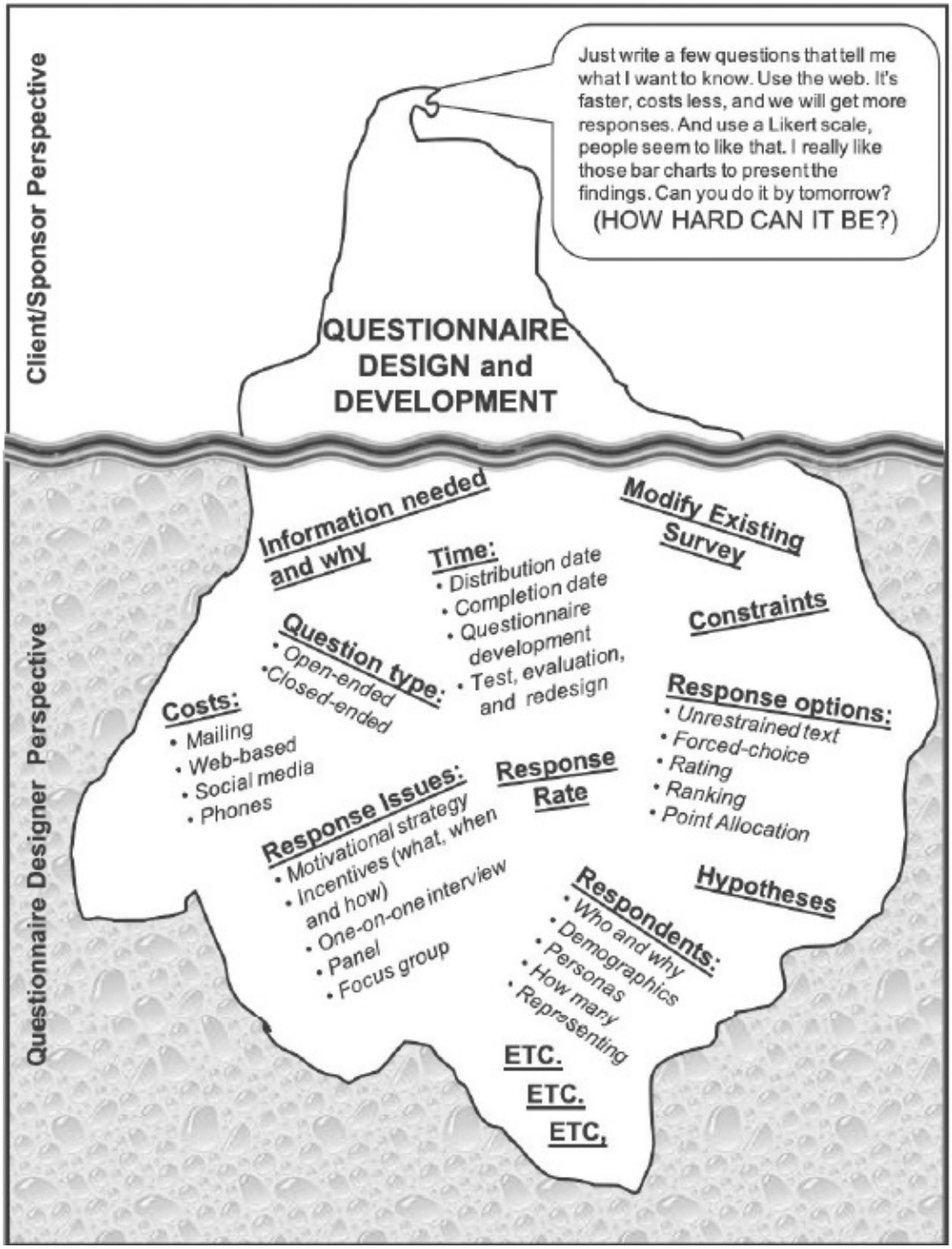
1 Introduction

1.1 Why Write a Manual on Questionnaire Design and Development?

Over the past two decades, we have come to realize that anyone can write a questionnaire, but not necessarily well. We believe that quality questionnaires are not just written; they are designed and developed, and we realize that few researchers and practitioners have education or training in this area. We wrote this manual to respond to that need.

Exhibit 1.1 describes the experience that we, and other questionnaire designers and developers, have had with sponsors and clients. They see the task as fairly simple because they see just the tip of the iceberg, as suggested by their thinking shown in the balloon. The reality is, of course, that questionnaire design and development are much more complex, as we have suggested by listing what appears below the water line: a very small portion of the issues that questionnaire designers and developers (i.e., *you*) need to consider when designing a quality questionnaire.

Exhibit 1.1. Contrasting Perspectives on Questionnaire Design and Development



Sponsors and clients often wonder: “How hard can questionnaire design and development be? I ask questions all the time; it’s just a matter of organizing the questions and distributing them to the respondents.” When you encounter people who hold this assumption, we suggest that you share the iceberg image and the following problematic question with them.

Gordon Willis (2012) provided a good example of a problematic question, which he encountered while evaluating survey questions on digestive disorders

for the National Center for Health Statistics http://bit.ly/2KgdbZm. The question was, *"In the last year have you been bothered by pain in the abdomen?"*

Using cognitive interviewing, he identified several problems. Interviews with potential respondents indicated that "In the last year" had several interpretations, including the last calendar year, sometime within the current year, the past 365 days, or the 12 months prior to today, counting back from the day you responded to that question. (FYI: the latter is the timeframe of interest to the clients.)

The ambiguous phrase "bothered by pain" was misleading and extraneous. The real intent was to determine the respondent's experience of pain. Finally, "in the abdomen" was also problematic, which was determined by presenting potential respondents with a diagram of a human torso that was divided into 19 numbered sections. None of the dozen respondents picked the same region. In retrospect, a better solution would have been to provide an image indicating what the sponsors considered to be the abdomen and asking, "*In the past 12 months, have you had pain in the abdomen? By abdomen, we mean the shaded area in this picture."* Willis makes a strong argument for formally pretesting questionnaires prior to their release. He specifically recommends iterative cognitive interviews (see Section 7.4.1).

1.2 Our Objective

Our objective is to facilitate the design and development of questionnaires for self-administered surveys that are handed to potential respondents, or delivered online or through a postal service. Therefore, in this manual we emphasize a respondent-centered systems approach. We believe that the systems approach reflects Aristotle's maxim, "Well begun is half done." If we have done our job properly, readers who follow the process will be aware of pitfalls and have strategies to avoid them.

As part of our emphasis on a respondent-centered systems approach, we encourage you to think of a questionnaire as a conversation and not just a tool. Unlike other texts on questionnaire design, we do not focus just on the mechanics of questionnaire design; rather, we emphasize the questionnaire development process as a whole. Thus, we stress that one should define the problem domain and determine what data are needed and why they are needed before starting to write questions.

This manual is a product of multiple trade-offs:

- In balancing the academic and the applied, we favored application over

research but reached selectively into the science of questionnaire design to identify best practices.

- In balancing theory and practice, we favored the school of experience over the researcher's world. When the science was not definitive, we did not hesitate to offer our opinions.
- In balancing depth versus breath, we restricted ourselves to providing sufficient coverage in areas critical to designing a quality questionnaire, but we provided links and references to other important areas. (Look for a statement such as "Readers who are working with unique populations are referred to…")
- To meet length constraints, we include worksheets and samples in our appendices and encourage you to use those materials and modify them to meet your requirements. Active links within the text let you access sections of the text that are of interest and locate online sources for additional detail. When we couldn't incorporate material due to space constraints, we developed a supplemental Web site, which is described in Section 1.5.

We don't claim to have all the answers, but we believe we have provided critical elements and rendered structure to the questionnaire design and development process.

Simply stated, our objective will have been achieved if, after reading and following our guidance, you know how to

- Ask better questions and ask questions better.
- Specifically:
  - how to ask the right question
  - of the right person
  - at the right time
  - while using an appropriate data collection process to get the data or information you need.

You can expect to learn

- A respondent-centered systems approach to questionnaire design and development, which includes framing your research question(s) and identifying your data needs, respondents, and unique concerns.
- The advantages and disadvantages of questionnaires.
- The pitfalls in writing stems and questions.
- How to select response options and/or scales.

- How to assemble and test your questionnaire.

1.3 About this Manual

In Chapter 2, we continue the discussion of questionnaires and introduce our respondent-centered systems approach. That approach asserts that questionnaire designers need to understand and shape the respondents' mental model in their conversation that is structured as a questionnaire. As part of the respondent-centered approach, we encourage the use of personalization, cultural conventions, and affordances in questionnaires.

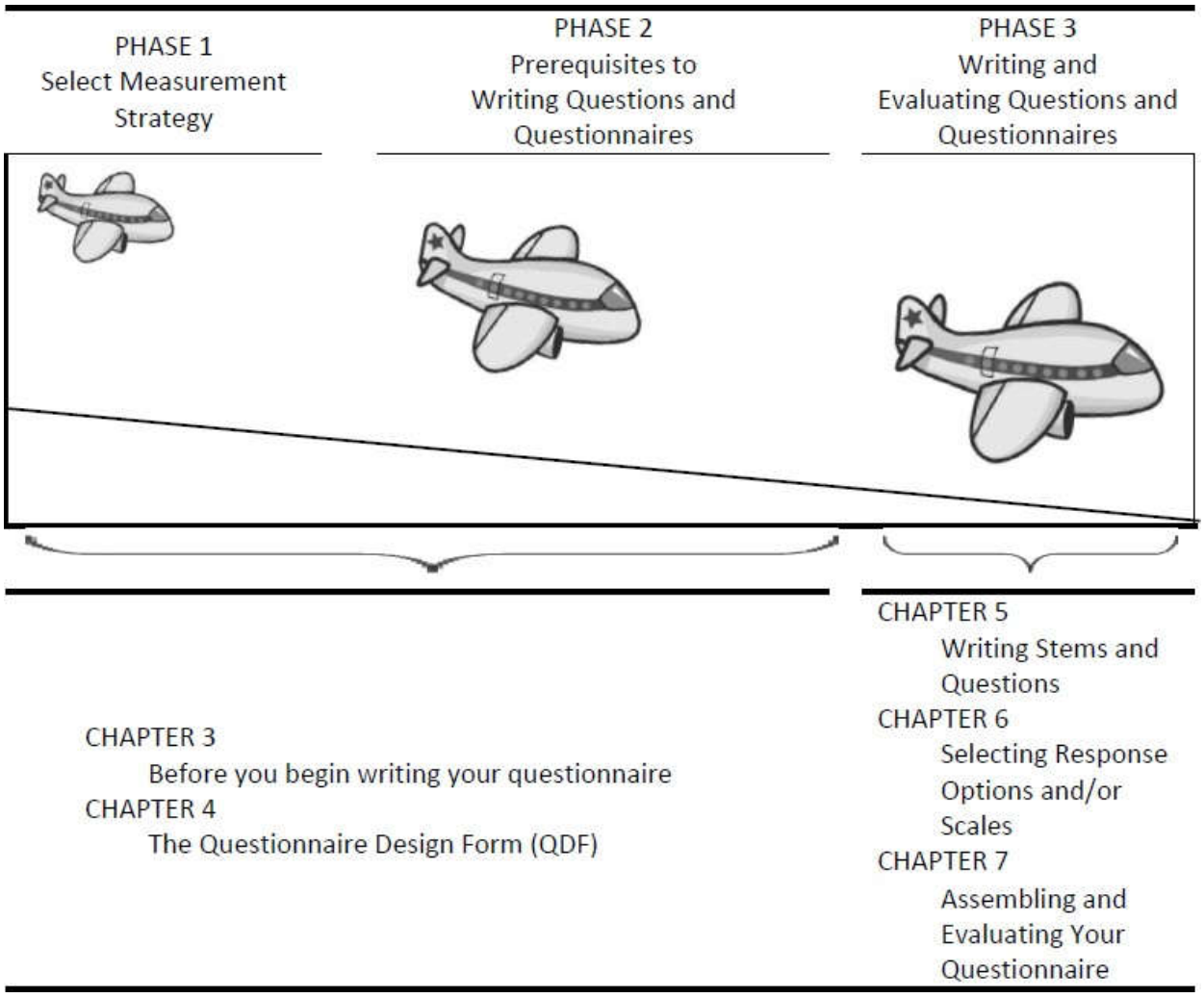
For the remainder of this manual, we use a top-down approach, as suggested by the changes in altitude shown in Exhibit 1.2. This exhibit shows a three-phase systems approach to questionnaire design and development.

Phase 1: Select Measurement Strategy addresses, in part, the often-omitted question, "*Is a questionnaire appropriate?*" (discussed in Section 3.2.3). If, having considered the issues raised in Phase 1 you decide that a questionnaire is appropriate, you can proceed to **Phase 2: Prerequisites to Writing Questions and Questionnaires**. Chapter 3 provides an overview of the entire questionnaire design and development process, and Chapter 4 introduces our Questionnaire Design Form (QDF) checklist, which walks you through the process by describing and illustrating the steps in developing a comparatively straightforward survey.

Phase 3: Writing and Testing Questions and Questionnaires (Chapters 5, 6, and 7) provides the details you need to develop individual questions and a complete questionnaire. In Chapter 8, we provide six maxims, corresponding to Chapters 2–7, that summarize the core of our guidance concerning the questionnaire design and development process.

Appendix A provides a checklist that shows how the guidance presented in Chapters 4 through 7 correlates with the several phases of the questionnaire design and development process described in Chapter 3.

Exhibit 1.2. A Top-Down View of the Phases of Questionnaire Design and Development



1.4 How to Use this Manual

As you read this manual, we expect that you will come to share our belief that focusing on producing a form with questions decreases the quality of the final product, and that a more systematic approach is needed to be able to focus on asking the most appropriate questions in the most meaningful way.

We strongly encourage you to read this manual in a serial fashion, particularly if you are new to this domain. Doing so will familiarize you with the systematic approach that we advocate. After you have digested the material, you can return to the sections that seem particularly appropriate to your questionnaire. A nonlinear approach to reading can be used if you have a specific need or topic of interest. Simply search the detailed Table of Contents and go to the appropriate page.

Please note that within academic circles there are differences between the

terms *questionnaire* and *survey*. However, in the interest of simplicity, we use the words interchangeably. We briefly discuss the distinction in the FAQs at https://sites.google.com/view/questionnaires-how-to.

1.5 Your Supplemental Web Site

Recognizing the impossibility of including everything we consider pertinent within this text, we have provided information online. The supplemental material is presented under four tabs:

- **Questionnaire designer FAQs** answers questions frequently asked by questionnaire designers and students, including whether and how to use incentives; ways to increase response rate; tips for recruiting respondents; and using social media. This section reflects lessons we have learned over more than 20 years spent responding to questions raised by both researchers and practitioners.
- **Case study** presents a pretest/posttest study comparing the effectiveness of two training programs in reducing discomfort among computer users (Cameron, 1997). We examine reaction, learning, behavior, and results. Several examples of original and revised versions of a single question are presented within the systems approach described in Chapters 3 and 4.
- **Forms and templates** has material you can download and modify to meet your needs, including a Questionnaire Design Form (Chapter 4); sample electronic correspondence (invitations, reminders (Appendix B); a sample persona (Section 4.10); and a checklist of items to consider when selecting Web-based questionnaire design tool.
- **Links** contains links to questionnaire checklists, sample size calculators, selected articles, and more.

1.6 Our Intended Readers

We started with the assumption that you are not a practitioner, researcher, or student in the area of questionnaire design. We also assumed that many of you are members of the growing body of do-it-yourself (DIY) researchers, practitioners, and students who rely on the myriad commercially available Web-based questionnaire design tools. We also realize that this manual crosses interdisciplinary boundaries and therefore have included material from multiple domains.

1.7 What We Do Not Address

It would not be possible contain the full breadth of a vast literature on questionnaire design and development in this concise and straightforward manual. Therefore, we acknowledge that we do not address the following areas:

- Interviewing and telephone surveys. Our focus is on Self-Administered Surveys (SAS) administered in a paper-and-pencil format or on the Web.
- Using focus groups or panels to collect data.
- Ethnographics, content analysis, verbal protocol analysis, and similar methods.
- Sampling strategies and survey research techniques.
- Data analysis and statistical procedures.
- Scale design and development. If you plan to study constructs or to modify an existing scale, we suggest you consult Johnson and Morgan (2016) and DeVellis (2016). Strayer et al. (2015) illustrates developing a scale for assessing cognitive distraction in automobiles.
- Implementing your questionnaire, including distributing it, analyzing the data, reporting and/or using findings, and evaluating the process and lessons learned.

1.8 Moving on to Considering Questionnaires as Conversations/Tools for Communication

Questionnaires, like any well-designed interface, should be intuitive. Just as a well-designed interface enables the user to achieve the desired end easily, a well-designed questionnaire conceals the complexity of the design and development process and allows the respondent to complete the task smoothly. If issues like those presented below the waterline in Exhibit 1.1 have been addressed properly, the respondent can focus on the task of completing the questionnaire.

In Chapter 2 we describe our strategy for making the respondent's task as easy as possible by using a respondent-centered systems approach to questionnaire design and development that includes considering questionnaires as conversations.