

Computer-Assisted Data Collection: Ghana's Experience

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Various independent discussions of mode effects of survey methodologies outline three basic modes of data collection—face-to-face, telephone and self-administered. There is an extensive literature on possible effects of collecting data by each of these modes because they appear to differ in fundamental ways. What appears to have been less noticed, however, is that there are variations within each of these methods, and the variations depend mainly on whether or not the methods are computer-assisted; that is, whether the questionnaire is represented in electronic or paper-and-pencil form. There is a paucity of literature on within-mode effects of using computers to assist in the data collection process.

Over the last decade, there has been a considerable general rise in the use of computers in Ghana, and that has particularly influenced the design of survey data collection as compared with using only the traditional theories and methods of cognitive psychology. Computers were first used by the Ghanaian market research firms in the early 1990s to aid in the collection of data by telephone. Since then, numerous computer-assisted telephone interviewing (CATI) systems have been developed. With the proliferation of light-weight portable computers over the last few years, the development of computer-assisted personal interviewing (CAPI) has proceeded rapidly. These, plus other computer-assisted survey information-collection methods, are referred to as CASIC.

The application of only the traditional theories and methods of cognitive psychology to survey methodology has been exercised in Ghana for some years now, even though it was originally promoted by a U.S. National Academy of Sciences panel on the cognitive aspects of survey methodology (CASM) in their 1983 report. Many of the major Ghanaian state statistical agencies and numerous private survey organizations used solely cognitive aspects of survey methodology in questionnaire development and for researching other aspects of survey methods.

In September 1999, staffs of the National Census Secretariat, Omega Systems Technology and the Statistical Department initiated a series of meetings to set new goals for a redesign of the methodology used in the 1984 Population Survey, and, through this process, the introduction of a new questionnaire and computer-assisted interviewing that fairly integrates the traditional theories and methods of cognitive psychology were given the highest priority. The interagency team created to develop and test a new questionnaire for full implementation using CAPI and CATI in the 2000 Population and Housing Census (PHC) established two sets of objectives, one related to data content and one related to data quality. The objectives for improving data quality included:

- improving the measurement of population and housing classification,
- improving longitudinal and earnings data,
- reducing the reliance on respondent volunteered information,
- reducing interviewer error, and
- reducing error in the interaction between interviewer and respondent.

It is through the careful combination and synthesis of the two new survey research methodologies--CASIC and CASM--that the team has met its objectives. As a consequence, a questionnaire, as defined by the dictionary or current practice, no longer exists for PHC. That is, there does not exist a list of questions on paper that can be used by an interviewer to query a respondent. The new instrument has been designed to use the computer to aid both the respondent and interviewer perform the mental tasks associated with a PHC interview, i.e., question asking, question answering, and the resulting interaction.

The question-asking task has been characterized as question reading or recall and question formulation. In fact, the interviewer's task goes beyond question asking, to include categorizing responses to open-ended questions when the questionnaire only contains a small set of response categories and converting sometimes lengthy descriptions of *tenant behaviour* or *important activities or duties* into responses that can be entered on a short line. To aid the interviewer in the question-asking task, many of the probes currently discussed in interviewer training and included in the interviewer manual have been incorporated into the new instrument, thus reducing the memory demands on interviewers. For example, currently interviewers are instructed to probe about unpaid work if the household contains a farm or business, but the current questionnaire contains no explicit question to determine if the household contains a farm or business nor does it specify the wording to be used to probe about unpaid work in the family business.

In the new instrument, the first question in the labor force series, for instance, asks about the presence of a family business. If the respondent gives a positive response, appropriate follow-up questions are displayed on the computer screen for reading to the respondent. To aid the interviewer in the categorization of responses to open-ended questions, some categories have been relabeled and others have been added. To aid the respondent in the question-answering task, many questions have been tailored using information provided in response to earlier questions during the current interview, e.g., the presence of a family business or being retired or disabled, or during previous interviews, e.g., name of company for which the respondent works or length of a continuing spell of unemployment. An anchor-and-adjustment strategy is explicitly used to aid respondents in recalling hours worked last week. Respondent's comprehension is aided by defining some of the labor force concepts within the instrument, either in the actual question wording or through the application of specific follow-up questions.

The interaction between interviewer and respondent is aided by the improved flow of the interview through the use of the computer. Interviewers feel more professional, and respondents feel more involved. For some data items, verification questions have been included in the instrument to insure that interviewers and respondents have communicated effectively. For some data items, a no response results in a follow-up question which includes a motivational statement in an attempt to elicit a response.

Throughout the development and testing processes, laboratory methods developed by cognitive psychologists and other behavioral scientists have played a crucial role. Verbal, protocol analysis and paraphrasing were used to determine problem questions and evaluate alternatives. Sorting tasks were performed by interviewers and data analysts to detect problems in category titles. Focus groups with respondents were used to discuss the interpretation of questions and concepts. Coding of interviewer and respondent behaviours during actual interviews was used to evaluate the usability of alternative questions. In some cases, field-based versions of laboratory methods were developed. For example, respondent debriefings were conducted at the end of selected interviews.

As a result of our two-year effort to create and test a new instrument for computer-assisted information collection in PHC, the interagency interdisciplinary team of economists, psychologists, social scientists, computer scientists and statisticians have broken new ground, both in terms of how to develop and test new data collection instruments and in terms of the design of an interviewing instrument that can only be administered using a computer.

SUMMARY

Using the theories and methods of cognitive psychology and other behavioral sciences, a new instrument has been developed for the Population and Housing Census, and the associated Post Enumeration Survey (PES). Designed solely for computer-assisted interviewing, the new instrument reduces measurement error and the general margin of error by aiding both the respondent and interviewer perform the mental tasks associated with the survey interview.