COMPUTER ASSISTED SURVEY METHODS (CASM) AT OPCS AND SOME CURRENT ISSUES IN THE USE OF BLAISE FOR THE LABOUR FORCE SURVEY

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1. Introduction

This paper aims to explain briefly the OPCS strategy for conversion of its social survey work to computer assisted methods, and then to examine some of the second-level issues that have arisen in the early stages of implementing this strategy. The issues chosen arise in parts of the survey system where Blaise is the software used at OPCS. The issues are in the fields of authoring, testing instruments, documentation and computer assisted coding.

The paper refers in particular to the Employment Department's Labour Force Survey, the first survey for which OPCS used computer assisted methods of data collection. A companion paper by Jil Matheson discusses the more complex surveys which are now being implemented in CASM, using Blaise.

2. Computer Assisted Survey Methodology (CASM)

For some years the idea of computer assisted survey methods has been subsumed in the term computer assisted interviewing (CAI), covering telephone (CATI) and face-to-face (CAPI) modes, and interactive data entry (CADI or CADE). It was the possibility of cost-effective combination of CATI and CAPI that made computerisation of the interview feasible for agencies, such as OPCS, whose principal work would not allow them to rely on purely CATI techniques because of coverage bias and concerns over complex and lengthy interviews on the telephone. It is not surprising that the initial focus of discussion within and between

agencies should have been on the obvious and dramatic effects of CAI on the data collection part of the survey process. Increasingly, however, attention is turning to the total survey systems of which CAI is only part[1].

OPCS's efforts and planning in this direction now go under the title of computer assisted survey methodology (CASM). The purpose of the reconceptualisation implied in the change of name from the earlier "CAI" is to ensure that all survey processes from design to dissemination are covered, and that all developments in the agency are considered in the light of computerisation of the central survey process of data collection.

3. Blaise and the QLFS system for data collection and processing

Computerisation of the interview became a possibility for OPCS when it discovered a package, Blaise, which provided the essential functions in a form that fitted the intuitive methods of survey designers, field managers and interviewers (and therefore was able to meet the cost and timetable criteria for production work). Computerisation of the interview did not have to mean treating its design as an extension of methodologies which are appropriate in the formal world of large-scale data management but which are too cumbersome for the gritty, nuanced, interactive processes of most social survey work. Confidence in the end product could be based on testing it rather than the means by which it was produced. This section explains how Blaise is used for the QLFS.

1) American Statistical Association 1991 Joint Statistical Meetings, Special Contributed Papers on Computer Assisted Survey Information Collection: International Progress - papers by authors from Netherlands Central Bureau of Statistics, Statistics Canada, OPCS Great Britain and US Bureau of the Census.

CAI at OPCS was initially developed and implemented for the former QLFS which converted from pencil-and-paper interviewing (PAPI) to CAI in September 1990. The former QLFS was replaced in March 1992 by a much larger QLFS of similar design.

The larger QLFS, like the former version, is a panel survey with sample rotation and a weekly placing pattern, covering every week of the year proportionately. Information is collected about all members of sampled households. Proxy interviews account for about one-third of all responses for adults. Interviews average about 30 minutes per household. The set sample yields over 60,000 responding households per quarter (about 160,000 persons per quarter). All first interviews are face-to-face and recall interviews are by telephone if the respondent agrees. Overall, nearly 60% of interviews are conducted through CATI (all from a central unit), and some 40% through CAPI (all face-to-face).

Response rates did not change with the introduction of CAI to the former QLFS. As in the PAPI era of the survey, about 83% of eligible households responded for first interviews and about 78% (of the original eligible sample) for fifth interviews. Item response was improved by CAI, as one might expect. Distributions were consistent with earlier quarters' results. Findings are similar for the enlarged QLFS.

The QLFS system is as follows, for every week of the year. Addresses are selected from a computerised file of postal delivery points (Postcode Address File) for small-volume users. The central case management system prints address lists and labels, and one-page summaries of each household to help interviewers plan their work; and it produces Blaise files with the corresponding serial numbers (and, for recall interviews, last time's data). These files are sent to the CATI unit or encrypted and dispatched to the CAPI interviewers. After the day's interviewing and completion of the post-interview work, such as coding occupation and industry, the data are transmitted to the central office. The laptop computers each contain quasi-case management, using facilities provided in a Blaise module for converting data to ASCII format. This ensures that only interviews which are complete, clean and have not been converted before are transmitted. The data are encrypted

and compressed before transmission. The interviewers initiate these processes. At the end of the week they send in their encrypted interviewing and backup disks, which are searched for any missing interviews reported by the central case management system. Field managers decide which interviews to reissue for follow-up over the 9 days following the reference week. Data for completed weeks are passed on for updating (for the next interviews), derived variable creation and weighting to population estimates. The final data files must be passed to the customer, the Employment Department, within 4 weeks of receipt of the final interviews for a quarter.

The system outlined above could clearly be improved by full case management on the interviewers' laptop computers. In the present system, the interviewers cannot readily see which interviews have been accepted for transmission. Any discrepancies between what interviewers think they have sent and what has actually gone are only apparent at the end of the interviewing week when the central case management system still shows some cases as outstanding. Although the number of discrepancies is small, searching the relevant disks and resolving the problems takes a disproportionate amount of time. OPCS is interested in the new Blaise system, LIPS-SPIL, which involves 2-way communication and may therefore allow true case management for laptops.

4. Blaise and Authoring: Questionnaire and Edit (QE) instruments

One of the reasons for OPCS's choice of Blaise was its ability to deal with QE instrument changes rapidly at the level of the whole system, not merely of the field instrument itself. Definition of the field instrument in the Blaise language can be used to provide automatic definitions of the data wherever else they are needed in the system. This removes the need for reformat programs, which are notoriously error-prone and time-consuming. The idea of a single point of definition is built into Blaise, and OPCS computing specialists generalised it for packages to which Blaise does not provide automatic interfaces. In doing so, they abandoned traditional concerns of computing specialists for storing and processing data in the most machine-efficient ways. All LFS

processing is on microcomputers, for which costs of "inefficient" database structures are far less than the costs for the time of skilled staff to program and test reformats .

The design for the enlarged LFS includes quarterly change of some 10% of the content. There is a core questionnaire which may be changed annually (with provision for emergency changes to reflect new legislation). The non-core questions, which vary quarterly, can be interwoven in their logical positions with core questions in a CAI QE instrument, rather than forming a distinct supplement to be completed after the core interview, as often occurs in PAPI surveys for logistical reasons.

Thorough customer testing is a vital part of CASM. With the CAPI software currently available it remains a distressingly labour-intensive process. OPCS is trying to develop ways to automate the process, with limited success so far. In the short term, however, the LFS needs a systematic and thorough approach to customer testing, which may fall short of the desired goal of automation. Currently there are 5 checks.

The first check involves a detailed (character by character) comparison of the new QE program in Blaise with the program from the previous quarter. Although labour intensive, this is a very useful exercise and can detect simple errors at an early stage of the questionnaire development process.

The next stage involves detailed comparison of the documentation provided by the Employment Department in the form of a QE specification and the questionnaire program in Blaise. The third stage consists of interactive checks of the functioning of the QE instrument on the laptop. The appropriate layout and content of questions are systematically checked, as are the appropriate use of checks and signals and the correct operation of all the standard functions used by interviewers in the field. Fourthly, the operation of hidden and protected fields needs to be routinely checked at this stage, which involves compiling a version of the QE instrument with all hidden and

protected commands removed. Finally, it is vital to see the effect of any questionnaire changes on recall interviews, using a test batch of data brought forward in readiness for recall.

Although this system of customer testing has been developed specifically for the LFS, it is likely that the same principles will be adopted by other surveys moving to CASM in the future, until an automated alternative can be found. This is clearly a key area for development and one which OPCS considers a high priority as part of its strategy to move more of its surveys to CASM.

5. Blaise and Authoring: skills and new staff

OPCS aims to have the survey researchers who design, manage and analyse its surveys as the authors of CAI QE instruments, only resorting to specialist programmers in situations where the software is pushed to its limits and computing efficiency matters. Such situations can be expected to become increasingly rare as software improves. The argument for this strategy is that designing a QE instrument, in Blaise at least, involves the survey researcher in precisely the same essential steps as for a PAPI operation. The survey researcher will always have to specify what is wanted in some kind of formal language. The importance attached in most agencies to standards for paper questionnaires and edit specifications illustrates the need to squeeze out ambiguity and aid comprehension. Our experience is that, for surveys which are not pushing back the frontiers of CAI, writing Blaise instruments involves about the same level of knowledge of logic, special conventions and generalisable know-how as the paper questionnaires and edit specifications that we take for granted shortly after encountering them when we begin survey work. In these circumstances, for the survey researcher to write specifications for a programmer is a step backwards - reintroducing the possibility of error through miscommunication and, at best, duplicating effort.

The LFS QE instruments in Blaise have always been written and amended by survey researchers. The methods by which new recruits learn to write CAI instruments are much the same as for paper questionnaires and edit specifications. That is to say, training focuses on research concepts and their operationalisation: in relation to such essential and difficult concerns, training in how to write in Blaise requires little time and is mainly a matter of learning the local conventions by understanding model instruments and reading the manuals, and practice.

The main problems for new researchers on the LFS are associated with the demands of the panel element of the survey. Sampled households are contacted five times at 13 week intervals. At each recall interview virtually all the data is carried forward from the previous interview and appears, as appropriate, on the lap-top screen. This allows interviewers to check that certain information given at the last interview is still applicable. Where no change in situation has occurred at a particular question the interviewer simply confirms the previous data entry. If a change has taken place since the last interview the new information is entered, overwriting the data brought forward.

The requirements of the system for recall interviews means that writing the LFS QE instrument is not simply a case of designing clear and concise questions, logical routing and sensible edit specifications with comprehensible error messages for interviewers. If the LFS was a straightforward survey without recalls this would be the case. Given the panel design, it is essential that the researcher has a very clear and detailed knowledge of its operation and a complete understanding of which elements in the Blaise QE instrument affect the structure and appearance of the questionnaire at recall waves. All editing for the LFS is done during the interview, so the Blaise QE instrument must be written to take account of the state of the data at the last interview, in the current one and at the start of the next. It is particularly crucial to ensure that data which must be preserved for the next interview never disappear from view as a result of new routing, lest the interviewer write off the interview before it can be retrieved. Dealing

with such complexities means that the author of the QE instrument must have a very clear picture of the survey's structure. But Blaise itself presents no problems.

Thus new researchers have much greater difficulty with the conceptual problems of a panel survey which uses dependent interviewing and correction by overwriting than with learning to use Blaise. As noted earlier, training effort concentrates on survey design; Blaise needs and gets no special attention.

The skills of information technology specialists have been employed on the LFS in designing and implementing effective systems for backing up, storing, transporting, monitoring and ensuring the security and integrity of the outputs from Blaise. They have been particularly skillful and imaginative in building on the strengths of Blaise rather than attempting to fit its outputs into traditional models of data management.

6. Documentation and discussions with customers

The major redesign of the LFS questionnaire and edit instrument for the enlarged survey required extensive consultations between OPCS and the customer, the Employment Department. The Employment Department had to consult its own wide range of customers in other divisions and other government departments, most of whom had proposals for new questions and amendments to old ones. Draft instruments were vital documents in these discussions, but there were no paper questionnaires to fulfill this role.

The project manager at the working level in the Employment Department felt able to understand and work with the Blaise specifications for the QE instrument, after explanation of a few basic principles. The solution for the wide consultations was to use the printed questionnaire generated by Blaise, with some additions. This document lacks routing instructions, so information was added at each question about the subsamples to whom it applied. As Blaise works from precisely this

information, and not from the programming equivalent of skip patterns, checking the discussion document against the Blaise instrument was less error-prone than checking complex skip patterns against customers' specifications tends to be with paper questionnaires. It may also be argued that this method provides analysts directly with the information they need about questions, and is preferable to requiring them to construct it by retracing skip patterns as they may have to do where paper questionnaires are used as documentation. We envisage that this form of documentation will be refined through practice to make it as readable as possible for a wide variety of audiences.

Blaise gives the survey researcher - and the customer, if that is someone else - much closer control over data quality than in systems (paper or otherwise) where questionnaires may be public documents but the equally important editing instructions are, if public at all, in languages which tend to be difficult for non-programmers to follow. The exact relationship of questions and edits (e.g. the order in which edits are performed) can be difficult to discern. In a CAI instrument, designers must consider fully the implications of edits as they design questions. Editing instructions must be comprehensible to the interviewers, who have to take action if they are triggered. Simple text must be supplied. The result is self-documentation of both questionnaire and edit in an accessible form which also shows the relationship between the two elements. Such opportunities that CAI offers for survey researchers will be lost if authoring is regarded primarily as a matter for good programming rather than for good survey design.

7. Computer assisted coding (CAC) in the interview

In the QLFS, the interviewer codes occupation and industry at home. When the QLFS started, nationality, country of birth and ethnicity also had to be coded; but the coding of these items was quickly brought into the interview with CAC, using the integrated Blaise module. The lists involved in CAC were short, with no more than 700 entries, and there was no effect on the speed of the interview. The enlarged survey has added the requirement for interviewers to code local authority district

and travel-to-work-area of place of work for main job and job one year ago (address of firm is not collected in Britain); and subjects of educational and business qualifications. We expect to extend CAC in the interview to all the questions mentioned above. Trials have shown that the new Blaise CAC module can handle very long lists (more than 30,000 items for placenames, and similar sizes for occupation and industry) compactly and fast enough not to lengthen the interview.

8. Conclusion

Blaise has proved flexible enough, and easy enough to use, for survey researchers who are not skilled in programming to deal with the complexities of a panel survey. There are other ways of achieving our objectives than the ones we chose: for example, external files might have been used. In achieving our objectives for the QLFS, the close understanding which the survey designers have of their own requirements has been much more important to a successful survey using CASM than programming skills. However, there is a vital role for specialist programming support. It is to provide an environment in which the survey designer can have complete control over the details of the total survey system through QE specifications in Blaise. This takes full advantage of the central Blaise ideas on integration.