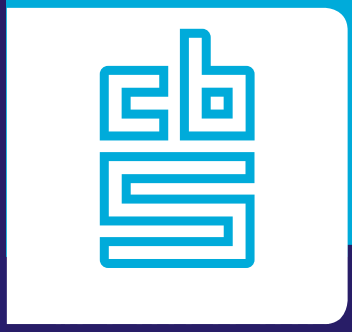


Blaise

Blaise 5 and Complex Surveys

June 2019

NSI Challenges

National Statistical Institutions (NSIs) feature wide-ranging programs of surveys such as establishment and household surveys, to collect economic, institutional, and social data. Often these surveys are in more than one language. The complexity of an NSI's survey program is reflected in its survey instruments, its survey management challenges, and in its methodological studies, all the while coping with fewer resources and an ever more complex survey-taking milieu. It is the creation, management, and deployment of these kinds of surveys for multiple modes, devices, and versions where Blaise 5 shines.

Establishment Data Collection Instruments

Survey flow (routing), consistency checks, mathematical relationships between fields, flexible question statements along with mode-specific routing, text or checks (e.g., for CAPI, CAWI, CATI) are many characteristics of a complex survey. While the length of a survey may add to its complexity, it is the internal data relationships that are the significant determinants of complexity. Some surveys use specialized coding frames and external file references to access routing and edit information. The ease of programming and their ease of delivery are further requirements for these surveys.

Questions and Blocks

Examples of complex economic surveys are company-based surveys such as Surveys of Industries. Often these companies are surveyed multiple times on topics ranging from income and expenditures, to energy use, and other nationally important data such as jobs data. While the goal is to summarize these data across industries and create national accounts, each industry has individual characteristics that must be accounted for during data collection. This is a prime example of multiple questionnaires representing variations on a theme. They contain many similarities, but also key differences.

The ability to handle versions of instruments across surveys or geographic regions has always been a Blaise strength. Blaise offers mechanisms to maintain the source code of a questionnaire, such as splitting up a questionnaire into blocks or even components of blocks, organizing those blocks into separate files, customizing the behavior of blocks through the use of block parameters, and making use of Blaise keywords reflecting mode or communication channel. It is also possible to govern the behavior of a questionnaire through real-time references to external files. For example, external files hold different edit limits and exist for each of the different commodities or products.

Economic surveys collect much numeric data, and there are usually many complex relationships between data items. There can be lengthy conditions that govern the routing through such a questionnaire, and many single-item and multi-item edits. From its start 30 years ago, Blaise was designed to handle these kinds of surveys.

Then there are data relationships between blocks of code. These are often relational or hierarchical relationships that can lead to lengthy questionnaires. The Blaise architecture has several features that allow you to march through these relationships in the order you specify, to keep everything straight, and to handle massive volumes of data. Blaise's unique selective checking mechanism continually enforces data integrity while maintaining top performance.

With proper planning, Blaise makes it possible to set up a production environment for industry survey instruments that resembles a specification exercise much more than a programming chore. Using Blaise blocks allows for carefully designed and specified relationships, which simplifies handling variations on a theme.

Coding Frames

A broad-based survey program requires coding frames, such as the NACE (Statistical Classification of Economic Activities in the European Community), the ISIC (International Standard Industrial Classification of All Economic Activities), the NAICS (North American Industry Classification System), and the ANZSIC (Australian and New Zealand Standard Industrial Classification). Coding frames are a crucial element to enable on-the-fly-coding during an interview and to drive routing and edit limits based on what was coded. Blaise 5 can include separate coding frames specifically for any particular country as well as coding frames for cities, car makes and models, food, medicines and more. As an example, Statistics Netherlands (CBS) uses Blaise 5 to collect expenditure data for well over 20 major categories of expenses and many hundreds of items. These instruments refer to lists of items and present them in such a way that the respondent can give the data to the interviewer. Often these are implemented as lists in a dynamic table.

Complex Consistency Checks and Routing

Economic and agricultural surveys collect a large amount of numeric data that feature intense relationships between data items. These relationships include routing, range edits, and complex consistency edits. Some economic surveys can contain more edits than fields collected, and they all have to be satisfied. With Blaise, real-time calculations, including summations and other mathematical operations, can invoke more routing and edits. Specialty surveys such as food consumption, time use, and expenditure surveys, rely on respondents' recall of complex data and often need real-time corrections, including the ability to navigate to fix errors. More complex selection algorithms may include randomly selected individuals within a household or some other members of an entity.

Often, complex surveys must offer non-linear routing through the questionnaire. For example, a company survey may need responses from the accountant, the comptroller, the purchaser, the attorney, the human resources department, and other specialized units. With parallel blocks, these respondents can fill the questionnaire sections in as they have time to give the data.

Household and Related Surveys

Household surveys are another primary type of survey that NSIs conduct. Household surveys have their own design challenges that Blaise is designed to support.

Multi-level Surveys

Multi-level surveys include relational and hierarchical surveys and emphasize complex relationships between entities. Educational and medical surveys are well known for their intricate relationships. For example, surveyed households contain people with medical issues, and for each issue they receive treatments and medicines, visit doctors or hospitals. Any system has to keep all of this straight.

Household surveys may contain specialty tables, for example, to state the relationship between each pair of members within the household. These relationships are especially tricky for extended and blended families. The questionnaire has to keep straight the family members and their relationships as these relationships may determine the kinds of questions for each individual. After listing household members, either all or a random selection of the members are surveyed further.

Longitudinal Surveys

Longitudinal surveys are common at NSOs, for both social and economic surveys. This requires capabilities to compare data between waves of a survey or carry previously collected data into the next round to help shorten or guide the current questionnaire. Blaise allows you to either preload many already collected data fields or refer to the previous questionnaire values through an external file reference. Usually, complex IF conditions govern the applicability of these longitudinal edits and the Blaise language has excellent facilities for handling such complexity.

Methodological Studies

The capture and presentation of paradata and audit trails offer a great source of valuable data. Apart from the actual survey data, associated paradata is also of great value to researchers. These data give critical insights to better control the quality of administered surveys and to better understand the behavior of respondents, without employing an observer. Blaise paradata is rich and can capture all keystrokes and actions within a survey. The provided paradata includes audit trails and other survey management and instrument performance data as well as access to CATI and other survey management data.

Survey Management

Some countries have an extensive range of time zones; any CATI management system needs to handle this as well, and Blaise 5 does. Many NSIs use Blaise to manage multimode surveys across geographic areas. The combined use of Blaise 5's Call Scheduler along with Manipula and Maniplus give an incredible multimode management capability. These tools enable the adjustment of the day's calling workload, as well as shifting or sharing cases across call centers and between CATI, Web and CAPI on the fly. An essential part of longitudinal surveys is the ability to collect multiple instances of contact data for future contacts.

Team Blaise is undertaking a prototype study of complex multimode survey management, following specifications given by BCLUB (Blaise Corporate Licence User Board) members. An in-depth study of operational and outcome coding schemes based on specific survey parameters and what has happened for each case formed the basis of this prototype.

Figure 1: Diagram of a Multimode Management System

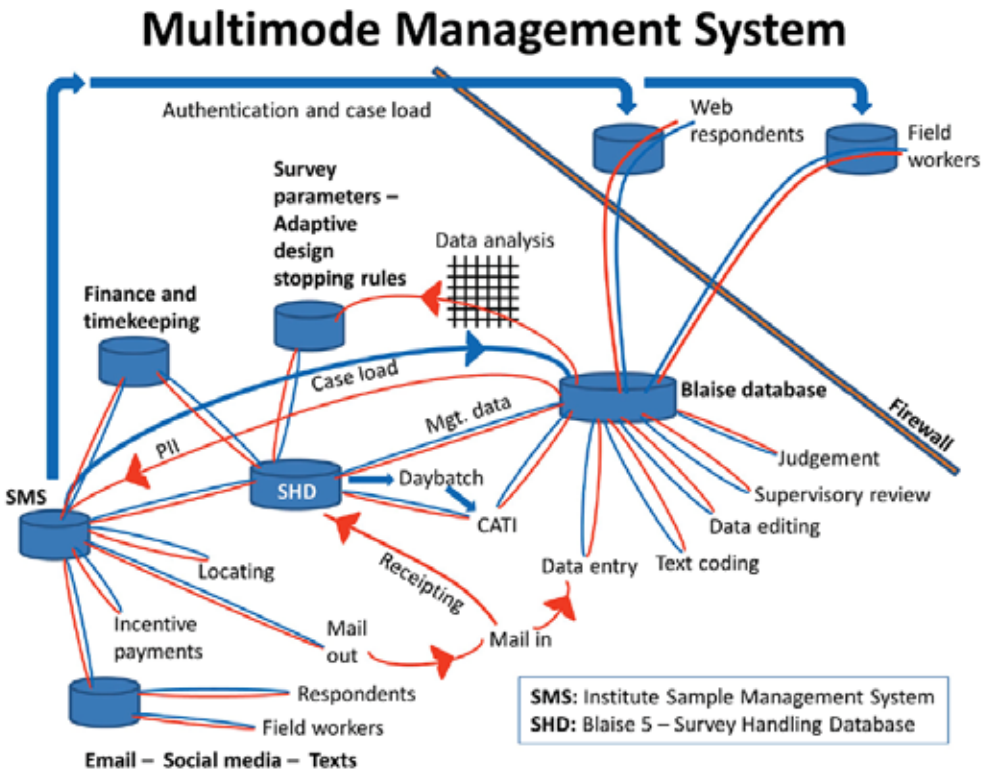


Figure 1 shows how all the parts of a multimode management system work together. The SMS would be an NSI's own Sample Management System, while the SHD would be the Blaise 5 provided Survey Handling Database. The figure shows data collection modes such as CATI, paper, web, and fieldwork (CAPI), and associated in-survey and post-survey modules. For example, if a respondent logs onto the web, the case should be disabled from CATI immediately. Other modules, such as real-time data analysis, may determine the best way to allocate remaining survey resources, while the finance system would tell you how some resources have already been spent. The prototype brings all these parts of survey management together so that they can be managed as one effort.

Survey-Taking Milieu

To achieve good response rates, the survey-taking milieu needs to be taken into account. It can be viewed from two perspectives: the technological milieu and the social milieu.

The necessity to adapt to technological developments requires multimode, multi-device, multi-platform, and multi-operable instruments. Blaise 5 is designed with these and future technologies in mind. The system works in a Windows environment as well as on multiple devices of different sizes and different platforms, e.g. iOS or Android. It also offers different usability paradigms such as gestures on a hand-held device versus function keys on a keyboard.

Statistics Netherlands' methodology and IT departments are conducting state-of-the-art studies on the deployment of challenging surveys across a range of devices. Size of screens is a particular challenge. For example, the presentation of a battery of similar questions may be different on a computer browser screen than on a handheld screen. While there are many possibilities to handle these challenges, the Blaise 5 architecture allows you to carry out your own preferred solutions.

To take an example, the social milieu includes the use of languages. Some countries conduct surveys in more than one language, and some surveys require multiple languages, such as travel and airport surveys. Blaise allows you to switch languages on the fly. Blaise 5 offers a demonstration questionnaire that handles ten languages: Dutch, English, French, Spanish, Greek, Hebrew, Arabic, Hindi, Chinese, and Japanese. It is possible to design Blaise instruments that operate in different countries while referring to different currencies, phone number formats, and even country-specific versions of a coding frame. Figure 2 shows the same questions in English and in Arabic, while Figure 3 shows the change of currency when the country of residence is the U.S. or the Netherlands.

Figure 2: The same questions in English and Arabic

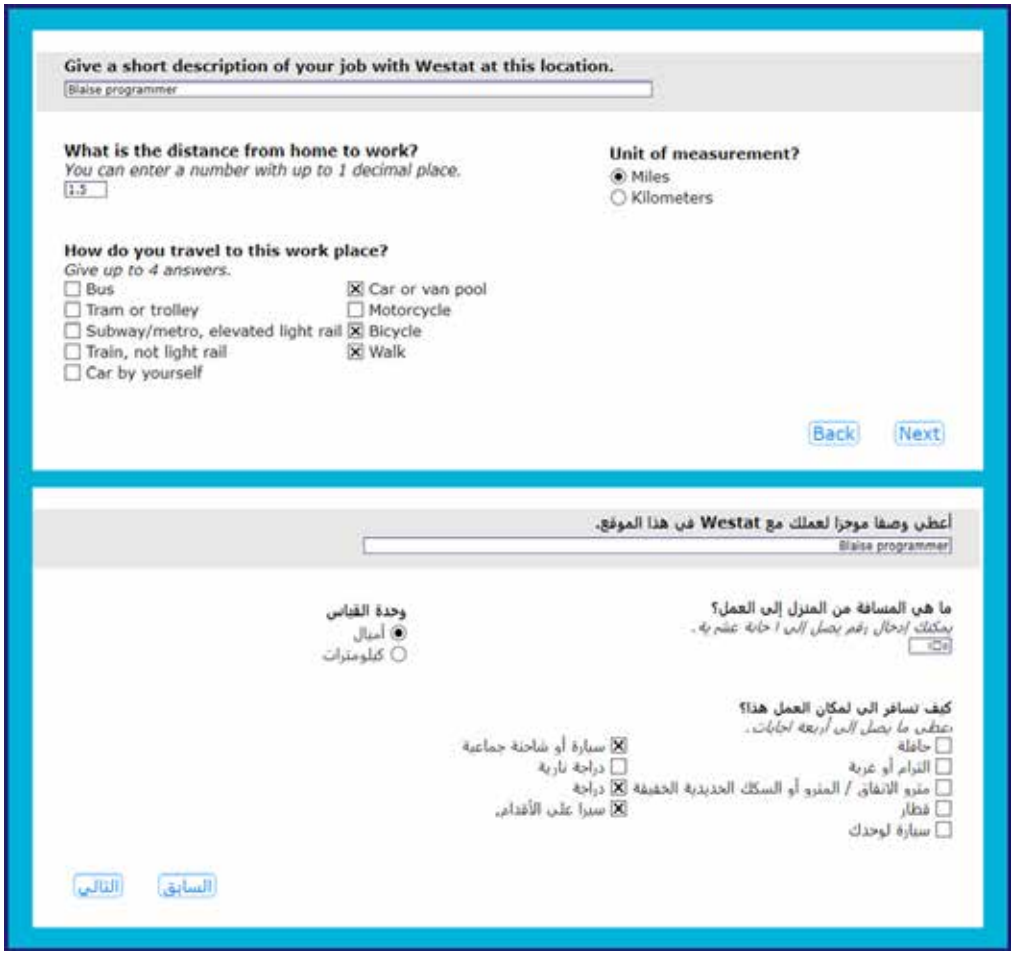
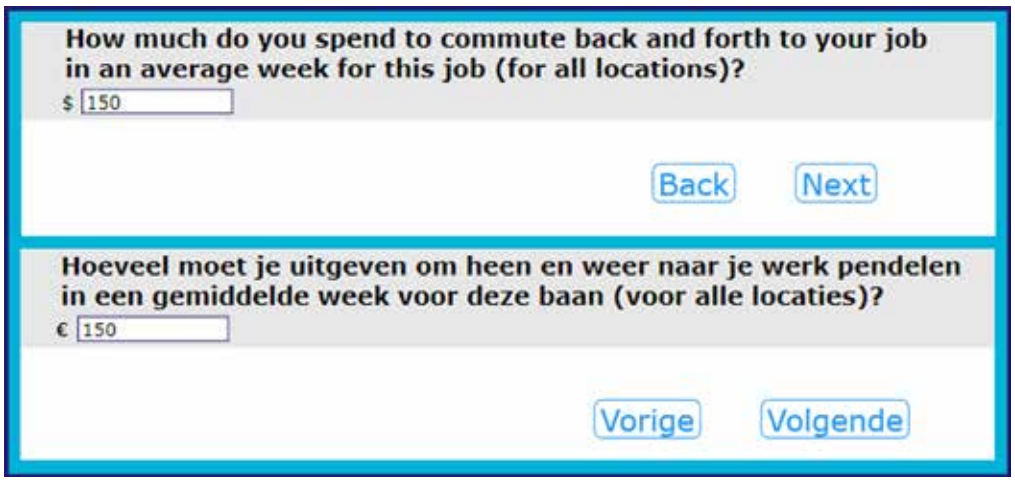


Figure 3: Question with different currencies for the U.S. and the Netherlands



Benefits of Blaise 5

Blaise is built for human and technical diversity. NSI's can use Blaise to guarantee their surveys are multilingual, multimode, multi-device, multiplatform and multi-operable. Blaise instruments also support multi-versions questionnaires. Blaise 5 maintains the highly praised interviewer ease-of-use pioneered in earlier Blaise versions. The Blaise team continues to improve the system based on the requirements of its users. As BCLUB members, NSI users may influence the way Blaise 5 evolves. NSIs should see other major Blaise users as allies in a demanding industry. Significant improvements made for one user usually end up benefiting all Blaise users.

The Resource Database and the Screen Layout Designer

Blaise 5 introduces the Resource Database and the Screen Layout Designer, two related screen design tools. The first allows you to define NSI templates. The second enables you to apply them. While there is a learning curve, the result is faster instrument production based on your own look-and-feel. Blaise 5 knows when to use each layout definition. Moreover, it is the NSI that defines these layout definitions. For example, you might set up templates for a vertically oriented smartphone, a horizontally oriented smartphone, a tablet (also for both orientations), and for a desktop and laptop. Then you might have different conventions for self- versus interviewer mode such as displaying DK (Don't know) and RF (Refusal) possibilities for the latter, but not for the former. Blaise 5 will detect the platform and the context and adjust the screen automatically.

One Source Code Deck - Multiple Uses of that Source Code

Blaise 5 introduces powerful new keywords that allow you to condition source code statements on mode and other attributes. It is possible to use one source code to define an instrument's different modes and post-collection data editing. Some examples of Blaise 5 keywords include MODES, ROLES, SPECIALANSWERS, and SPECIALANSWERSETS. These work hand-in-hand with screen-display features such as the Resource Database and the Layout Designer. For example, a common web operability standard is that a respondent can choose to leave a question empty and move onto the next question or screen. For an interviewer using the same questionnaire, the convention is to require a survey answer or a special answer such as Don't Know or Refusal. The Blaise 5 keywords handle both modes (self-administered and interviewer administered) easily. Another example: it is possible to use a MODES keyword such as Self versus Interview to route the questionnaire differently or to impose edits in one mode but not the other.

Figure 4: Source Code snippets and Layout Set management in the Layout Designer

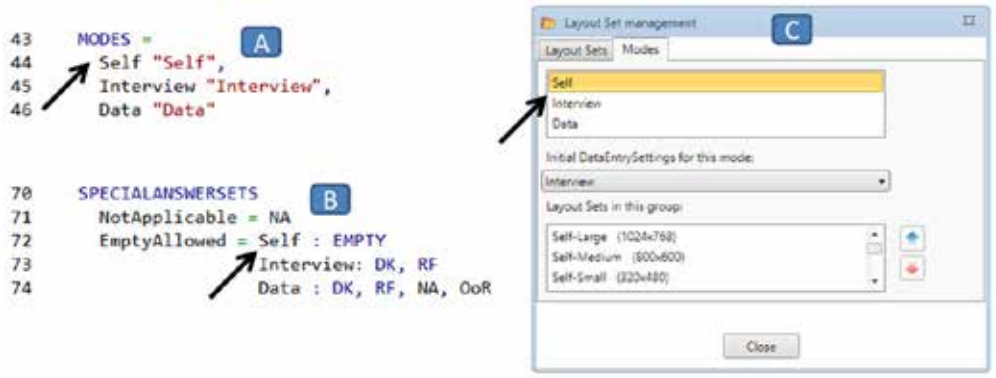


Figure 4 above shows two source code snippets (to the left) and a detail image from the Layout Designer. The Self mode defined in (A) shows up in the Layout Set management dialog (C). In the lower part of the dialog, you can see layout sets that are defined for the mode. In (B) the Self mode is set up so that any field can be left empty. This means that the self-respondent can move past a question without answering it. However, an interviewer cannot pass a field without providing an answer though that answer might be a Don't Know or Refusal.

Figure 5 below shows a screen (D) for the Self mode. There is no possibility for the user to enter DK or RF but she can leave any answer empty. There is a different screen (E) for the Interview mode. The detail in (F) shows that DK and RF are available for the interviewer.

Figure 5: Differences between the Self mode and Interview mode screens

Other Considerations

Blaise 5 is a fully secure system as confirmed by third-party security testers. Blaise 5 also undergoes regular stress tests, especially for the web. These are conducted by team Blaise, and the results are available to BCLUB members.

Blaise 5 incorporates the full range of accessibility features as described by the latest international standards WCAG 2.0 (Web Content Accessibility Guidelines). It is not possible anymore for an NSI to field instruments that are not accessible. However, while Blaise 5 is developed as fully accessible, any instrument design team must also make sure the questionnaire design is also accessible. For example, the instrument designers must supply appropriate screen reader texts and captions for images among many other considerations.

Blaise 5 also comes with a powerful Applications Programmers Interface (API) that allows you to access your in-house systems from within a Blaise instrument. Some users may hook in their own coding frame system from within a Blaise 5 instrument. With the API, this can be done seamlessly.

About Blaise®

Blaise® is a software platform for survey data collection and survey processing and is designed to handle governmental and scientific surveys. Statistics Netherlands (CBS) is a highly regarded National Statistics Institution and the producer of Blaise. Stationed at the CBS offices in Heerlen, Netherlands, a team of dedicated software engineers and survey specialists make up the heart of Team Blaise. Together with CBS' methodologists, data analysts, questionnaire developers and survey managers, they continuously work on improving Blaise® while supporting their vibrant user community.

Test the **National Commuters Survey**, our demonstration questionnaire, to see what a Blaise 5 questionnaire can do.

View the latest Blaise 5 video on the Blaise CBS YouTube Channel