Business Process Re-engineering using Blaise 4.8 API and Datalink

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1. Introduction

In accordance with our remit to develop the use of Blaise within ONS, the Blaise Development Standards and Support team (BDSS) within ONS Social Survey (ONSSS) have been looking at ways of using the software to streamline our business processes. ONS Social Survey systems have largely been based on using Manipula in conjunction with survey-specific Blaise database storage. Whilst this technology is flexible and well understood, it does have the downside of requiring a continual commitment of trained resource in the production and maintenance of Manipula scripts, and it can be difficult to manage data across multiple surveys.

The Blaise API and Datalink functionality provide both an alternative to the reliance on Manipula and an opportunity to reduce the resource committed to manual interventions in processes such as report generation, manipulating Blaise databases, and sample file maintenance on longitudinal surveys. At the same time, this technology can allow survey teams greater control over their business applications.

This paper focuses on the example of Electronic Learning Questionnaires (ELQs) to show how BDSS are helping to re-engineer a specific business process and showcasing these aspects of Blaise within ONS.

2. Selection of business process for re-engineering

When assessing whether to use Blaise API or Datalink to re-engineer a business process, there were a number of factors to consider:

i) What would the impact be on other IT systems within ONSSS? Ideally we wanted to introduce an application that would not have a large impact on other processes;
ii) Was there a clear efficiency gain to be had from re-engineering?
iii) Technical knowledge. The application would be written from a small pool of resource from within ONS Social Survey, which would influence the range of possible technical solutions.

3. Electronic Learning Questionnaires (ELQ)

3.1 Background

When BDSS took control of the Electronic Learning Questionnaire (ELQ), it became apparent that the ELQ report writing system provided an excellent opportunity to demonstrate the possibilities of Blaise Datalink and API. The reasons for this were:

i) The current system requires users to formally request our Information Management (IM) department to manually run an application to create the ELQ report. This involves filling out an IM request form, introducing a bureaucratic overhead. Ideally, users should be able to run the reports direct from their PC's, with no IM intervention;

ii) The ELQ report system is isolated from other business processes, as it is only reading data from returned ELQ case data and outputting it into a report format;
iii) A complete solution could be provided using the available technical skills available within BDSS;
iv) A standardised ELQ report across all the surveys could be easily provided, replacing the different formats that currently exist.

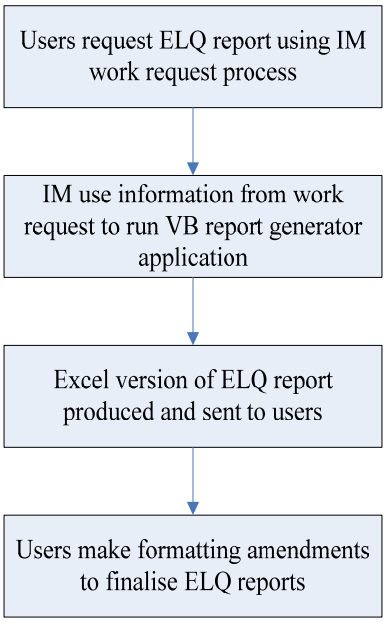
Field interviewers are sent a survey specific Blaise ELQ before they attend a survey briefing. The ELQ must be successfully completed for the interviewer to be eligible to attend the face-to-face briefing. The questionnaires are designed to test the interviewer's knowledge of a survey and key processes involved in working on it, and the interviewer has 2 attempts to answer each question correctly. If an interviewer answers a question incorrectly on the first attempt, they are directed towards the relevant section of their survey specific instructions. A report is generated which highlights the most problematic questions, which the trainer at the briefing uses to focus the session on problem questions and survey procedures.

For the purposes of this paper, the Household Assets Survey (HAS) ELQ has been selected. The HAS ELQ will test interviewer's knowledge on selected questions from the survey, covering pensions, mortgages and investments, as well as different scenarios that they may encounter. A list of questions included in the HAS ELQ can be found in Annex 1.

3.2 Current system for requesting ELQ reports

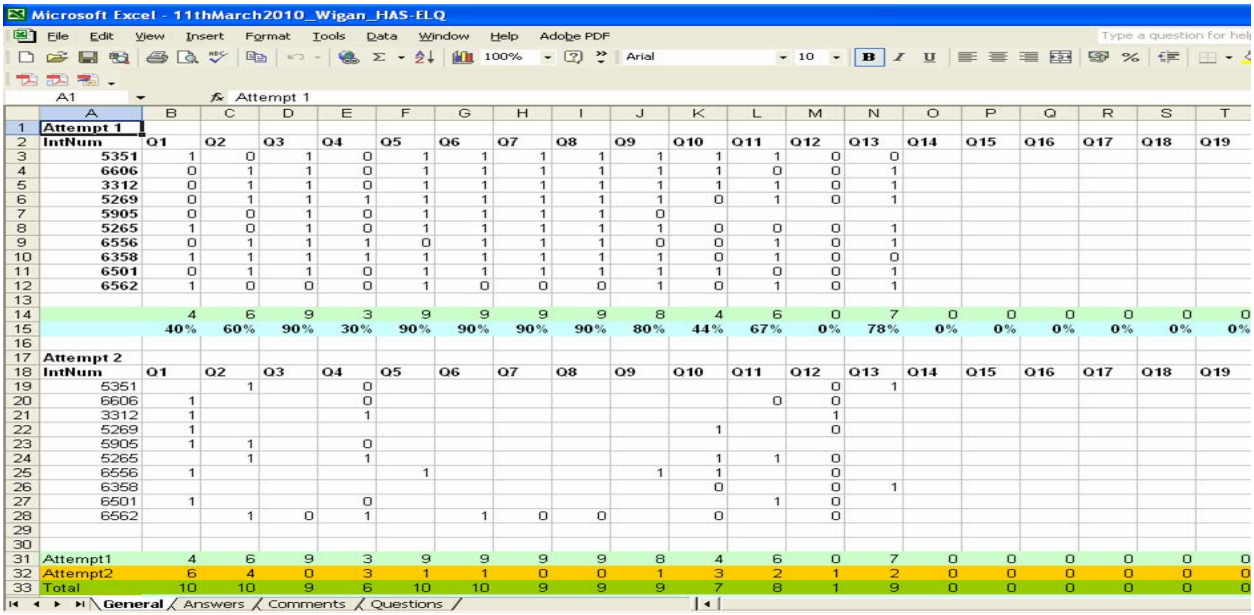
When an interviewer has completed their ELQ, the questionnaire is transmitted back to the office. The results from the ELQ are extracted by our Information Management Directorate from Blaise, and using a Visual Basic application which calls Manipula, the data is output to Excel spreadsheet format. Once the reports are produced, the Field Office team responsible for the survey will format the output into something that is appropriate for analysing. The process flow, shown in Figure 1 below, details how the ONSSS Field Office team produced ELQ reports.

Figure 1. ELQ report process



As the process flow demonstrates, there are a number of steps involved to produce the reports, each requiring some manual resource. An example report produced by our Information Management Directorate is shown in Figure 2.

Figure 2. Existing ELQ report



	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
1	Attempt 1																			
2	IntNum	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15	Q16	Q17	Q18	Q19
3	5351	1	0	1	0	1	1	1	1	1	1	1	0	0						
4	6606	0	1	1	0	1	1	1	1	1	1	0	0	1						
5	3312	0	1	1	0	1	1	1	1	1	1	1	0	1						
6	5269	0	1	1	1	1	1	1	1	1	0	1	0	1						
7	5905	0	0	1	0	1	1	1	1	0										
8	5265	1	0	1	0	1	1	1	1	1	0	0	0	1						
9	6556	0	1	1	1	0	1	1	1	0	0	1	0	1						
10	6358	1	1	1	1	1	1	1	1	1	0	1	0	0						
11	6501	0	1	1	0	1	1	1	1	1	1	0	0	1						
12	6562	1	0	0	0	1	0	0	0	1	0	1	0	1						
13																				
14		4	6	9	3	9	9	9	9	8	4	6	0	7	0	0	0	0	0	0
15		40%	60%	90%	30%	90%	90%	90%	90%	80%	44%	67%	0%	78%	0%	0%	0%	0%	0%	0%
16																				
17	Attempt 2																			
18	IntNum	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15	Q16	Q17	Q18	Q19
19	5351		1		0								0	1						
20	6606	1			0							0	0							
21	3312	1			1								1							
22	5269	1									1		0							
23	5905	1	1		0															
24	5265		1		1						1	1	0							
25	6556	1				1				1	1		0							
26	6358										0		0	1						
27	6501	1			0							1	0							
28	6562		1	0	1		1	0	0		0		0							
29																				
30																				
31	Attempt1	4	6	9	3	9	9	9	9	8	4	6	0	7	0	0	0	0	0	0
32	Attempt2	6	4	0	3	1	1	0	0	1	3	2	1	2	0	0	0	0	0	0
33	Total	10	10	9	6	10	10	9	9	9	7	8	1	9	0	0	0	0	0	0

There are several limitations to this report and the users would make extensive manual changes to it to make it suitable for distribution to the interviewer management teams. The main problem with the report was that there was no summary page identifying the key points from survey, it was not survey specific, it was cluttered, hard to read quickly and did not provide them with all the information they needed.

One major advantage of using Datalink to move the ELQ data into relational database storage is that it opens up the possibility of using off-the-shelf packages like Crystal Reports to produce tailored reports from the data.

4. The re-engineered ELQ reporting system

4.1 Objectives and benefits of the new ELQ reporting system

The main reason for re-engineering the ELQ reporting system is to reduce the amount of manual resource required to produce the reports. A successfully automated reporting system would enable Field Office users to have direct access to ELQ data from their desktops, and generate standardised reports from a standardised user interface. With more pressures on the resources of survey teams, automating more of their processes will enable them to continue delivering high quality outputs. Automating the systems will also release IM resource, enabling them to allocate more time to their core application support role rather than running business processes for customers.

Implementation of the new application would introduce a common format of ELQ reports across all surveys, reducing the time Field Office spend on standardising their outputs for analysis. It will also reduce the training requirements as Field Office staff move from supporting one survey to another.

Standard automated reports will enable quicker analysis of results, highlighting possible issues with questions. It will also enable the face-to-face briefings to be targeted at areas that the interviewers are struggling with, which should lead to better data being collected in the field.

The re-engineering project also provides an opportunity for the BDSS team to develop Blaise Datalink and API skills. This will allow us to take a fresh look at existing business processes within ONSSS, with the possibility of delivering cost effective applications to customers.

4.2 Developing the new application – Stage 1

The data from completed ELQ questionnaires returned by interviewers is already available in a merged Blaise database, created as part of the IM caseflow system. This will be the source of the ELQ data to be used in the reporting system.

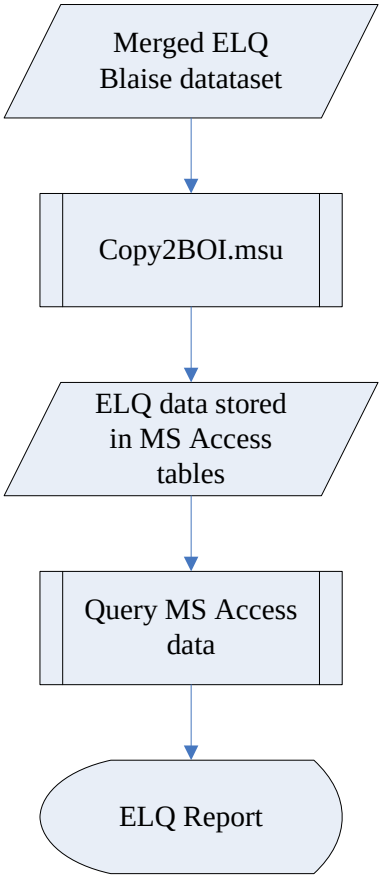
We decided on using Visual Basic to write the application, with Microsoft (MS) Access as the data storage method being queried by the application. These decisions were based on the relevant skills that were readily available within the BDSS team.

A BOI file was created to establish a link between the Blaise ELQ datamodel and the ELQ MS Access tables. The MS Access tables are based on the Blaise ELQ dictionary, and the data partition type selected was flat with blocks.

Using the merged Blaise ELQ dataset as the initial data source, the VB application runs a compiled Manipula script (Copy2BOI.msu) to copy data from here to MS Access tables. With the ELQ data now in MS Access, a simple SQL select query is run from within the VB application to retrieve the data. The application currently uses the in-built VB report writer to generate and display the data report on screen, with the option of printing. However, we are investigating using Crystal Reports to try and avoid maintaining VB code that makes direct reference to ELQ questions, thereby introducing more flexible report writing.

Variations on the SQL select query embedded in the VB application were introduced to enable data to be displayed either by briefing date of briefing location, depending on parameters input by users. The different outputs were achieved by use of different WHERE clauses within the SQL select queries.

Figure 3. ELQ reporting application process



After giving a demonstration of the first version of the application to field Office staff, the response was favourable. However, they ideally wanted to display not just the responses to the ELQ questionnaire, but also a summary page displaying those interviewers who had not yet responded, the number who had, the question causing the most difficulty at attempt 1, questions with in-correct answers after two attempts. In effect, a method of creating a dynamic sample would need to be integrated into the application, to enable responders and non-responders to be displayed on the ELQ reports.

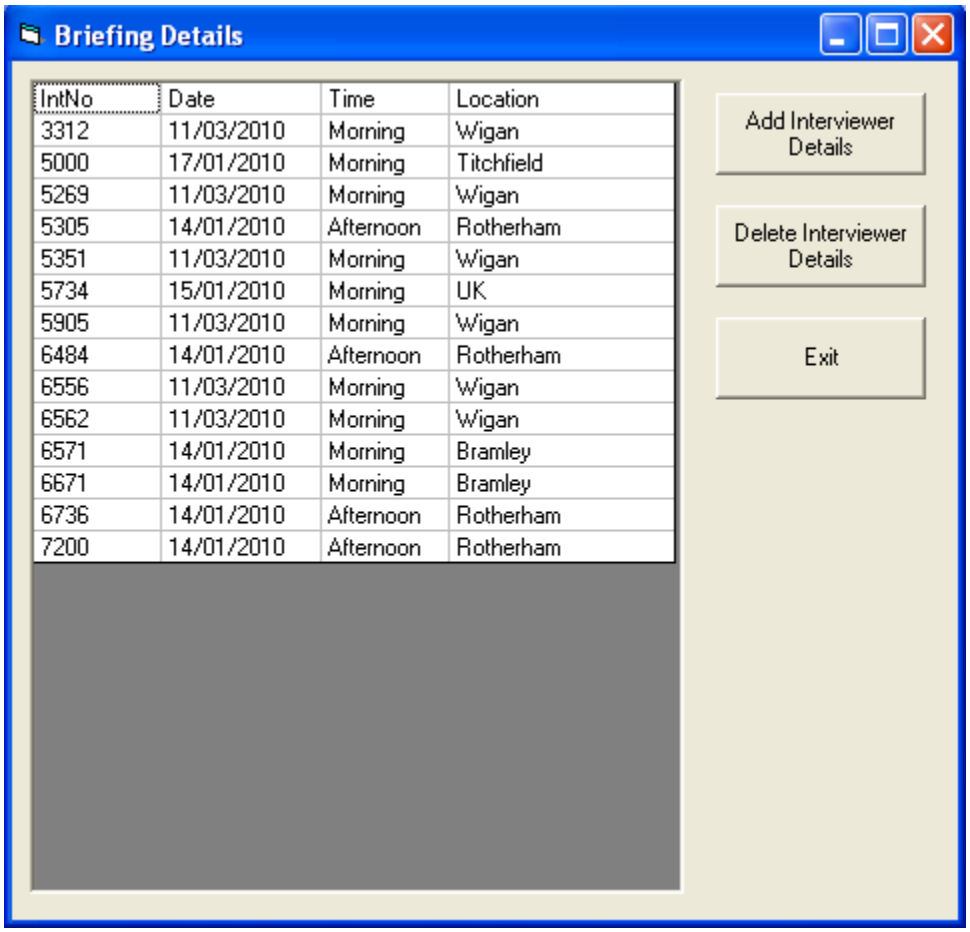
4.3 Developing the new application – Stage 2

To create the sample of interviewers for each briefing, a user interface was designed for the VB application. This interface would enable the user to enter:

i) The interviewer number
ii) Briefing date
iii) Briefing time i.e. morning or afternoon
iv) Briefing location

The briefing details entered through the user interface are stored in a text file. The Blaise API is then used in the application to copy the details stored in the text file into a Blaise database. This is achieved by using the ASCII file setting object and the copyfields method of the Blaise database manager object.

Figure 4. Creating the sample for interviewer briefings



IntNo	Date	Time	Location
3312	11/03/2010	Morning	Wigan
5000	17/01/2010	Morning	Titchfield
5269	11/03/2010	Morning	Wigan
5305	14/01/2010	Afternoon	Rotherham
5351	11/03/2010	Morning	Wigan
5734	15/01/2010	Morning	UK
5905	11/03/2010	Morning	Wigan
6484	14/01/2010	Afternoon	Rotherham
6556	11/03/2010	Morning	Wigan
6562	11/03/2010	Morning	Wigan
6571	14/01/2010	Morning	Bramley
6671	14/01/2010	Morning	Bramley
6736	14/01/2010	Afternoon	Rotherham
7200	14/01/2010	Afternoon	Rotherham

A Blaise BOI file was created to enable a link between the briefing data input through the user interface, and the MS Access BriefingDetails table. Initially a full BOI file type was specified. However, testing revealed that if the data partition type was flat with blocks, when a record was deleted from the source Blaise dataset containing the briefing details, a runtime error in the VB application occurred at the point where the SQL DELETE statement is invoked. Consequently, the BOI file type was changed to Data only. With only a data table being created, the SQL DELETE statement successfully deleted the selected record.

On exiting the Briefing Details screen (shown in Figure 4 above), the application then runs a compiled Manipula script that updates the BriefingDetails.boi updatefile with the data input by the user.

The BriefingDetails table in MS Access, updated with the briefing data supplied by the user, can now be joined (using the primary key field IntNo) with the MS Access ELQ table containing the returned data. The SQL select statement embedded in the VB application makes use of the LEFT JOIN command,

enabling all selected interviewer numbers to appear in the final report, irrespective of whether they have returned data.

The results of running the re-engineered ELQ report system can be seen in Figure 5. In this example, the first 6 interviewers in the list have returned ELQ data for the date 11/03/2010. The date would have been a user supplied parameter, and is used in the construction of the SQL query embedded in the application. The ELQ data table in MS Access has an Administration block, which includes a date field, and this is used to retrieve the relevant cases filtered by the supplied date. The seventh case (9999) has not yet returned a completed ELQ questionnaire after attending the briefing on this date. However, the results of using the LEFT JOIN in the embedded SQL syntax can be clearly seen, as all interviewers being recorded in the BriefingDetails table as attending the briefing on 11/03/2010 are displayed. As a result, users can clearly identify non-responders.

Figure 5. The end result

ELQ Report Printed on: 19 August 2010 16:00

Briefing Date: 11/03/2010

Attempt 1

Intlum	Q01	Q02	Q07	Q08	Q09	Q10	Q11	Q13	Q14	Q16	Q17	Q18	Q19	%
3312	0	1	1	0	1	1	1	1	1	1	1	0	1	77
5269	0	1	1	1	1	1	1	1	1	0	1	0	1	77
5351	1	0	1	0	1	1	1	1	1	1	1	0	0	69
5905	0	0	1	0	1	1	1	1	0					38
6556	0	1	1	1	0	1	1	1	0	0	1	0	1	62
6562	1	0	0	0	1	0	0	0	1	0	1	0	1	38
9999														
	33%	50%	83%	33%	83%	83%	83%	83%	67%	40%	100%	0%	80%	

The new report also allows users to easily identify the most problematic questions, which can then be addressed at the interviewer briefing.

Annex 1

Question	Question Text	Possible Question Responses
1	The HAS covers a number of topics relating to assets and debt. Which of the following is NOT within the scope of the HAS?	- Business Success - Government spending patterns - Consumer credit - Value of accounts and investments held overseas
2	You are about to start an interview (at a household interviewed at a previous wave) and you find the case on your laptop is corrupt and cannot be used. Do you;	- Use a training case to carry out the interview - Open a second household on another address - Leave and ask for the case to be re-scattered - Swap with an ineligible address

Question	Question Text	Possible Question Responses
3	The DWP uses the HAS to find out?	- About peoples business assets - About wealthy individuals and investment decisions - The value of peoples property - If people are saving for retirement
4	What is 'The Boost'?	- The £10 voucher to help response - The respondents who join a household - New addresses added to the sample - Multi households addresses
5	How many addresses are in a follow up quota from a previous wave?	- Less than 13 - 13 - More than 13 - 26 - Variable
6	The OSM agrees to interview but is not the HRP. The HRP and spouse refuse to take part in the survey. Do you?	- Interview the OSM and take proxy details for the HRP/Spouse - Interview the OSM only, as we are following individuals - Code the case as a refusal to interviewer - Code the case as ineligible
7	You expect to find the Smith family at the sampled address, but you find it empty and boarded up. The first thing you should do is;	- Contact the FEL and ask for the respondents new address - Outcome code the address as you found it, vacant - Try and find out where the respondents have moved - Code the case as moved away, address unknown
8	You find a 15yr old at the previous wave, now 17yrs old has moved out and is now flat sharing with five friends a couple of streets away. Should you;	- Open a second household and make a note of the new address for future allocation - Exclude, no longer a household member at the sampled address - Open a second household and interview the 17yr old and all his friends at the new address - Open a second household and interview the 17yr old only, as an original sample member
9	What are the extensions of time or extra visits rules on the HAS?	- No approval is required - Agreement is required from the Field Office/Survey Management area via your Field Manager - Agreement is required from your Field Manager - None permitted
10	When would you open a second household for a follow-up address?	- When the original household has moved to a second address - When some of the people have left the address - When another address/household in the quota is corrupt - When you discover a multi-household
11	Which of the following should you do if a respondent asks for clarification of an Opinion question (denoted by an * at the beginning of the question)?	- Rephrase the question - Repeat the question as it is written - Give your own interpretation of the question - Remain silent in hope respondent will give an answer
12	A household has taken out a loan secured on their main residence in order to help purchase a city-centre apartment. The payments they make partly cover interest and partly pay off the capital of the loan. How should this be coded at MType (Type of mortgage)?	- An endowment mortgage or loan - A repayment mortgage or loan - Another type (not listed in the coding frame for this question) - None of the above - this loan should be recorded in relation to the other property

Question	Question Text	Possible Question Responses
13	At GCOll 'Do you (or anyone in your household) own any collectibles or valuables - such as antiques, artworks, stamps etc - including items stored or kept elsewhere?' the respondent tells you that they have a number of antiques all kept at their main residence. They also have some valuable paintings in their second home in Spain. Which, if any, of these items should be included in their estimate of current market value at GcolV/GClVb?	- None - Just the antiques - Just the paintings - The antiques and the paintings
14	Thinking about occupational pension schemes, which of the following options of occupational pension schemes applies when a respondent says the value of their pension relates to the value of contributions made over the years as well as their salary in the final years before retirement?	- Money-purchase scheme - Salary-related scheme - Hybrid scheme - None of the above
15	Still thinking about pensions, which of the following statements reflects the true definition of a Group Personal Pension (GPP)?	- It is an occupational pension provided by the employer - It is an occupational pension scheme organised by an employer but provided by a financial institution - It is a type of private pension - It is a special type of stakeholder pension
16	When collecting information on savings and investments, a respondent tells you that they have a Basic Post Office Account. What sort of account should this be included as at FinvTy ('Types of accounts and investments you currently have')?	- Current account - Saving/deposit account - Individual Savings Account (ISA) - None of the above
17	When completing the financial assets section of the questionnaire, a respondent tells you that the Offset Mortgage covered earlier in the survey has a savings account element. What sort of account should this be included as at FInvTy ('types of accounts and investments you currently have')?	- Current account - Savings/deposit account - Investment Bond - Other financial asset
18	When interviewing a married couple you are told that the husband and wife hold a credit card account jointly in both names. Their daughter is an additional card holder. Against whose name should the value of any outstanding debt on the account be recorded?	- All - The husband and the wife as joint account holders - The husband or the wife, whoever is interviewed first - The husband or the wife, whoever is interviewed first, and the daughter"
19	Which of the following examples would qualify as a FULL individual interview on the HAS?	- The individual interview has been completed up to and including 'Trusts' - The individual interview has been completed up to and including 'Inheritance' - The individual interview has been completed up to and including 'Non-mortgage debt' - The individual interview has been completed up to and including 'Employment income'