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Telephone Data Entry as the Primary Mode of Response to Short Term Surveys at the Office for National Statistics, United Kingdom

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Abstract

Telephone Data Entry (TDE) is a system by which survey respondents can return their data to the Office for National Statistics (ONS) using the keypad on their telephone and currently accounts for approximately 12% of total responses to ONS business surveys. ONS is currently increasing the number of surveys which use TDE as the primary mode of response and this paper gives an overview of the redevelopment project covering; the redevelopment of the paper questionnaire, enhancements made to the TDE system and the results from piloting these changes. Improvements to the quality of the data received and increased response via TDE as a result of these developments suggest that data quality improvements and cost savings are possible as a result of promoting TDE as the primary mode of response to short term surveys.

Key Words: Telephone data entry, Questionnaire redesign, Data quality.

1. Introduction

1.1 Background

For the past 13 years, the Office for National Statistics (ONS) has offered Telephone Data Entry (TDE) as a means of responding to business surveys. TDE is a system by which survey respondents can return their data to ONS using the keypad on their telephone. Respondents are sent a paper 'counterpart' questionnaire which informs them of the freephone telephone number to call, their unique respondent identification number, and the data required. On calling the telephone number, a recording of each survey question is heard and the respondent enters their data using their telephone keypad. TDE has advantages over the more traditional paper and pen postal questionnaires: response is faster as data are no longer returned through the postal system; data processing is reduced (for example, no scanning of the questionnaire is required); data quality is improved as respondents have the opportunity to self correct their response; and there are cost savings of approximately 28p per response as return envelopes and postage are not needed.

TDE is currently an option for returning data or requesting replacement questionnaires for 14 ONS business surveys, and accounts for approximately 12% of total responses. In 2007 the original ONS TDE system was replaced with a new, more robust system which has the capacity to handle a larger number of calls at one time. This enabled ONS to expand the use of TDE to a greater number of respondents and potentially more surveys. Consequently, in the second half of 2007, Data Collection Methodology, Business Surveys (DCMB) at ONS undertook a research project to investigate the processes required to successfully promote TDE as the primary mode of response to ONS short term business surveys (a group of surveys that collect data on a monthly basis covering relatively simple data items such as turnover and employment), that currently only use TDE as one of several options for returning data. The project involved the redesign of the paper 'counterpart' questionnaire used to specify the data required and to prompt respondents to telephone the TDE system, and the TDE system itself, which includes, for example, the dialogue that respondents hear when they ring the TDE telephone number and the design of the 'routing' which

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respondents follow as they return their data³. The Monthly Inquiry into the Distribution and Services Sector (MIDSS) was chosen for this project. This survey collects business turnover on a monthly basis and every three months, the number of people employed by the business.

This paper summarises the work carried out by DCMB to redesign the paper counterpart to encourage response via TDE and to enhance the original TDE dialogue. The paper then goes on to discuss the impact of moving to TDE as the primary collection mode on response and data quality.

2. Method

2.1 Methodology

The research carried out to redesign and enhance the TDE ‘paper counterpart’ and the system was undertaken using a combination of qualitative techniques including cognitive interviews, semi-structured interviews and observational techniques. The development work was carried out in two phases with the paper questionnaire being redeveloped first (largely using cognitive interview methodology) followed by the TDE user interface (using a mixture of cognitive and semi-structured interviews and usability methods).

2.2 Respondents

The people interviewed during the project were either current MIDSS respondents or were eligible to be selected to complete the MIDSS questionnaire. The respondents represented businesses from a range of industry types and sizes and included respondents who had used the old TDE service, allowing a direct comparison between the previous and re-designed system. Approximately 50 businesses took part in the interviews – 25 in each phase of the project.

2.3 Interviews

Interviews lasted between 20 minutes and 1 hour. During the first phase of development the interviews focused on the redesign of the paper ‘questionnaire’. They covered respondent understanding of the concepts used, availability of the data requested and the effectiveness of the instruction to use the TDE system to return data. While these aspects of the response process were also covered in the second phase of the development, these interviews concentrated on the usability of the TDE system and respondent perception of using TDE to return data to ONS.

2.4 Pilot survey

Once the initial redevelopment work had been completed, the new ‘questionnaire’ and TDE system were piloted on the sample covered by one questionnaire type⁴, within the overall MIDSS sample. This pilot began in January 2008 with a 25% sample of respondents covered by the selected questionnaire and expanded to 50% of respondents with that questionnaire type in February 2008. It has been running at this level since. It is planned to put the new questionnaire and system into full production in January and February 2009⁵.

³ Note that the ‘system’ does not refer to any redesign of the software or hardware which runs TDE.

⁴ This covered a wide range of business types including: sale of cars, wholesale of fruit and vegetables and wholesale of clothing.

⁵ While the pilot has been running, DCMB have redeveloped the whole suite of MIDSS questionnaires and have continued to work towards additional enhancements to the TDE system.

3. Development

3.1 Redevelopment of the paper ‘questionnaire’⁶.

The original paper questionnaire had not been redesigned since its inception in 1995 and its overall design reflected this. Headings and statements rather than questions were used to request data, notes to assist respondents were presented in a separate section, absence of a clear navigational path and lack of prominence of the option to return data via TDE were features of the original questionnaire. In response to this the redesign of the paper ‘questionnaire’ focused on the comprehension of, and ability to provide, the data being requested, successful navigation through the questionnaire, and the recognition of the instruction to use TDE to return the data requested. This work followed standard questionnaire design principles and involved wording statements of data requirements as questions, placement of instructions and information to assist completion with the questions it related to, establishing a clear navigational path through the questionnaire and implementation of generally accepted standards for the visual presentation of data requests (Dillman 2000, Dillman et al 2005, Stern et al 2007).

Perhaps the most challenging aspect of the questionnaire redesign involved trying to encourage respondents, many of whom have been completing the questionnaire every month for several years, to change their response habit – from returning the questionnaire via post to using the TDE system to report their data. This was achieved by:

- redesigning the front page by replacing the old paper completion instructions with a prominent instruction to use TDE, emphasising the TDE phone number and de-emphasising any other contact phone numbers, and the inclusion of several visual clues (the placement of a picture of a telephone next to the instructions to use TDE on the front page and with the repeat instructions on the page containing the questions)
- reference to ‘phone call’ and ‘phone keypad’ in several places
- the removal of the constrained response boxes next to the questions.

Despite these changes, respondents often only noticed the questionnaire had changed when they could not find the standard response boxes where they expected them to be. The ‘response area’ was often the first place respondents focused when they received the questionnaire having failed to read the title of the survey or any of the instructions or questions, and not having seen the prominent pictures of telephones. While the change in format of the response box (from constrained boxes to a single line) often encouraged them to pay more attention to the questionnaire, and alerted some respondents to the instruction to use TDE, it did not have a strong positive impact on other respondents. Several designs were used during respondent interviews to attempt to emphasize the instruction to use TDE but perhaps the most effective prompt for respondents to use TDE was the removal of the postage paid return envelope from the survey request pack. This led respondents either to look back through the questionnaire for a clue as to what to do and then realise they should use TDE to return their data, or suggesting to the interviewer that they would use their own envelope to return the questionnaire.

A simple ‘flyer’ explaining the new return method was also included in the envelope with the questionnaire. This had a limited impact on current survey respondents. It was often either removed from the envelope with the questionnaire and put aside without being read, or not removed from the envelope at all. Respondents who were new to the survey were much more likely to read the questionnaire and flyer when they received it and thus notice they should use TDE to return their data. The use of coloured rather than white paper for both the questionnaire and flyer were investigated but were not pursued because of operational constraints.

A paper that discusses this questionnaire design work in more detail is to be published in ONS’ ‘Survey Methodology Bulletin’ in the near future.

3.2 Enhancements to the TDE system

This sections give an overview of the enhancements made to four core aspects of the TDE system: the length of the TDE call and standard of the dialogue; perceived confidentiality and proof of response; ‘press-ahead’

⁶ Based on work undertaken by Hamilton and reported in an unpublished working paper.

programming⁷; and respondent verification of their data entry. These aspects of the TDE system were focused on as they had been previously identified by respondents, via preliminary exploratory interviews carried out by DCMB and communication with the ONS' respondent relations team, as key to their willingness to use the TDE system.

3.2.1 Length of call and standard of dialogue.

The previous TDE dialogue was recorded at a slow tempo with noticeable gaps between the sound files - the individual recordings that come together to create the whole dialogue, they may be a whole paragraph, sentence or single word. This made the dialogue sound long-winded and mechanical and, as a result, kept respondents on the line longer than was necessary. To address this, the dialogue was rerecorded using a single voice and particular attention was paid to the intonation, flow and speed of the dialogue. Where the tempo of the dialogue was increased to make it sound less longwinded, a balance was met between speed and clarity ensuring respondents were able to understand what they were being asked. As Frostad (2003) notes, "the dialogue should cue off human conversation and not written speech".

The length of the call was further reduced by making several changes to the dialogue script. For example, the old system gave long lists of what the respondents should include and exclude in their response. As the redesigned paper TDE 'counterpart' questionnaire included these notes on inclusions and exclusions with the questions, they were removed from the dialogue.

Testing with respondents who were frequent users of the old TDE system revealed that they noticed that the system had been updated and were positive about the changes. Respondents found that entering data on the new system was straightforward and an improvement on the old system.

3.2.2 Perceived confidentiality and proof of response.

The current climate of concern about data security in the UK means ONS must reassure respondents of the confidentiality and security of their data. As part of the redevelopment of TDE, factors which reassure respondents about security and confidentiality of the system were investigated. Returning data by TDE is a secure method of responding and is safeguarded by stringent data protection protocols. However, the paper 'counterpart' questionnaire and TDE dialogue still need to reassure respondents of this security in order for them to use TDE with confidence. Currently, respondents are issued with a unique nine digit identification (ID) number each month. At the beginning of a TDE call, they are prompted to enter this number. If they enter a valid ID, they are granted access to the rest of the dialogue where they are asked to enter their data. This number is 'played back' to the respondent as the research showed that this increased the sense of confidentiality by reinforcing the point to respondents that they are entering data for their business.

Respondents are further assured of the confidentiality of the data supplied for the MIDSS survey by a unique reference number printed on the questionnaire which can be used for any queries they may have about their call. This is important as this and previous research at ONS revealed that respondents worried they had no recognition or record of their data submission via TDE (Jones et al., 2004). A reference number reinforces to respondents that their data has been recorded and gives them the piece of mind that they can check any issues about their data over the phone.

3.2.3 Press-ahead.

A significant aspect of a TDE system is the press-ahead function where a respondent can enter the requested data before the dialogue on the TDE system has ended. It is clear from observing and speaking to respondents that pressing ahead is very popular and used with other TDE systems (For example, if you phone a business and wish to speak to a member of customer services, when you hear "press two for customer services", you may follow the instruction immediately and not listen to any further options.).

⁷ Press-ahead is where respondents begin entering the required data before the dialogue has ended. It is discussed further below.

Respondents with experience of the ONS TDE system are able to anticipate which variable will be asked for and often have their completed questionnaire in front of them when using the system. Thus they know the order of the questions, are prepared for entering data before actually making a call and therefore often take the earliest opportunity on the TDE system to input their data.

In designing the 'press ahead' function in the TDE system a balance had to be found between enabling it too early in the question which could lead to respondents not listening to what they are being asked to provide, and making respondents listen to 'too much' dialogue so the call becomes unacceptably long. These new requirements have resulted in a system that allows respondents to 'press ahead' as soon as the requested variable has been read to them and not having to listen to the instructional notes – these can be heard if they do not 'press ahead' and relate to how to use TDE and give examples of entering data. Notes on data requirements are printed on the questionnaire next to the question they relate to so respondents have access to this even if they 'press ahead'.

3.2.4 Respondent data validation

When designing any interactive response system the options for 'online' validation need to be considered. The original system included two types of validation; respondents' answers were played back to them for confirmation or change and, in addition, any response that fell outside that expected by the system (eg. turnover more than 10% higher or lower than the previous month) was queried and respondents asked to supply an explanation, via a voice message, at the end of the call. A decision was made to drop this from the redeveloped system based on advice from the client that this second method of validation was not working as hoped when initially designed. It had also been found to annoy and upset some respondents (Jones et al, 2004, Hamilton 2007 and forthcoming).

The first type of validation, repeating the value entered back to the respondent and asking for confirmation or change, was retained and proved to be successful in two ways. Respondents appreciated the chance to re-enter their data if they had made an error, either by pressing the wrong keys or failing to round their response to the nearest thousand pounds⁸. It also gave respondents the opportunity to check their data before it is submitted thus giving them a feeling of control over the response process. By checking and confirming their data, respondents have a perception that they can take charge of the call and can navigate through the system at their own will giving them a sense of control over the response process and TDE system more generally.

A fuller description of the development of these aspects of the TDE dialogue can be found in Peck and Maclean (2008).

4. Results

The main objective of the development work described above was the introduction of TDE as the primary mode of response to MIDSS. Changes to the paper questionnaire were made in an effort to improve the quality of the data returned and to encourage respondents to return their data via TDE. Changes to the TDE dialogue were made to encourage respondents to continue to use TDE on an ongoing basis. The pilot survey was run to enable changes in response mode and rate to be accurately measured and for any changes in the quality of the data provided to be monitored.

4.1 Response rates

4.1.1 Response via TDE

Results from the pilot showed that response via TDE from the original questionnaire was around 17%. In contrast response via TDE from the redesigned questionnaire was just over 90%, with the remainder returning their data via

⁸ Respondents to most ONS surveys are asked to provide data rounded to the nearest thousand pounds, and drop the last three zeros from their response. Failure to do this results in, for example, £250,000 being recognised as £250,000,000.

post, fax or phone via the respondent relations team⁹. This level of response has been consistent over the first 10 months of the pilot.

4.1.2 Overall response rates

Overall response rates, over all modes of response, for those sent the redesigned compared with the original questionnaire, show that response rates for the new questionnaire are consistently lower than for the original questionnaire. However, during the first ten months of the pilot, the difference was statistically significant for only the first two months of the pilot (January and February). The possible reasons for this difference in overall response rate are still being investigated and may include slight differences in the make up of the pilot samples and in the response chasing strategy employed for the new and old questionnaires.

4.2 Data quality

4.2.1 Reporting period

The period to which returned data relates is critical for short term surveys. MIDSS respondents are asked to provide their data for a calendar month (standard dates) but are given the option, when returning via paper and TDE, to supply alternative reporting dates (non-standard dates). Analysis of the pilot results indicate that those who respond via TDE are more likely than those using the paper questionnaire to say they are returning data that covers a calendar month. However, analysis of these returns suggests that businesses are not systematically changing their reporting behaviour when using TDE. The number of businesses that changed behaviour is small compared with the overall number of respondents and a similar number of businesses change from standard to non-standard as change from non-standard to standard dates.

4.2.2 Edit failures

Analysis of turnover data returned during the pilot showed that data returned via TDE are less likely to fail the standard edit rules. Several possible explanations for this have been identified (Lewis 2008 unpublished working paper) including; an additional edit on paper returns (ability to include a written comment on the questionnaire), errors of reporting turnover (reported turnover is “read back” to respondents using TDE, giving an opportunity for self-correction) and possible scanning and recognition errors for paper returns.

Analysis shows that around 7% of respondents to the paper questionnaire leave a comment (ie. write something in the comments section). These edit failures, which are not relevant to TDE returns, account for between 11 and 22% of all edit failures. Thus, for many months, a large part of the difference in the number of edit failures can be explained by difference in the ability to leave a comment explaining changes in the data returned. Importantly these errors have no impact on the size of changes to data following validation.

4.2.3 Size of errors

Probably the most notable difference in the quality of data coming from TDE compared to paper questionnaire is in the size of errors in reporting turnover corrected by the editing process. For TDE the average size of adjustments to turnover from editing was around 30% to 40% of the total turnover estimate. For the paper questionnaire the errors were generally around 3,000% to 5,000% of the total turnover estimate. The main cause of this was errors in reporting the units of turnover. These errors include failure to report in thousands of pounds (£250,000 should be reported as £250) and inclusion of pence in the response (reporting £250,123.63p rather than £250). There were much fewer unit of response errors for respondents using TDE since they have the opportunity to confirm or change their response when it is read back to them, thus correcting any such errors at source.

There was no significant difference between modes in the size of errors in reporting employment. There is little difference in the number of records that fail edits and validation checks and the resulting changes are much more

⁹ These results are a summary of work undertaken by Daniel Lewis reported in an unpublished working paper.

consistent between the modes. There are two possible explanations for this; employment numbers tend to be less volatile than turnover data and reporting unit errors are unlikely to occur with employment.

4.3 Response burden

Limited analysis has so far been undertaken in any changes in either actual or perceived response burden. However, the addition of an extra step in the response task suggests that actual response burden will increase. Initial estimates show that the TDE phone call takes approximately 3 minutes and observation of respondents completing the response task suggest that the same process is undertaken for TDE as with paper, with the photocopying and enveloping of the questionnaire being replaced by the phone call. However, the significant reduction in edit failures that could lead to fewer respondents being contacted by ONS to confirm their response, may off-set much of the increase in time used to complete the TDE phone call. Further investigation of the impact of encouraging TDE as the primary mode of response on actual and perceived burden needs to be undertaken.

5. Discussion

The results of this pilot show that it is possible to change the response habit of respondents who have been in a survey sample for several years (in this case from 17% to 90% response via TDE). This can be done through redesign of the collection instrument(s) using best practice for design and development and qualitative pre-field testing methods. However, the power of the 'response habit' should not be underestimated when attempting to change the behaviour of respondents who have been completing monthly questionnaires for an extended period. The research reported here suggests that trained respondents pay little attention to the content of a questionnaire as they assume it will be the same as the last time they completed it. In fact, they may never have read the questionnaire at all having been told how to complete it, (which number to copy from the accounts) by the person who completed it before them. Significant changes to the front page and layout of the questions failed to alert many respondents to the changed mode of response. It was the removal of the prepaid return envelope that had the most significant impact on response mode behaviour. Further work has suggested that sending a separate, short, personalised letter to respondents a few days prior to them receiving the new survey questionnaire, could be the most effective way of alerting them to the changed response mode.

The results of the evaluation of the pilot suggest that significant improvements can be made to the quality of the data returned by respondents without the use of forced 'online' validation (preventing a respondent from continuing to the next question if a response is recognised as invalid). Investigation of the source of differences in edit and validation failures between the paper questionnaire and TDE system indicates that 'playing' the recognised response back to the respondent for confirmation or change eliminates the majority of response error. This process appears to balance the needs of the respondent for a simple and fast response method with those of the collection agency for accurate data. Lewis' (unpublished) investigation into differences in data quality between TDE and paper returns concludes that while several factors contribute to the difference between the data returned via TDE as opposed to paper, there is a real improvement in the quality of data returned via TDE that can be attributed to the opportunity for respondents to confirm their response when using the TDE system to return their data.

Investigation into reasons for the lower overall response rate in the pilot is ongoing. Research into further design changes to the paper questionnaire and TDE dialogue to address difference in the reporting period are being undertaken. The research undertaken thus far suggests that respondents are more likely to report standard dates as this is the first option on the TDE system and is the route of least effort – one key press rather than entering separate start and finish dates for their data.

Work is ongoing to redevelop the full set of questionnaires currently used to gather data from respondents to MIDSS. This work includes further changes to encourage respondents to notice the request to change response mode (additional graphical clues and wording changes) and the reduction in questionnaire types from 12 to four, with the integration of the 10 different versions of notes into the questionnaire. Additional improvements to the TDE system and voice are also being undertaken in an effort to encourage respondents to continue to use the TDE system. By ensuring the phone call is as positive an experience for respondents as possible we aim to reduce both actual and perceived response burden. Jones, Haraldsen and Dale (2007) note the various factors affecting the perceived burden

of responding to business surveys. Significantly, both the perceived length of time needed for responding and mode of data collection are potential sources of burden. Additionally, an unprofessional sounding dialogue reflects poorly on the organisation managing the system. Frostad (2003) argues that a system's voice/dialogue reinforces certain beliefs and attitudes of respondents towards the organisation behind the service and that respondents will develop an "image in their minds of the person they hear" (Frostad, 2003). Importantly, a system which is unattractive and difficult to tolerate could dissuade respondents from entering data during their call and may deter them from using the service in the future.

6. Conclusion.

This paper gives an overview of work undertaken by DCMB to attempt to make TDE the primary mode of response to the MIDSS survey. The redesign of the paper questionnaire to bring it into line with ONS best practice and to improve the quality of the data being collected was undertaken using qualitative pre-field testing methods. Similar methods were employed to redesign and test the enhanced TDE dialogue. The resulting questionnaire and TDE system were piloted during 2008 and will be put into production in 2009.

The redesign of both the paper questionnaire and the TDE system served to reinforce the need for and value of qualitative pre-field testing of data collection instruments. This enabled ONS to gain an indepth understanding of the response process and to make changes to both the questionnaire and the dialogue to address any misunderstandings or areas of frustration for respondents.

The two greatest challenges were changing the response behaviour of long time respondents from paper to TDE and redesigning the TDE dialogue and system to meet the needs of both respondents and ONS. The results of the pilot survey reported here show that the work has been successful in both regards.

Areas for further investigation identified as a result of this work include further changes to the design of the paper questionnaire to prompt response via TDE and an increased understanding of the impact of the 'voice' on response and respondents' perception of ONS. Continued investigation of the differences in response rates between TDE and paper questionnaires is needed so the differences can be addressed as TDE, as the primary mode of response, is introduced for more ONS surveys.

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