Proceedings of Q2006
European Conference on Quality in Survey Statistics

Web data collection in a mixed mode approach: an experiment

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Key words: Web data collection, mixed mode, response, CAWI

1. Introduction

Statistics Netherlands, like other national statistics institutions, is confronted with the fact that many potential respondents of a drawn sample cannot be reached or are not willing to participate in surveys involving individuals and households. The data collection department of the division of Social and Spatial Statistics is making a huge effort to reduce this source of survey error. This has resulted in a respectable rise in response rates. Nevertheless a significant group of people is still not observed (non-response error). Response rates of face-to-face and telephone interviewing vary between 60 and 70 percent. Various projects have been started up to further decrease this source of error. For instance, a research program focusing on measuring non-response error (Bethlehem, Cobben, Schouten, 2004).

Furthermore Statistics Netherlands has issued a company-wide observation strategy combining the use of administrative data and data from (sample) surveys. Statistics Netherlands is positioning itself to make greater use of administrative data. Sample units are observed through administrative data unless such data is unavailable. Data that is unavailable from administrative sources is collected through surveys. In selecting the survey mode(s), the preference is for inexpensive modes taking into account a number of criteria.

One possible remedy to the non-response problem, in accordance with the company strategy, is a mixed mode survey design. Mixed mode has several advantages. De Leeuw (2005) describes it appropriately as an opportunity to compensate for the weakness of each individual mode at *affordable* cost. It can provide more choice and flexibility for respondents, while improving timeliness and minimizing non-response and non-response bias. Furthermore it provides the means for operational efficiency savings.

On the other hand, mixed mode introduces a couple of disadvantages. Do respondents provide the same answers to questions through different modes? And if this is not the case, how can this problem be minimized? Can we simply combine answers obtained through different modes? From previous research we already concluded that interview

[1] The views in this paper are those of the author and do not necessarily reflect the policy of Statistics Netherlands. BPA no.: SOO-2006-

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mode does matter. A difference in outcome was observed between CAPI en CATI observations from the Dutch Labour Force Survey. However, considering we want to facilitate respondent participation as much as possible, restricting data collection to one mode is an unlikely option. Therefore the division of Social and Spatial Statistics, conducting the surveys involving individuals and households, has started up a project to integrate mixed mode data collection into the survey process. The project consists of several steps.
Five research topics were identified, namely (1) mode effects, (2) response rate, (3) questionnaire design, (4) use of Blaise IS and (5) likely mixed-mode strategies in terms of cost, organisation, necessary infrastructure and logistics and survey duration. Web data collection, one of the applicable modes in a mixed mode survey design, is the project's first step. The division of Social and Spatial Statistics has little experience with this method of data collection, while this is an established or at least an up-and-coming mode in different organisations. In order to get insight into the five research topics an experiment was set up (Janssen, Wetzels, Fouwels, 2006). The main focus of the experiment was on web interviewing, but affects all five research areas. The following goals were identified for the experiment:

- Determine the response rate to be obtained using web interviewing as a starting or follow-up mode taking into account the chosen approach strategy.
- Determine the characteristics of the sample units responding in the experiment.
- Determine the necessary logistics and infrastructure, the problems, cost and survey duration using web interviewing taking into account the chosen approach strategy.
- Gain the necessary experience for designing web questionnaires.

The goals did not include determining mode effects and a comparison of survey outcome between modes.

2. Survey and questionnaire design

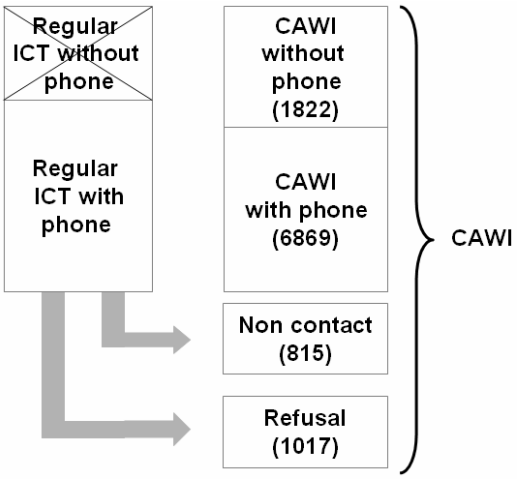
2.1 Survey design

We decided to select an existing questionnaire and use it as a starting point of the construction of the web questionnaire. We chose the ICT survey, which is carried out annually by telephone interviewing (CATI) throughout April and May. Its purpose is to provide information on ICT usage in households and by individuals. As the observation of sampled units is limited to telephone interviewing, only people with a known telephone number[3] are approached. Therefore approximately 25 percent of the sample units are excluded from the survey. The sample of the experiment was drawn in accordance with the sample design of the ICT survey. The target population consists of non-institutionalised people aged between 12 and 74. The experiment included people with and people without a known telephone number, in contrast to the ICT survey. In addition to this, we also approached the non-contacts en refusals from the ICT survey.

[3] Samples are extended with telephone numbers by two Dutch companies who do not posses all existing numbers or are not allowed to provide specific numbers. Mostly cell phone numbers and unlisted numbers aren't at the disposal of Statistics Netherlands.

Figure 1 shows the different groups identified in the experiment with their respective ratios.

Figure 1 Group identified in the experiment



Although the objective of the experiment was to determine the level of response to be obtained when we would use the internet, we also wanted people who lacked access to the internet to be able to respond. Therefore a paper questionnaire was developed besides the web questionnaire. To keep people with internet access from responding on paper, people had to apply for the paper questionnaire by means of a stamped return postcard.

The following approach strategy was applied:

1. All units received a letter containing the internet address where the web questionnaire could be found and a personal login to gain access to the web questionnaire. The letter had to be varied a little bit to distinguish between people aged over 15 and people under 15. A separate letter was drafted for the refusals of the ICT survey, adapting to their refusal in a previous approach through another mode. The return postcard was added to all letters.
2. One week after the first letter, a postcard was send to all sample units to jog memories. Literature (Dillman, 2000) suggests that without follow-up contacts, response rates will usually be 20 – 40 percent lower than those normally attained. The postcard contained a thank you for people who already responded as well as a reminder for people who did not yet fill in the questionnaire either on paper or online.
3. Two weeks after the postcard follow-up, people who had no yet completed their questionnaire were approached once more. It was decided to split the entire group of non-respondents into two separate groups. In the first group all non-respondents with a known telephone number[4] were approached by telephone while the remaining sample units received a reminder letter. The other group was approached by means of a letter in its entirety. The purpose of the telephone approach was to persuade non-respondents to fill in the questionnaire online, not to get the questionnaire

[4] Pending the results of an experiment concerning the use of cell phone numbers in surveys involving individuals and households, it was decided not to use cell phone numbers in the web.

answered by phone. The advantage of the difference in approach was that the effect of the telephone approach could be analyzed in comparison with the paper approach together with the accompanying costs. The letter reminded people with an insistence that the previous contacts lacked, emphasising the importance of the participation of the recipient. Again a return postcard was added to the letter.

The refusals from the ICT survey were excluded from the third step. These people had already refused during the telephone approach of the ICT survey. The third step would mean their fourth approach. This would be too much of a good thing.

2.2 Questionnaire design

The web questionnaire was build using Blaise and provided to sampled people using Blaise Internet Services (Blaise IS). Blaise IS translates the Blaise questionnaire to HTML so that it can be presented on the internet by means of an internet browser. The main challenges in translating the CATI questionnaire were page layout, converting interviewer instructions to respondent instructions, and keeping rephrasing of questions to a minimum.

Page layout was a challenge. How many questions are presented on a single page? Literature search provides a list of principles of design for web questionnaires (Dillman, 2000; Dillman, Bowker and Tortora, 1998; Schonlau, 2002) intending to reduce survey error. These were used as a guideline. The first page of the questionnaire consisted of a login page where the respondent had to enter their personal login to gain access to the web questionnaire. The login was constructed in such a way that survey participation was limited to our sample units. The second page of the questionnaire included a welcome screen containing a short description of the survey and an instruction on the action needed for proceeding to the next or previous pages. The next pages contained the various questions. Questionnaire routing was provided by Blaise IS. Per screen only one or very few questions were presented so respondents wouldn't have to scroll down to get to a next question. An indication of survey progress was supplied in two ways. At the top of the screen a progress bar was shown. At the left of the screen the main topics of the questionnaire were represented together with the topic at hand.

A next challenge in translating the CATI questionnaire was the need to convert interviewer instructions. The necessity to do this is pretty obvious. Interviewer instructions are formulated to aid the interviewer in their conversation with the respondent. Before building the web questionnaire, we had to decide how to rephrase the interviewer instructions in order to become useful respondent instructions.

Last but definitely not least, the questions had to be reviewed. Most questions could be accepted in the questionnaire without a single adjustment. Some questions had to be changed. In the CATI version of the questionnaire for instance there is more space on the computer screen to present questions, so transitions between mutually dependent questions can be kept short. In the web questionnaire this was not possible, so questions had to be written out fully including the connection with the previous question.

3. Results

3.1 Analysis of day and time of questionnaire completion

Two groups could be distinguished in the experiment, namely a new sample containing 8691 units, and the refusals and non-contacts from the ICT survey containing 1832 units. Unfortunately we could not determine in advance what response level could be achieved using the approach strategy employed in the experiment. Because it was expected that people would mainly fill in questionnaires during the weekend or in the evening, the IT division was afraid of an overload of the server. In these periods the helpdesk is not staffed.

To minimize the risk of an overload we decided not to approach all people in the experiment at once. The new sample was divided at random into four equal sets. The refusals and non-contacts from the ICT survey were combined into a fifth set. The first letters with regard to the first set arrived at the sampled units on 7 May. All sets were approached one week after the other with the exception of the fifth. The final results from the ICT survey were available by the first week of June. At that point the proper records could be selected for the experiment. In due course the various portions would start running parallel to each other. To avoid letters, postcard follow-ups and reminder letters arriving on the same date, we had to deviate a little bit from the week schedule. Therefore not all sample units received the letters or postcard follow-ups on Saturday, but also on Thursday and Friday.

We recorded the start and the end day and time of filling in the questionnaire for everyone who responded online. In addition we knew the day the first letter arrived and the days of the reminder. On this basis we could examine if there was a distinct pattern to be found in times of filling in the questionnaires. Before starting the experiment two assumptions were made:

1. People would mainly fill in questionnaires at the weekend or in the evening.
2. The postcard follow-up and the reminder letter would have a positive effect on the response level.

After analyzing the day and time of filling in the questionnaires the first hypothesis could be rejected. The number of people completing their questionnaire increased throughout the day, but there was no peak in the evening. Most respondents completed their questionnaire between 1 and 9 p.m. In this period the number of people completing the questionnaire is relatively constant. At 6 p.m. there is a small dip. Also there is no peak of people completing the questionnaire at the weekend. Every day of the week there is a significant number of people filling in their questionnaire. The number does decrease as the weekday deviates more from the day of arrival of the letters or postcard follow-up.

The second assumption can be confirmed. Figure 2 shows the effect of the two reminders.

Figure 2 Effect of reminders

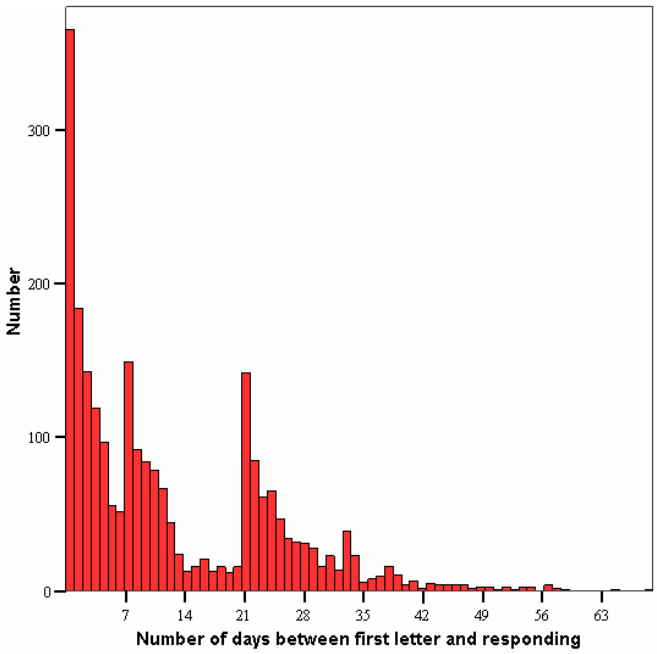


Figure 2 shows a distinct peak after one week and after three weeks. These moments correspond with the arrival of the postcard follow-up and the reminder. The figure shows there is no obvious need to put a two week time span between the postcard follow-up and the reminder letter. Sending the reminder letter one week after the postcard follow-up (instead of two) should not lead to a significant loss of response but would reduce the necessary time span of the entire approach strategy with one week.

3.2 Analysis of response level and composition

One of the goals of the experiment was to determine the response rate that could be obtained by using web interviewing as a start or as a follow-up mode. Furthermore it was our goal to determine the characteristics of the sample units responding in the experiment. Although the response level will vary depending on the subject of a survey, the approach strategy and the length of the questionnaire, it can still be used as an indication of the response level to be obtained by using web interviewing. Drawing general conclusions about mixed mode interviewing on the basis of this experiment should however be done with caution.

3.2.1 Analysis of response level

In the experiment we applied various approach strategies, namely:

- Two times on paper (2 x P): first letter and postcard follow-up (part of three times on paper)
- Three times on paper (3 x P): first letter, postcard follow-up and a reminder letter.

- Two times paper followed by telephone (2 x P, 1 x T): letter, postcard follow-up, telephone reminder.

In the analysis, the results from the new sample and the sample containing the non-contacts en refusals from the ICT survey were examined separately. Table 1 presents the obtained response levels for the approach strategies identified in the experiment. The results for the non-contacts and refusals from the ICT-survey are excluded from this table. These results are presented in table 2.

Table 1 Levels of response corresponding to approach strategies in the experiment and to the regular ICT

Strategy	Restricted to available phone number	CAWI	PAPI	Total
		%		
Complete	No	27.8	9.7	37.5
Complete	Yes	30.3	10.5	40.7
2 x P	No	18.7	4.2	22.9
3 x P	No	25.9	7.5	33.4
3 x P	Yes	28.9	8.1	37.1
2 x P, 1 x T	Yes	32.2	14.3	46.5
2 x P, T or P	No	29.7	11.9	41.6
Regular ICT	No	--	--	51.4
Regular ICT	Yes	--	--	65.1

First, when all sample units are considered regardless of the applied approach strategy (= complete), we obtained an internet response level of 27.8 percent and a paper response level of 9.7 percent. In total 37.5 percent of the sampled units completed a questionnaire either online or on paper. The ICT survey yielded a response level of 51.4 percent of the entire sample. The web response level is significantly lower than the common response levels of CAPI and CATI surveys. This is partly caused by the simple fact that not all sample units have access to the internet. But also because the human contact and power of persuasion of an interviewer is not available in an internet approach. It is not unthinkable that respondents proceed with the survey only to meet the interviewer's wishes. When the internet response is combined with the paper response, the response level jumps significantly. But still it is no match to the CAPI and CATI response levels. The comparison is not entirely fair because in the ICT survey we only approached sample units for which there was a telephone number available. Therefore the data set was restricted to sample units with an available telephone number. In this way, all sample units did have a non-zero chance of participating in the

survey. Table 1 shows that 40.7 percent of the sample units completed a questionnaire either online or on paper as opposed to 65.1 percent for the ICT survey. The response level for the sample units with an available phone number is slightly higher than for the sample units without an available phone number. In absolute terms the difference is only 3.2 percent.

Now we will further detail the approach strategies applied in the experiment. First we consider the dataset where no sample units are excluded on the basis of the availability of a phone number. Table 1 shows that three approaches on paper improved the internet response level significantly, as opposed to two approaches. The internet response level increased by 7.2 percent while the paper response level increased by 3.3 percent. Because adding a third paper approach is a relatively cheap step, we recommend to make it a standard step.

Next we compare three approaches on paper with two approaches on paper followed by a telephone approach. Does a telephone reminder add significantly to the response level as opposed to a paper reminder? To make this comparison, the data set again is restricted to sample units with an available telephone number. The telephone reminder adds 3.3 percent to the internet response level. 6.2 percent is added to the paper response level. This is a little bit disappointing since the reminder by telephone is a relatively expensive step. Further analysis revealed that only 40 percent of the people, who promised to participate in the survey during the telephone call, did actually participate. This leads to our recommendation to substitute the telephone reminder with a telephone data collection call, so promises are redeemed immediately. Further experiments have to point out if this substitution yields a profit that compensates for the cost of the telephone data collection.

Finally, we consider the response level of the approach strategy in which we used the telephone reminder but the data set is not restricted to sample units with an available telephone number. The sample units without an available telephone number received a reminder on paper. This strategy yields a total response level of 41.6 percent. Considering the recommendation to substitute the telephone reminder with a telephone data collection, this percentage is considered to be a minimum response level.

Next we will examine the response level of the approach of the refusals and non-contacts from the ICT survey. Table 2 presents the results for these two groups.

Table 2 Levels of response for the non-contacts and refusals from the ICT survey

Strategy	CAWI	PAPI	Total
	%		
Refusal	5.9	2.0	7.9
Non-contact	19.1	5.0	24.1

The refusals of the ICT survey respond very poorly. Only 7.9 percent of the sample units approached completed a questionnaire. Seen in proportion to the entire sample

used, this only adds 1 percent to the response level of the ICT survey. This result does not justify the cost made to approach the sample units. The non-contacts from the ICT survey responded somewhat better then the refusals. Approaching this group adds 2.5 percent to the overall response level of the ICT survey. The non-contacts were approached three times on paper. The result can therefore be compared to the result in table 1 were the approach strategy is 3 x P and the data set is restricted to sample units with an available telephone number. The non-contacts yielded 13 percent less response, meaning this is a specific group to be reckoned with.

3.2.2 Analysis of the composition of response

The response of the experiment can be classified on the basis of different characteristics: sex, age, marital status, ethnicity, family type, family size, degree of urbanisation and income. First the sample units responding through the internet are considered. The overall conclusion is that the response level of all classes within a specific characteristic is worse than for telephone interviewing. For instance table 3 shows the results for the age classes. It shows that the distribution of the internet response across the various classes of age is askew. This is probably caused by the fact that internet access decreases as age increases. The response rate of older people is much worse then for people under 26. The same applies to single persons or single parents, divorced or widowed people. This is not very surprising considering there is strong correlation between these characteristics. Also ethnic minorities from non-western countries and people on a low income respond poorly to the internet questionnaire.

Table 3 Response levels by age and mode

Age	CAWI	PAPI	CAWI + PAPI	CATI
	%			
0 - 25	36	6	42	54
26 - 35	26	7	33	42
36 - 45	29	7	36	52
46 - 55	29	9	38	53
56 - 65	23	16	39	52
66 or more	13	24	37	59

The addition of the paper response provided a much more even distribution of the response across the various classes of the identified characteristics of the sample units. Older people, single and widowed people responded relatively well, but not ethnic minorities from non-western countries. Future experiments have to point out if substituting the telephone reminder with a face-to-face or / and telephone data collection can improve the situation even more. When considering the various approach strategies identified in the experiment, the most striking conclusion that can be drawn is that groups responding poorly online respond much better on paper when reminded by telephone as opposed to the situation when a reminder on paper is used. A probable explanation for this phenomenon is that these groups are more motivated by the personal attention of an interviewer.

3.3 Face-to-face: some consequences of mixed mode

The mixed mode survey design applied in the experiment did not contain face-to-face (CAPI) observation. However it is still possible and interesting to assess the consequences of the applied strategy for CAPI fieldwork. In this paragraph the assumption is made that relatively cheap modes like web-based and paper data collection are given priority over more expensive modes like telephone and face-to-face data collection. Within this scope telephone and face-to-face interviewing are used as follow-up modes. Within this group the assumption is made that, if there is a phone number available, the sample unit is approached by telephone. Using these assumptions we can determine which portion of the entire sample becomes available for CAPI. This can be done for the Netherlands in its entirety, but it's more obvious to consider the regional division used by Statistics Netherlands. Table 4 shows the number of sample units drawn in each region, together with the percentage of sample units eligible for CAPI, the percentage whose telephone number is available to Statistics Netherlands and the percentage responding online or on paper.

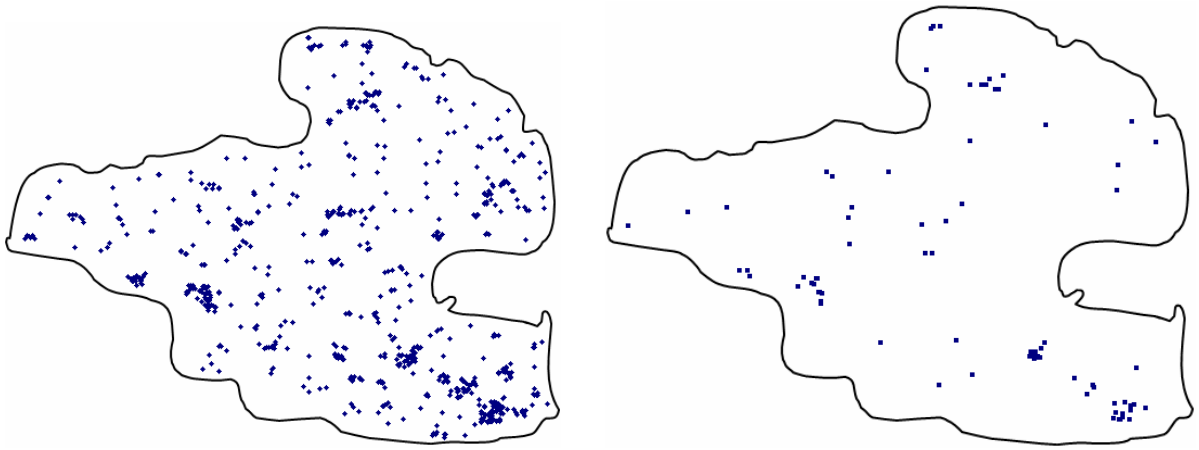
Table 4 Percentage to CAPI, possession of telephone and response CAWI and PAPI by region

Region	Sample units	Available for CAPI	Phone possession	Response rate CAWI	PAPI
		%			
2	838	10	86	28	11
7	538	12	85	31	10
13	746	12	83	30	12
12	607	13	85	25	9
3	924	14	82	29	9
4	584	14	79	28	8
6	726	14	80	32	9
1	649	15	80	28	11
11	755	15	80	32	8
10	675	15	80	24	11
8	541	20	72	30	8
9	585	27	66	23	9
5	523	31	60	21	12
Total	8691	16	79	28	10

Table 4 shows that the percentage of sample units available for CAPI varies between 10 and 15 percent for most regions. Three regions stand out with percentages between 20 and 31 percent. These are the most urbanised regions containing the cities of Amsterdam (region 5), Rotterdam (region 9) and The Hague (region 8). The high percentage of available sample units for CAPI is mostly caused by a relatively low

percentage of available telephone numbers. In addition a relatively low internet response rate was obtained.
Now let's suppose the experiment survey is the only survey currently conducted. Furthermore suppose the original survey design only employed face-to-face as observation method. Consider the situation in region 2 represented in figure 3.

Figure 3 Graphical representation of change of survey design in region 2



On the left the situation is shown in which all sample units are covered by face-to-face observation. On the right the situation is shown in which all sample units are excluded that either respond online or on paper or are approached by telephone. From table 4 it follows that only 10 percent of the available sample units in region 2 are eligible for a face-to-face follow-up. Furthermore, figure 3 shows that these eligible sample units are neatly dispersed over the entire region, with a few minor concentrations around the main cities[5]. The resulting sample units eligible for face-to-face observation would require less face-to-face interviewers. Less interviewers covering the same geographical area entails travelling larger distances, meaning higher travelling costs. This partly cancels out the cost reduction from employing less face-to-face interviewers. The details of the cost reduction versus the cost increase are not the subject of this article and will have to be further examined in future. The situation is slightly different in the highly urbanised regions, where at least 20 percent of the sample units are eligible for face-to-face observation. Furthermore the eligible sample units are still concentrated in a relatively small area, so travelling distances will not increase dramatically.

Of course the assumption that there's only one survey, entirely performed through face-to-face interviewing, can easily be rejected. The ICT survey is actually entirely done by telephone. Other surveys already employ a mixed mode approach consisting of face-to-face and telephone observation. Table 4 implies that on average there is no telephone number available for 21 percent of the sample units. Still there are surveys that are entirely conducted by using face-to-face interviewing during their first approach. The two main surveys employing this strategy are the Labour Force Survey and the Health Survey. Together these surveys claim about 70 percent of the total available interviewer

[5] Namely Almelo, Assen, Enschede and Zwolle

capacity for face-to-face interviewing (in 2006). A change in the approach strategy for these surveys will inevitably have major consequences. However, a lot of research on mode effects is still needed before such a change can be expected.

Another consequence for face-to-face interviewing is the perception that the remaining sample units for CAPI are the units that are most difficult to reach. There is no direct evidence to confirm this perception. Nevertheless, the response level within the sub-sample of units without a known telephone number is worse than within the sub-sample with a known telephone number. These sample units may have deliberately chosen not to make their number public and will most likely consist of people who only have a mobile phone. Unfortunately not all phone companies make the telephone numbers of their subscribers available to Statistics Netherlands. Therefore it is not unlikely that the CAPI-units are difficult and hard to reach. Future experiments must provide further insight on this subject.

3.4 Analysis of paper questionnaires

People who lacked access to the internet could apply for a paper questionnaire. We restricted the number of questions in the paper questionnaire because it was not the objective of the experiment to analyze the difference in survey outcome between the various modes. The data of the refusals and non-contacts of the ICT survey were excluded from the analysis of the paper questionnaires. These were already selective groups in comparison to the new sample and they requested a very small number of paper questionnaires.

There were exactly 1001 paper questionnaire applications. This was not expected considering the barrier we put up to prevent this from happening. The return percentage of paper questionnaires was about 84 percent. 844 people actually returned their completed paper questionnaire, roughly 10 percent of the entire newly drawn sample of the experiment. One relevant question included in the questionnaire was on respondent internet access. The outcome in table 5 resulted from this question.

Table 5 Number of respondents by internet access

Internet access	**Respondents**	
	number	%
Yes	434	51
No	410	49
Total	844	100

Over half of the respondents indicated that they or someone in their household had access to the internet. Nevertheless they did not respond through the internet. This phenomenon could be explained by the fact that someone in the household other than the respondent has access to the internet. Therefore the results from two others

questions were examined[6]: "When was the last time you used a computer?" and "How many times did you use a computer over the past three months?" We concluded from the answers that about 82 percent of the people had used a computer within the last three months. 74 percent of the people who continued to the next question indicated that they used a computer on a daily or at least weekly basis. Although computer use does not necessarily imply use of or access to the internet, we expect a strong correlation between these two variables. Unfortunately there were no questions on internet usage available in the paper questionnaire.

In the questionnaire the respondent was asked to comment the proposition: "The increasing usage of the internet invades privacy more and more". From the answers to this question 50 percent of the respondents who indicated they have access to the internet, agreed with the proposition. From this it cannot be concluded that invasion of privacy is the main reason these people did not respond through the internet. When the restriction "internet access = yes" is dropped (thus all paper questionnaires are included) still 50 percent of the respondents agree with the proposition. Evidently half of the people returning a paper questionnaire are worried about the invasion of privacy through the increasing use of the internet. Furthermore we do not know the answer to the proposition of the people who did respond online and the people who didn't respond at all. The only thing that we can say for certain is that there's a group of people with a preference for responding on paper.

3.5 Difficulties setting up and conducting the experiment

We encountered three kinds of difficulties during the set-up and execution of the experiment: technical difficulties, logistic difficulties and difficulties due to lack of appropriate facilities.

The technical problems occurred when people used a pop-up blocker on their computer unknown to the Blaise IS software running on the internet server, and when people did not key in the correct internet address. In order to provide a secure internet connection it was necessary to use http**s://** in stead of the usual http:// in the internet address. The reported number of contacts with the helpdesk showed that there were fewer problems than expected. There's a good chance, however, that people simply don't report the observed problem because they don’t have any direct interest in completing the questionnaire.

The logistical difficulties that occurred could all be solved quite easily or be prevented the next time. For example one batch of paper questionnaires was accidentally printed in black and white instead of colour. The biggest logistical problem was the variety of letters. People could contact Statistics Netherlands by mail or telephone in order to apply for a paper questionnaire (instead of using the return postcard) or to apply for a new letter containing the internet address and their personal login. These two possibilities also existed during the telephone approach. Different letters had to be

[6] Limiting the data set to people who responded they or someone in their household had access to the internet.

prepared to respond to each situation, and distinguishing between the various letters was a challenge.

These difficulties could all be overcome. A more difficult problem was the lack of facilities essential for a flawless execution of the experiment in the present System for Survey Administration (SSA). There is no proper provision for a successive approach of sampled units with the same or various modes. A Statistics Netherlands wide project has been started up to provide a more extensive computer system that encompasses all the requirements posed by mixed mode interviewing. For now, however, we had to find a temporary solution. A plain computer programme was build to provide the missing facilities.

4. Conclusions and recommendations

On the basis of the results of the experiment the following conclusions and recommendations are made:

- Statistics Netherlands is able to conduct a survey using web interviewing yielding a decent level of response and without excessive problems. The internet response level varies between 25 and 30 percent depending on the approach strategy. The paper response level varies around 10 percent.

- We recommend using a CAWI - CATI strategy as a starting point for future experiments and observation of telephone surveys in which web interviewing is considered an acceptable alternative. In the proposed strategy, interviews by telephone are preceded by web interviewing in which sample units are approached up to three times in writing. When a sample unit agrees to participate in the survey during the telephone approach, the questionnaire is filled in immediately on the telephone.

- Although it was not tested in the experiment, the same approach strategy may be applied in future observation of face-to-face surveys in which web interviewing is considered an acceptable alternative.

- Older people, single persons, single parents, divorced or widowed people, ethnic minorities from non-western countries and people on a low income responded poorly to the internet questionnaire. Adding the paper response improved the overall response level of these sections of the population. Future experiments have to show if substituting the telephone reminder with a face-to-face or / and telephone data collection can improve this situation even more.

- The use of a mixed-mode approach has consequences for the amount of work in face-to-face and telephone interviews. The consequences will be considerable and should be researched without delay.

5. Work in progress and future plans

The first step of the mixed mode research consisted of the experiment as described in this article. The comparison of the answers from the regular ICT survey with the answers from the experiment was not one of the objectives of the experiment. Furthermore the experiment did not include face-to-face interviewing as a mode. Finally, we recommended replacing the telephone reminder with a telephone data collection. The following steps have been identified in our research in order to extend the mixed mode strategy:

- A second experiment was planned for February and March 2006. Again an existing questionnaire was chosen as a starting point for the web survey, in this case the questionnaire from the Crime Survey which was carried out during the same period using CAPI and CATI. This questionnaire is much more complicated than the ICT questionnaire. The experimental sample units were approached up to three times in writing asking them to respond through the internet. After these three approaches, sample units who had not yet completed their questionnaire, were approached either by face-to-face or by telephone, depending on availability of a telephone number.
- A third experiment was planned for April 2006. This time a survey called Shadow Economy was used. The questionnaire consists mostly of highly sensitive questions, covering subjects like hidden labour income and tax evasion. Two samples were drawn using the same sample design. One sample was observed using face-to-face interviewing. The other sample was observed using a combination of internet, telephone and paper.
- The main objective of both experiments is to compare the outcomes for selected variables of the regular survey with the outcomes for the same variables as obtained from the experiment. Results were not yet available while writing this article. The realisation and analysis of the experiments will take approximately until August 2006. The remaining time will be spent on determining the preference of sections of the population for specific modes. If we can ascertain that specific sections of the population have a significant preference for one mode over other available modes, then why not start with this mode in first place? But what if the preferred mode is an expensive mode?
- When the analysis of the experiments is finished, and we have drawn our conclusions, we can start working on making current surveys and questionnaires fit for mixed mode. In general all questionnaires have to be evaluated for use in different modes. This will necessitate a lot of consultation with all interested parties, especially the statistical departments.

6. References

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