

NEW APPROACHES IN THE DEVELOPMENT OF FORMS FOR THE 1996 POPULATION CENSUS IN NEW ZEALAND

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I lead a small team of people at Statistics New Zealand who were responsible for developing the forms for the Population Census held in New Zealand this year. There were three major changes from previous developments of Census forms in NZ. The first change is to do with the use of cognitive evaluation methods, the second is the development of a bilingual form and the third is the use of imaging technology for processing the forms.

Cognitive evaluation

The first, as I said, is the use of cognitive evaluation. This is not actually new in NZ or for that matter anywhere else. What is new is that the majority of the development of the Census forms was based on this sort of evaluation. What distinguishes our approach from what happens in many other places is that we in the design team did almost all of the cognitive work ourselves.

I want to set this in the context of the other evaluation approaches we took (see figure 1).

The first study listed, the one involving interviewers, had the main aim of finding out how good the household and family information from the draft Census forms was likely to be. Because the interviewers had already done an interview in the household, and had collected family and household information, it was possible to check the accuracy of the information we got from the self-completed form. So this was a valuable exercise.

We also conducted a large pilot - we call it a Dress Rehearsal - using 5,000 households (that's large for NZ). In previous Census we have done 3 or 4 pilots. It would have been good to have had two this time, but given the constraints on time and resources we judged it better to have more time for the cognitive studies which give much better information for less cost. We examined a number of the filled-in forms from the Dress Rehearsal, and learned a little from respondents' errors and

written-in comments (some write in the margins or across the questions). There was also a form inviting respondents to give us feedback. We had a poor response rate to that of course, but we learned a little from respondents' comments.

Our cognitive evaluation was mostly working with individuals. We had the individual fill in the form, talking aloud as they did so if they could. The researcher noted their behaviour in relation to the form, and asked questions as needed. Our term for that is *observation studies* - I know that others use different terms. This was a very low cost and effective way to discover problems with the questions and the layout of the forms. We did some focus groups, but found them less efficient than observation studies as a way of detecting problems. We got our respondents for the cognitive studies by advertising and getting people to come into our office, or through groups who were prepared to get respondents together for us. Respondents were compensated with a small amount of money, and we gave a donation or gift to the groups.

I want to say something about cognitive evaluation that hasn't already been said many times elsewhere. So I'll mention two issues that I have not seen in print. The first is this: doing this sort of evaluation, you need to be very flexible in your timetabling - you can't have a test scheduled at a definite date to go on until another definite date. Well you can, but you will be wasting resources. To be efficient, you have to be prepared to stop testing when you have discovered something that needs fixing and then resume testing when you feel you have a solution. The other thing is that it doesn't make sense to try to mimic the sort of findings or reports you get from quantitative testing. Sometimes, you may only have done 5 studies before the need for change is clear. To try to produce any sort of quantitative output and report on that is pointless.

Figure 1: Methods Of Evaluation Used

What Statistics New Zealand did to evaluate Census forms

- forms delivered and collected by household interviewers who conducted follow-up interviews and provided validation information
- group discussions, with forms filled in just beforehand or during discussion
- individual observation studies
- Dress Rehearsal with respondent feedback form (self-administered)
- focus groups with Dress Rehearsal respondents

Both of these features of cognitive evaluation can be a source of problems with people who have to be convinced by the work you do, especially in statistical agencies where quantitative data is the norm. They are likely to want timetables and to want quantitative evidence. The problem is that to do the number of studies you'd need to produce convincing quantitative data in a report is a very inefficient way of doing cognitive research.

Bilingual form development

Now I want to move on to the second major change in Census development in New Zealand - the production of a bilingual form.

Maori is the language of the indigenous people of New Zealand and in recent years there has been a resurgence of interest in and use of it. In 1996, for the first time, there were parallel English language Census forms and Maori language forms, asking the same questions.

In fact, we produced bilingual forms, rather than separate English and Maori forms. We were developing forms for people who almost universally read English, but who have a commitment to the use of the Maori language. And we knew from previous experience that many who wanted to use a Maori form would in fact not read and write Maori well enough to do that, unless they had the English questions available to consult.

We had previously worked with the Maori Language Commission in NZ on a survey. In that instance, the questionnaire was developed in English and then translated into Maori, and we found that that worked very badly. It was decided that for the Census we would use a different method: parallel development.

We had a group of Maori translators - from three to five people at different times - working part-time on the Maori forms for about a year. We referred to them as translators but in fact they were more than that, as I will explain. We began the work on each group of questions by supplying them with the information specifications for the topics and our first draft questions in English. Then we set up a meeting of the group of staff in Statistics New Zealand who sponsored the topics, the Maori translators, and us (the English form developers). At that initial meeting we discussed the concepts underlying the questions, the purpose of collecting the data and the English questions. Then the translators developed what they saw as equivalent questions in Maori. At least one of us sat in on their discussions to help if necessary with clarification of the specifications or the reasons for the way the English questions were written. The translators also produced Maori versions of the instructions that went with the questions.

The questionnaire development team developed the actual forms, using the Maori words produced by the translators. Then we recruited people fluent in both languages to carry out cognitive evaluation of the bilingual forms for us.

As a result of that evaluation, and as a result of changes that we needed to make to the questions in English, revisions were made to the questions in Maori, by the people who had originally produced them.

Unfortunately, because of lack of resources and time, not as much evaluation work was done on the bilingual forms as on the English forms.

Impact of imaging

This brings me to the final topic - the impact that the use of imaging for processing, had on questionnaire development.

I should briefly explain what the imaging did. The forms were run through a machine which produced an electronic image of them. At the same time, it detected the existence of marks in specified places and recognised some responses, so that through the magic of modern technology, we had almost instantaneous data. Operators then used the images to deal with the responses that were not automatically captured and to deal with problems discovered through editing.

The machine has to be able to sense the marks respondents make, while ignoring everything that is already printed. We have two forms - one for the household and one for the individual and for obvious reasons use a different colour for each. They were imaged in household lots. So we had to find colours that could be used in sufficiently high concentrations to let the white spaces show up, without the colours showing up in the imaging and interfering with the detecting and reading of the responses. This was not easy. We succeeded, though the contrast between colour wash and response space was not as good as we would have liked. We had originally been told we could have key-lines around the response spaces, which would have made the response spaces stand out better, but in the Dress Rehearsal it turned out that the key lines interfered with imaging and so we had to remove them. It should be said, though, that as far as we have been able to discover to date, most respondents had no problem seeing and using the response spaces.

We had to have a huge code mark on the front of the household form to show the beginning of a new household - I never understood why it had to be so big. That didn't seem to bother anyone but us.

We also had to have registration marks in the corner of every page and small squares which, by their number and position, indicated which page was being imaged (see figure 2)

All these marks for the machine had to be a minimum of 1 cm from the edge of the paper and had to have 0.5 cm of clear space around them. That wouldn't have been a problem if we had had lots of space, but space was tight. Each form was restricted to one A3 fold. That decision was partly based on the ease of handling that single sheets would give during imaging.

Numbers were being machine-recognised, though words weren't, so we could use ordinary spaces for words, but there had to be a certain space between the area for writing each digit, which gave us some problems, especially with dates, in the limited space we had.

You obviously want to put more space between the month and day and year than between the digits in each one of those. Otherwise you have a long string of boxes and its hard to see where to put which number. But with a three-column layout, we found we ran out of space. So we added white lines around the spaces for day, for month and for year, to unite each element of the date, and separate it from the others (see question 7 in figure 2).

When we first heard about the constraints that imaging would produce for form design, we had some fears. But in fact none of those constraints interfered seriously with our ability to produce forms that worked.

Conclusion

Statistics New Zealand adopted a number of new approaches for the development of the NZ Population Census forms. These included the development of a bilingual form, the use of imaging and the extensive use of cognitive techniques in the field evaluation. I am happy to report that the approaches we took resulted in forms that were accepted by the public of New Zealand, - in fact they got quite a lot of public praise. And, as far as we can tell so far, they seemed to have worked very well.

Figure 2: Draft Front Page of Individual Form (70% of actual size)

Individual Form

The Census of Population and Dwellings Tuesday, 5 March 1996

For Census advice and information:

- Look at the Individual Help Notes
- Call the Census Helpline toll-free

0800 80 1996

Office use

Dist	SubDist		
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	MeshB	
<input type="text"/>	<input type="text"/>	L	
<input type="text"/>	<input type="text"/>	P	

ID elsewhere

CE PES DS

For each question:
 tick one or more circles

write a number like this

print an answer in capital letters like this

Follow the arrow coming from any answer you tick. For instance, if you had ticked this circle, the next question to answer would be 55.

no → **Go to 55**

One of these blue forms must be filled in for every person in New Zealand on the night of Tuesday, 5 March 1996, including babies.

The information you provide is collected under the authority of the Statistics Act (1975).

Your information will be used only for statistical purposes. Census responses will be used to select people for a disability survey (see Help Notes).

Your information remains confidential to Statistics New Zealand and is protected by the Statistics Act (1975).

Len Cook
Government Statistician

1 What is your name?
Surname or family name

All first and middle name(s), or all given name(s)

2 Where do you live - give the full address, including, if possible, all of these:

- flat number (if it is a flat)
- street number and street name
- suburb or rural locality
- city, town or district
- country

3 How long have you lived at the address you gave in question 2?

less than a year **OR** number of years

4 Where did you live 5 years ago, on 5 March 1991?

not born 5 years ago

at the address you gave in question 2

living in NZ at another address → Give that address as fully as you can

not living in NZ → Print the country you were living in

5 On the night of Tuesday, 5 March 1996, are you at the address you gave in question 2?

yes → **Go to 6**

no → Give the address where you are on Census night. Include, if possible, all of these:

- flat number (if a flat)
- street number & name
- suburb or rural locality
- city, town or district

6 Are you:

male

female

7 When were you born?

day month year you were (e.g. 29) (e.g. 11) born (e.g. 1963)

8 What country were you born in?

New Zealand → **Go to 10**

Australia

England

Scotland

The Netherlands

Western Samoa

Cook Islands

Fiji

other → Print the present name of the country

9 If you live in New Zealand, answer this question.

When did you first arrive to live in New Zealand?

month (if known) year

10 Tick as many circles as you need to show which ethnic group(s) you belong to.

NZ Maori

NZ European or Pakeha

other European → Which of these groups?

Samoan English

Cook Island Maori Dutch

Tongan Australian

Niuean Scottish

Chinese Irish

Indian other

other (such as FLIJIAN, KOREAN) → Print your ethnic group(s)

11 Tick as many circles as you need to answer this question. Are you:

living in New Zealand → **Go to 12**

working in New Zealand → **Go to 12**

NOT living in NZ and NOT working in NZ

↓

Go to 54 at the end