

Section D: User Experiments Report

D1. We undertook user experiments with the aim of exploring where and how easily people find government-related information. We created a questionnaire with 15 questions (see Annex D1 below²) that asks for information relating to common information needs of citizens and that is provided on UK government websites. We asked our participants to answer these questions with the help of the internet. They had one hour to complete all questions and could decide to skip a question if they felt they would not be able to find the answer or it was taking too long. Subjects were motivated via an initial payment for participating and a small additional payment for each correctly answered question. The experimental setup allowed us to check whether subjects answered a question correctly, where they found the information, how many (and which) pages they visited in order to find it and how long it took them to do so.

D2. We used two treatments:

Treatment 1: Open Search – subjects were presented with a blank browser page and could use any means in order to locate the information necessary to answer the question.

Treatment 2: Cross-Government Website – subjects were asked to locate the relevant information by starting their navigation from the Directgov home page. They were allowed to use the internal search on the site or follow it to other sites, but they were not allowed to use external search engines.

D3. We conducted four sessions over three days: two sessions in London (13 and 18 December 2006) and two sessions in Oxford (22 January 2007). We used two different samples: in London, the sample consisted exclusively of current students of University College London and in Oxford the sample consisted of internet users drawn from the general population of Oxford that were not studying. **Figure 1** shows the number of participants for each treatment:

Figure 1: Participants for the Two Treatments

	Open search	Cross-government site	Total
General internet users	16	15	31
Student group	21	17	38
Total	37	32	69 ³

D4. In the Main Report, we quote only the results of the sample of general internet users and exclude the student sample. Throughout this report we provide results from across the two groups, highlighting whether a particular finding was consistent across the general internet users and the student sample or was driven by either one of the two samples.

² The analysis is conducted over question 2-15, so 14 questions in total. Question number one was excluded because we assumed this should be a 'practice' question; participants would make themselves familiar with the interface and the process of searching for information, therefore probably taking somewhat longer than for subsequent questions.

³ We had 70 subjects in total but despite the already high variance in the sample, there was one subject that we decided to filter out as their performance in finding information was way above all other subjects – possible due to a measurement error.

D5. The results reported here should be interpreted with caution. The science of experimentation for internet use is still in its infancy and there are inevitable limitations to the design of such a study. First of all, an experimental setting is always artificial. Furthermore, our sample has a number of limitations. The number of people involved at 70 is small and the participants included are not randomly drawn. Slightly more than half our subjects were students, and the demographic background of the remainder was extremely varied. However, the objective of an experiment like this is to compare the effect of the treatment (i.e. open search or use of the cross-government site in this case) on two similar groups. A statistically significant difference across the two treatments (as we found) highlights that for this particular group of people there is an effect of the treatment.

D6. The selection of questions will also impact on the results and it is difficult to choose a representative selection of questions prior to undertaking research. We tried to choose issues of which we know from previous research that many people are faced with in everyday life and that ranged across the ‘basket’ of e-government applications specified by the European Union in its main monitoring work on e-government progress⁴. We used a post-experiment questionnaire to ascertain the extent to which subjects viewed our questions as relevant to them (see paragraph D2.1). Subjects felt questions were very relevant: on average 85 per cent said they could imagine looking for this information and of those, all would use the internet to do so. To some extent, the design of our experiment was amenable to the cross-government site because we also ensured that all the information we asked to find could be found on www.direct.gov.uk when we designed the questions.

Key findings

D7. Subjects found open search to be as fast, easy and as reliable as the cross-government site.

- Significantly fewer people managed to find answers to our questions (no matter whether right or wrong) with the help of the Directgov website. For the open treatment about 90 per cent of the subjects finished all 14 questions, but this proportion fell to 70 per cent on the cross-government site.
- On average, subjects would answer one question fewer if using the cross-government site.
- The reasons for this effect can be found in the time it took subjects to locate the information. Our subjects would spend on average about 30 seconds more on answering a question in the cross-government site treatment before answering it (or deciding to skip it) than subjects in the open search treatment.

⁴ These applications are: 1. Income Tax, 2. Job Search, 3. Social Security Benefits, 4. Personal Documents, 5. Car registration, 6. Building permission, 7. Declaration to the Police, 8. Public libraries, 9. Certificates, 10. Enrolment in Higher Education, 11. Announcement of Moving and 12. Health related services. See European Commission, Directorate General for Information Society and Media: “Online Availability of Public Services: How is Europe Progressing?” Available from: http://ec.europa.eu/information_society/eeurope/2005/doc/all_about/online_5th_measurement_fv4.pdf.

- Subjects in the cross-government site treatment needed on average about one more click to locate the right answer (9.5 clicks versus 11).
- There was no difference in the quality of the answers. In both treatments subjects would on average answer 4 out of 5 questions correctly.
- The main driver for the performance of the cross-government site was the student population in our sample. Students performed significantly worse than general internet users when using Directgov. It took them on average about 50 seconds more to answer a question on this site, resulting in fewer questions being answered correctly. With some variations, our sample of general internet users mainly performed consistently across both treatments.

D8. Search is important: both external and internal.

- In the open search treatment, nine out of ten questions were answered correctly with the help of an external search engine (always Google). This is in line with people's responses to our questionnaire in which they indicated they used search engines very often. There is an interesting divide. While a minority of two people would never use search, the rest would use it for almost every question. Both general internet users and the student sample relied equally strongly on the external search engine.
- In the cross-government site treatment, the majority of questions were answered with the help of the internal search function (70 per cent). The student sample relied on the internal search function slightly more (75 per cent of questions) than the sample of general internet users (65 per cent of questions). This underscores the high importance of internal search that our subjects also indicated in our questionnaire.

D9. Governments face competition from alternative information providers and the cross-government site was not highly visible to subjects in the open search treatment.

- In the open search treatment only about half of all questions (56 per cent) were answered with information from governmental sources.
- On average, for people in the open search treatment only about one out of seven questions (15 per cent) was answered by accessing information from the Directgov website at some point.
- The information obtained from non-governmental sources is more likely to be incorrect. In our sample information from non-governmental sources yielded correct answers in only 71 per cent of cases, compared to 86 per cent for governmental sources.
- People within the cross-government site treatment answered all questions using government websites.
- The two samples (general internet users and the student group) did not differ significantly in their use of non-governmental sources.

D10. Difficult questions

- Some questions were more difficult to answer than others. Questions which took subjects longer than the average time to answer were locating the crime figures for a particular area, how to replace a passport and assessing the risk of flooding in a specified area.

Full analysis

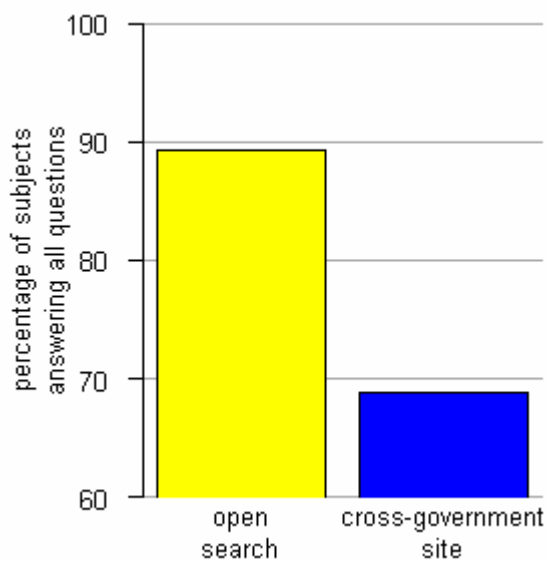
D11. Comparing the open search and cross-government site treatments.

There are a number of ways to establish how subjects performed in the different treatments. Measures of interest are:

- Could subjects find an answer to a question?;
- How long did it take to answer?; and
- Was the answer found correct?

Figure 2 reports the percentage of subjects who managed to answer all the 14 questions in the experiment. This does not take into account whether the answer was correct or not but simply whether subjects were convinced that they found the answer.

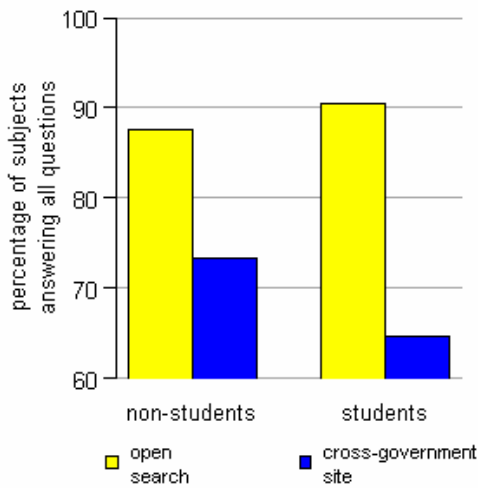
Figure 2: Percentage of subjects that answered all questions across the two treatments



Treatment	Mean percentage	Std. Deviation	N
Open search	89	31.5	37
Cross-government site	69	47.1	32
Total	80	40.5	69

D12. So subjects in the open treatment were more likely to answer all the questions, a difference that is significant (at the 0.95 level). While both groups had more difficulty in answering all questions with the cross-government site, the difference is particularly strong for the student sample. **Figure 3** shows the breakdown between the student and non-student groups of subjects answering all questions.

Figure 3: Percentage of subjects answering all questions by group



D13. On average, subjects in the open treatment would answer one more question than their counterparts, a difference that is again significant (0.95) (see **Figure 4**). This difference was, however, driven by the student sample while the general internet users answered on average the same number of questions across both treatments (about 12).

Figure 4: Number of questions answered

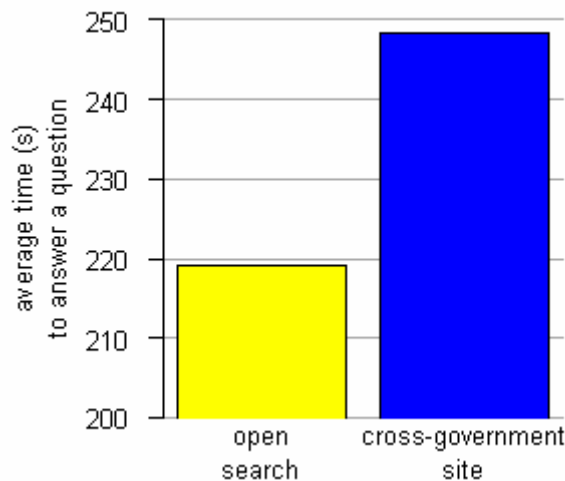
Treatment	Mean	Std. Deviation	N
Open search	12.9	1.3	37
Cross-government site	11.9	2.3	32
Total	12.4	1.9	69

We explored the reason for this difference in the number of questions answered by subjects in the allotted time across the two treatments. Specifically, we analysed the effort that it took our subjects to locate answers to questions, defining ‘effort’ as:

- number of clicks (i.e. pages visited);
- time spent on answering the question.⁵

D14. **Figure 5** reports the average time it took our subjects to answer a question. We calculate the average time it took over all questions that people accessed during the experiment, including those that they subsequently decided to skip as it is important to take into account how much time is wasted on searching for information that cannot be found.

Figure 5: Average time taken to answer questions across the two treatments



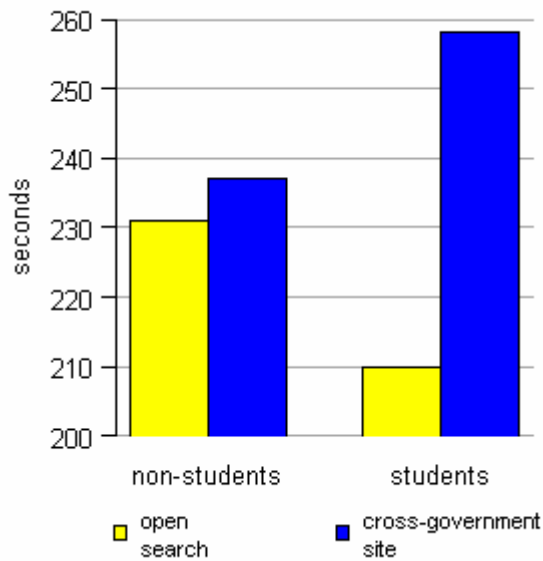
Note: N=69

	Treatment	N	Mean (seconds)	Std. Deviation	Std. Error Mean
Average time taken to answer a question	Open search	37	219	51.4	8.46
	Cross-government site	32	248	68.5	12.11

As noted in the previous paragraph, this difference is driven by the student sample which spent significantly longer answering a question (about 50 seconds more). The general internet users did not respond differently to the treatments. **Figure 6** shows the breakdown between the student and non-student group in terms of the average length of time it took to answer questions.

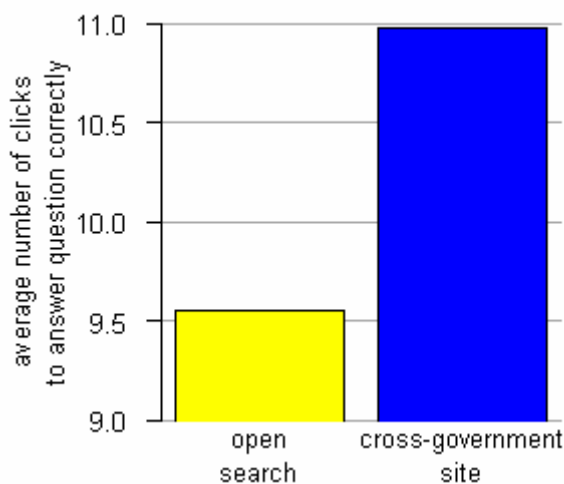
⁵ Both measures are highly correlated (0.77**) but still a high number of clicks does not necessarily mean that a lot of time was spent on the site and vice versa – depending on the design of the web pages.

Figure 6: Average time taken to answer questions by group



D15. Subjects spent significantly (0.95) more time in the cross-government treatment before answering a question (or deciding to skip it) than subjects in the open search treatment. Similarly, the average number of clicks required to find a correct answer was significantly (0.95) higher for people using the cross-government site as **Figure 7** shows⁶:

Figure 7: Average number of clicks taken to answer questions correctly



Note: N= 69

⁶ We calculate the average number of clicks only on the questions that were answered correctly as this gives a good indicator of how easy it is to locate useful information. Question that were skipped are not included here.

	Treatment	N	Mean	Std. Deviation	Std. Error Mean
Unique path length (number of clicks)	Open search	36	9.6	2.7	.45
	Cross-government site	32	11.0	2.7	.48

This difference is equally significant across both student and general internet user groups.

D16. Also of importance is the quality of the information found, namely whether it leads to a correctly answered question. **Figure 8** shows that in both treatments subjects answered about 80 per cent of their questions correctly, so it appears that the treatment used did not make a difference to the accuracy of the information obtained. The same applies to the nature of the sample as both general internet users and the students performed equally well.

Figure 8: Percentage of questions answered correctly

	Treatment	Mean	Std. Deviation	N
Percentage of questions answered correctly	Open search	79.5	1.2	37
	Cross-government site	78.2	1.6	32
	Total	78.9	1.4	69

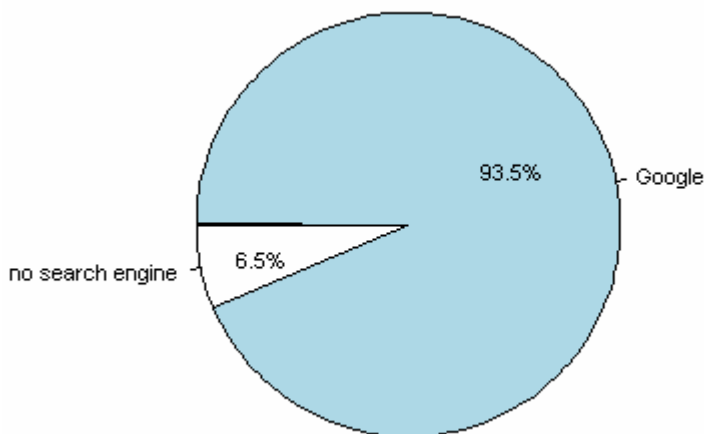
D17. Summarizing on the reported measures, the subjects in the open search treatment answered more questions because it took them less time to find an answer on the internet and fewer clicks to find a correct answer. Both treatments would provide subjects with a comparable quality of information.

D18. Finally, it should be noted that as the Directgov website was moving to a new platform at the same time as our experiments were taking place, we had some difficulties with its availability during our experiments. During the first experiment in London in December it was unavailable for about 20 minutes and caused the termination of the session. During the second experiment in January, it was unavailable for about 5 minutes during the first session. Some features on Directgov site also caused the browsers that we were using to crash. In particular the schoolfinders tool and the internal search on Directgov created problems, especially in London in December 2006 so that subjects in that search treatment encountered extra difficulties.

Importance of search

D19. For people in the open search treatment, use of external search engines was immensely important. Nine out of ten questions were answered with the help of an external search engine and this was always Google (shown in **Figure 9**). In this respect general internet users and students have the same information seeking habits; there was no difference across the two samples. Furthermore, while there were two people out of all our subjects in this treatment that did not use any search, the rest did so for every question.

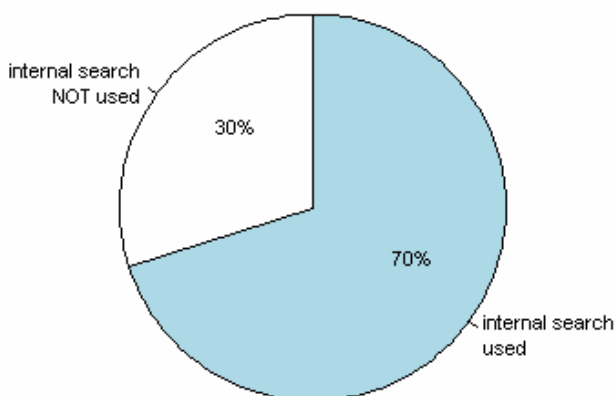
Figure 9: Use of search engines by subjects using open search



Note: N=510 (open search treatment only)

D20. Search is also important once people have arrived at a site. The internal search was a highly used feature of the information seeking behaviour of people in our cross-government site treatment. On average, participants in this group used the internal search function for seven out of 10 questions. Students used internal search slightly more (75 per cent of questions), general internet users slightly less (65 per cent of questions). In contrast to the findings for external search engines, use of the internal search is somewhat more varied with more people using it for just some questions, but not for others, as **Figure 10** below shows.

Figure 10: Use of internal search engines in the cross-government site treatment



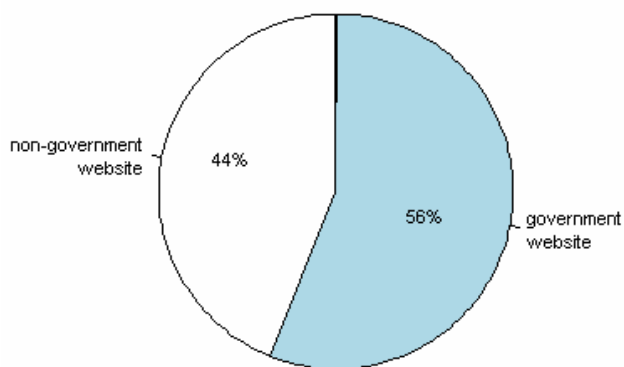
Note: N=418 (cross-government site treatment only)

Relevance of Governmental Information Sources

D21. We now look at where subjects found the information to answer the questions, in particular whether the information they used came from a government website or not and whether it was correct (see **Figure 1**).

D22. We focus here on people in the open search treatment because only they were free to choose their sources. First, the majority of people used a mix of governmental and non-governmental sources. Of all questions in this treatment, almost half (44 per cent) were answered with a non-governmental website. While there is variation amongst individual subjects (unrelated to being a student or not), this gives a good indication of the extent to which non-governmental information sources were used.

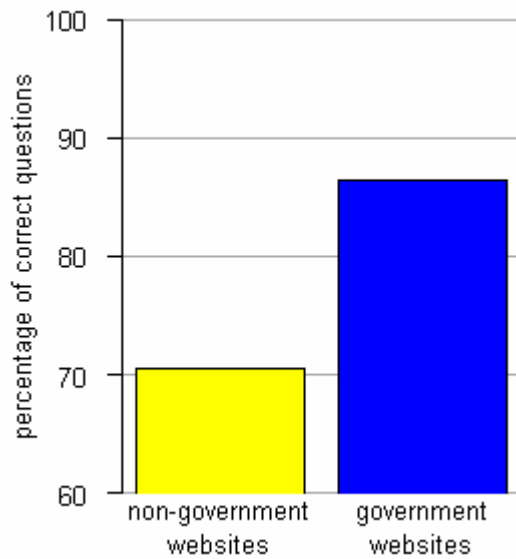
Figure 11: Sources of information used to answer questions



N=510 (open search treatment)

D23. One important finding (shown in **Figure 12**) is that the information obtained from non-governmental source is more likely to be incorrect: in our sample, information from non-governmental sources yielded correct answers in only 71 per cent of cases, compared to 86 per cent for governmental sources. This difference is significant (0.99) both for students and general internet users. It should be noted, however, that non-governmental sources might be slightly disadvantaged in our experiments because the questions were worded so that they could be answered with the help of the cross-government site (that is, we only asked questions for which we knew www.direct.gov.uk contained the answers).

Figure 12: Percentage of questions answered correctly, according to information source



Note: N=510 (open search treatment only)

D24. We examined for what types of information government websites were most likely to be used. **Figure 13** reports the questions for which most people in the open search treatment (that is greater than 70 per cent of subjects) found the correct information on government websites:

Figure 13: Percentage of people who used government sites to answer a question

Question number	Question	Percentage that used government websites to answer
10	<i>Can you find a site where a person could get information on the amount of state pension he/she can expect?</i>	92
12	<i>How can you apply for a replacement passport?</i>	92
8	<i>Can you report a theft from your car online?</i>	88
5	<i>How much do you have to pay for a European Health Insurance Card?</i>	86
11	<i>In which local library in Oxford could you find this book?</i>	85
15	<i>How severely is Wolvercote (Oxfordshire) affected by flooding?</i>	70

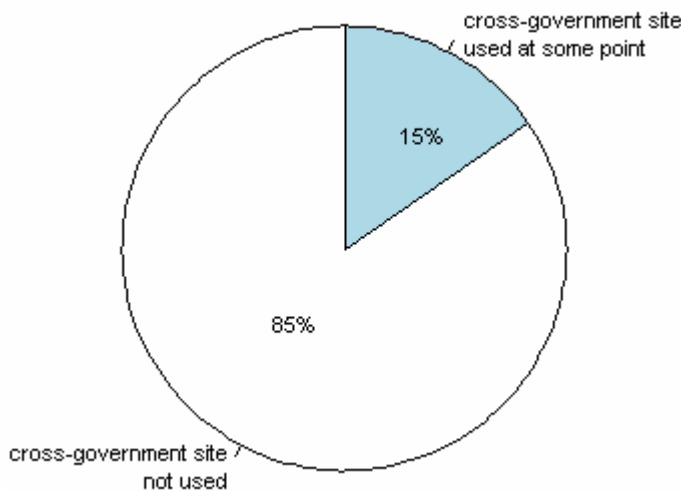
D25. **Figure 14** reports the questions for which many people in the open treatment found the correct information on a non-government website. The types of websites participants used included local and national newspapers; local schools; third sector organisations; interest groups; local businesses; and sites focussing on the local area.

Figure 14: Percentage of people who used non-government information sources to answer questions

Question number	Question	Percentage that used government website to answer
4	<i>Is the risk to become a victim of crime (of any kind) greater in Oxford than in Britain in general?</i>	55
14	<i>Can you find out what the 488 in the tax code stands for?</i>	54
6	<i>Does the SCHOOL NAME in Oxford achieve at least above average GCSE results for England?</i>	27
7	<i>Are people that require drugs because of diabetes mellitus eligible for free prescriptions?</i>	23
9	<i>What kind of NVQ level 3 course in Children's Care is available in Oxford?</i>	18
13	<i>Can you find a list of shop assistant positions available in Manchester?</i>	17

D26. For those people who could choose their sources of information freely (that is in the open search treatment), Directgov was rarely used in answering the questions. On average, about one out of seven questions (15 per cent) in this treatment were answered by accessing information from Directgov at some point. We observed no differences for students and general internet users. Most subjects therefore answered the majority of questions without any information being drawn from the cross-government site (see **Figure 15**).

Figure 15: Use of cross-government site to find information in the open search treatment



N=510 (open search treatment only)

People in the cross-government site treatment obtained their information exclusively from governmental sources.

Difficult Questions

D27. It is also interesting to see which particular questions posed problems to our subjects.

In order to determine which questions were difficult to answer, we can measure difficulty in two dimensions:

- a. was it possible to answer a question correctly?;
- b. how much effort was involved in answering the question correctly (using time and clicks)?

Correctly Answered Questions

D28. We defined questions that were difficult to answer as those for which less than 80 per cent of the subjects who tried to answer them found the correct answer. (We chose 80 per cent as the threshold as for our experiments this was the overall probability of a question being answered correctly.) According to this definition, questions that were difficult to answer were the following.

Figure 16: Questions that were difficult to answer correctly (less than 80 per cent of people answered correctly)

Question number	Question	on open search percentage of subjects	on cross-government site percentage of subjects
14	Tax code	78	
2	Pet immigration	76	
11	Book from library	73	
12	Passport replacement	72	76
15	Risk of flooding	70	64
4	Crime statistics	59	47
9	NVQ course	46	
7	Free diabetes prescriptions		41
6	School league table		72

D29. Due to the small sample size, not too much attention should be paid to scores nearly reaching the 80 mark. But questions that clearly were difficult for subjects to answer were those in the first four rows of Figure 16. We were somewhat surprised by this result, because for each of these questions there does exist good information sources on government websites. The problem was not necessarily in locating the website, but rather the particular piece of information.

Effort to answer a question correctly

D30. Effort could be measured either by the number of clicks (that is, the number of different pages visited) in order to answer a question correctly or by the time it took to answer a question correctly. Both are highly correlated but there can be differences depending on how quickly people navigate, whether there is a lot of text to read per page, and other factors. Given our data (and assuming that it does not matter too much how often people click as long as they do it quickly), one possible indicator is the average time it took to answer a question correctly as an indicator for difficulty. Overall, we found that subjects needed about 3 to 3.5 minutes to answer a question correctly. Questions that took a particularly long time to answer correctly (more than 250 seconds) on one or both of the treatments were as follows:

Figure 17: Questions that took more than 250 seconds on average to answer

Question Number	Question	on open search average no. of seconds	on cross-government site average no. of seconds
7	Free prescriptions		444
4	Crime statistics	272	439
6	School league table		323
9	NVQ course	358	274

D31. Effort can also be expressed in the number of clicks to answer a question correctly (which we describe as ‘path length’). Questions that took a particularly high number of clicks to answer correctly (that is, questions where the total average for correctly answered questions are above the average of 10 clicks) were:

Figure 18: Questions that took more than 10 clicks to answer

Question number	Question	on open search average no. of clicks	on cross-government site average no. of clicks
4	Crime statistics	16	30
7	Free prescriptions		21
15	Risk of flooding		17
6	School league table		15
11	Book from library	16	14.5
9	NVQ course	18	11.5

D32. So as we would expect, many of the questions that took many clicks to answer also took a longer time to answer. However, the questions about library books and flooding both took a high number of clicks, yet subjects were quite fast here, suggesting that time per question rather than clicks per question is the more useful measure.

Annex D1: Questions (correct answers given in bold)

No.	Text	options
1	You want to learn how to drive a car. You have been told that for this you need a provisional driving license. <i>In which ways can you apply for a provisional driving license?</i>	online only by post only online or by post
2	Some relatives of yours are living in the US and want to come over during Christmas. They also want to bring their dog to the UK. The dog has been micro-chipped and vaccinated against rabies but will that be enough to bring it over? <i>In order to bring a dog from the US to the UK, is it enough to have it micro-chipped as well as vaccinated against rabies?</i>	Yes No
3	Imagine you just got a new job and you're getting paid 6 Pounds per hour. A friend told you that businesses are required by law to pay at least a certain amount of money per hour to their employees. <i>Does the money you get paid satisfy legal requirements?</i>	Yes No
4	You are thinking about moving into a new area. You just got a nice offer for a place in Oxford. However, after a friend of you got burgled there you are wondering about the safety in Oxford. <i>Is the risk to become a victim of crime (any kind) greater in Oxford than in Britain in general?</i>	Yes No
5	You want to go on a winter holiday to France. The travel agent advised you to make sure you got a European Health Insurance Card. <i>How much do you have to pay for a European Health Insurance Card?</i>	10 Pounds 5 Pounds nothing at all
6	Imagine you have to choose a school for your daughter. A friend is suggesting the SCHOOL NAME in Oxford but you would like to make sure that it is a good school. <i>Does the SCHOOL NAME in Oxford achieve at least above average GCSE results for England?</i>	Yes No
7	A relative of yours has just been diagnosed with Diabetes Mellitus. For this condition he has to get treated with drugs that can get quite expensive. So far he always had to pay for his drugs but he wants you to find out whether he is now eligible for free prescriptions. <i>Are people that require drugs because of diabetes mellitus eligible for free prescriptions?</i>	Yes No
8	Imagine you are coming back from a holiday and you find that your car was broken into. Not much has been stolen but you need the crime number for insurance purposes. <i>Can you report the theft from you car online?</i>	Yes No
9	You want to earn an additional qualification to care for children. After getting some information you decide on a National Vocational Qualification (NVQ), level 3, in Children's Care that you would like to do part time while you are in Oxford. <i>What kind of NVQ level 3 course in Children's Care is available in Oxford?</i>	full-time part-time no course at all
10	An older relative of yours is interested in how much state pension he will receive once he is 65. <i>Can you find a site where he could get information on the amount of state pension he can expect?</i>	Yes No
11	During the Christmas break you are staying with a friend of yours in Oxford. Recently you read an article about the computer operating system Linux which recommended Ellen Siever's book "Linux in a nutshell". <i>In which local library in Oxford could you find this book?</i>	Abingdon Library Central Library Headington Library Summertown Library Woodstock Library

12	<p>You want to go on a holiday but after hours of searching at home you still cannot find your passport. You finally decide you will have to apply for a replacement. <i>How can you apply for a replacement passport?</i></p>	<p>fill in a form online and that is it fill in a form online but still have to sign a paper copy not possible to do it online at all</p>
13	<p>You are planning to move to Manchester and are looking to find a job there (as a shop assistant in a supermarket) before you go. <i>Can you find a list of shop assistant positions available in Manchester?</i></p>	<p>Yes No</p>
14	<p>You have a tax code 488L on your payslip but you don't really understand what it means. <i>Can you find out what the 488 in the tax code stands for?</i></p>	<p>it does not mean anything it identifies your tax office you have 4880 Pounds tax free pay the last digits of your National Insurance number</p>
15	<p>You are thinking of buying a house in Wolvercote in Oxfordshire but you are worried about possible flooding. <i>How severely is Wolvercote (Oxfordshire) affected by flooding?</i></p>	<p>not at all only a bit very much</p>

Annex D2: Details of the sample and additional information on responses

Sample

D2.1 Our subjects filled out a post-experiment questionnaire which provided us with some information on the sample. (Not everybody provided all information, so N=65 out of 70 subjects):

Background:

- People came from diverse backgrounds (for example unemployed, ethnic minorities, seniors).

Age:

- The majority of all subjects (80 per cent) were aged 30 or less, but these younger people were evenly distributed in the age span from 18-30. (The bias towards a younger sample came mainly from the student cohort in the London experiments.)
- There were no age differences between treatments.

Usage of the internet:

- Almost everybody reported using the internet on a daily basis (90 per cent).

Internet abilities:

- The majority of subjects (82 per cent) rated their internet skills as either good (57 per cent) or excellent (25 per cent).
- There were no major differences between treatments and no differences between students versus non-students in internet abilities.

Knowledge and usage of government websites:

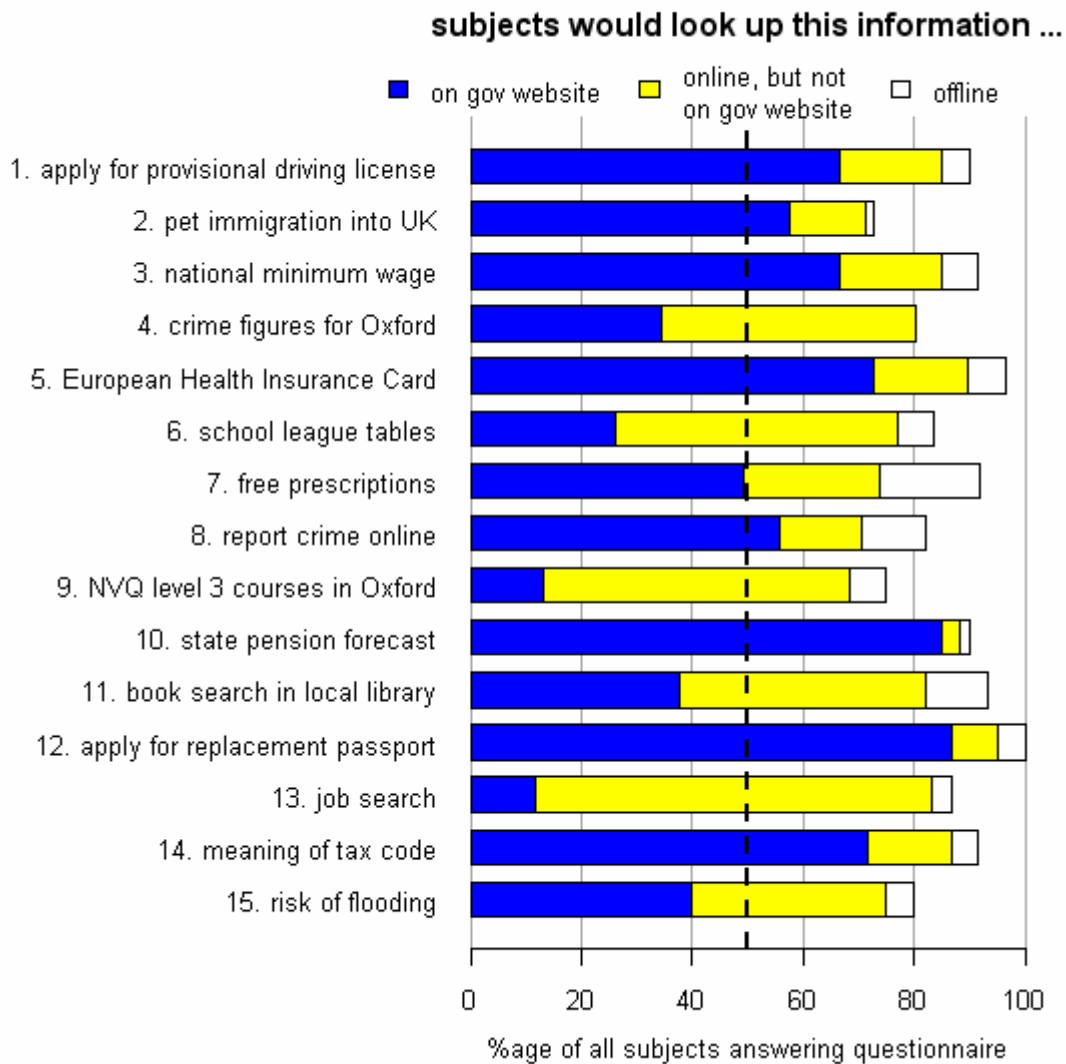
- Around 70 per cent of our participants had used government websites to look up information in the last year.
- There were no differences between students versus non-students in knowledge of government websites.

Search behaviour:

- Everybody usually used a search engine, and the search engine used was almost exclusively Google.
- Reported usage of internal search capabilities was high with two thirds of participants using it quite often (50 per cent) or almost always (15 per cent).
- Only one out of 10 reported using internal search seldom or never.

D2.2 Our participants were also asked for feedback on how likely they would be to use government websites to answer the questions asked during the experiment, reported in the following Figure:

Figure D2.1: Feedback on questions from the user experiments



Note: The response rate was 87 per cent, as some subjects had to leave early.

We asked the following question: Please think about yourself: Do you think it is likely you could be in a situation where you would be interested in that kind of information? And if so, would you look for this information on a government website or rather somewhere else?

Options:

- would look it up online on government website;
- would look it up online, but not on a government website;
- would look it up offline;
- can not imagine being interested in this information at all;
- do not know;
- n/a.

Annex D3: Technical Set-up and Acknowledgements

Technical Setup

D3.1 The subjects used PCs with the Firefox browser (version 1.5 and 2.0) with the Slogger extension (www.kenschutte.com/slogger/) in order to log times and the URLs of pages that were accessed through the browser. Subjects were presented with an online questionnaire that was created and subsequently analyzed via customized Perl scripts. In order to enable blocking of certain sites (for example access to search engines for people in the cross-government site treatment), subjects accessed the internet through a proxy server, blocking was subsequently enforced via Apache's mod_proxy module.

Acknowledgements

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