

User information seeking behaviour: Perceptions and reality. An evaluation of the WHO Labresources Internet portal

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Abstract

Evaluation on Internet portals is a key component of any online resource development. Understanding user information seeking behaviour and user perceived behaviour is essential to obtain the full picture of user needs, online activities and draw lessons to improve the design of Internet portals to better meet user expectations. This article discusses the evaluation of a WHO Internet portal: the Labresources website. The evaluation investigates user satisfaction with the resource, usability, demographic information about users and how well they could complete specific tasks using the website and compared this with the actual online behaviour revealing a number of discrepancies. An online questionnaire was advertised on the Labresources website during the period 25 November 2005 to 20 February 2006. As the site caters to English and French speakers, the questionnaire was made available in both languages. It consisted of two sections – the first section required the participant to complete three tasks using the website whereas the second section tested user satisfaction, information needs and appropriateness of the content. Weblogs data were compared with the questionnaire results to compare user perceived and actual online behaviour. Twenty one respondents completed the online questionnaire from a total of 18 countries. This was out of a potential 60 website users among whom the questionnaire was promoted. In general, respondents were satisfied with the website layout and navigation. 61.9% of respondents listed WHO among their top 5 and a third listed the Labresources website. The number of sessions where users browse (146) the information resources is almost three times more than the number of users who search (52) the resources. Weblogs revealed most interesting results with differences between what users reported doing when completing tasks and how easy they perceived the tasks and what they actually did. Twelve respondents completed at least one task. Of the remaining nine respondents, three did visit the Labresources website from the link in the questionnaire but did not go on to complete the tasks. Only one of the twelve who completed a task reported it being difficult. Three of the respondents who didn't complete a task reported the tasks to be difficult but only one of these actually followed the link to begin the tasks in the questionnaire. This article described an evaluation study investigating user perceived and actual behaviour at the WHO Labresources Internet portal. Although the questionnaire results demonstrated general satisfaction with the resource, a combination of a weblog evaluation with the questionnaire revealed a clearer picture of the user perception of and satisfaction with the website compared to their actual activity when completing the set tasks.

Keywords: *Internet portal, Weblog analysis, qualitative study, quantitative study, user information seeking behaviour*

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1. Introduction

Evaluation is a key component of any online resource development. This article describes the first evaluation of the Labresources website (<http://www.who.int/labresources/>), a World Health Organisation resource for public health laboratories in resource-limited countries. The main features of the site include a password-protected area for defined groups of users; a resource centre (documents, Internet links to existing sites, news from the field); tools for distance communication and a multilingual interface. The site was launched in 2005 and has been piloted in collaboration with the participants of a WHO Laboratory Training programme [1] and with participants to the WHO External Quality Assessment programme in the African and Eastern Mediterranean WHO regions [2]. As for any software, a first evaluation of the website was necessary to ensure that the system meets initial specification as well as user needs and requirements.

Chowdhury and Chowdhury [3] define evaluation as a judgement of worth to ascertain a level of performance or value. Saracevic [4] takes this further, suggesting that performance can be broken down into two criteria:

- Effectiveness i.e. how well does a system perform that for which it was designed?
- Efficiency i.e. at what cost (financial or time/effort)?

Recently, there has been growing research interest in health websites evaluation investigating usability, satisfaction, content quality and navigation aspects, however, a general approach has often been lacking.

Web evaluations can involve many different research methods including weblog analysis and pre- and post-questionnaires to investigate learning and use of online resources [5–7].

Weblog analysis enables tracking of user activity within a website or within the course environment [8].

A recent review identified the most commonly used criteria for evaluating health websites and found that over two thirds of the individual criteria elements were related to content, including accessibility, relevance and validity. Fifty nine percent of the criteria sets had criteria related to the navigation and organisation of the site, while 77% included criteria about the site ownership and funding [9]. Recent research has tended to focus on website usability and content evaluation rather than investigating user perception and satisfaction with their visit to a website and a recent study suggests that there are a lot of cultural issues involved in the use of healthcare websites by healthcare professionals [10]. Previous study of the National electronic Library of Infection, by the authors, has found discrepancies between what users report doing and what they actually do as recorded by web access logs [11].

Previous research by the authors has included investigating the knowledge increase and attitude changes of online digital library users using pre- and post-questionnaires [12] and evaluating use of online digital libraries with online questionnaires, weblog data and search query data [13].

This article discusses the methods used in the evaluation of the Labresources website. The evaluation investigates user satisfaction with the resource, usability, demographic information about users and how well they could complete specific tasks using the website. This enables a clearer picture to be gained of the user perception and satisfaction with the website compared with their actual activity when completing the set tasks. In addition, obtaining demographic information allows comparison of website use between different geographic areas.

2. Methods

An online questionnaire was advertised on the Labresources website during the period 25 November 2005 to 20 February 2006. As the site caters to English and French speakers, the questionnaire was made available in both languages. It consisted of two sections. The first section required the participant to complete three tasks using the website

- Task 1 – upload a file to the resource centre
- Task 2 – post a reply to a discussion message and attach a file
- Task 3 – find two resources known to be in the resource centre

The second section consisted of nine questions about the following:

- Question 1 – how users access information & barriers to use of the site
- Question 2 – users' Internet connection, currency of information on the site
- Question 3 – site layout, language and navigation
- Question 4 – content access, description and navigation, uploading content
- Question 5 – actual content
- Question 6 – news on the site
- Question 7 – help feature
- Question 8 – discussion features
- Question 9 – name and country of residence

In addition, web access logs for the period were collected for all visitors to the website, not just those taking part in the evaluation. Web access logs show the activity of users within a website, i.e. each page that a user visits is recorded along with the time and date of access. User IP addresses (the identification address of their computer) are also recorded so it is possible to group web access logs into sessions by each user. It should be noted that the visitor statistics are unlikely to be wholly accurate due to changing and sharing of IP addresses during and between visitor sessions. However it gives an indication of the use of the website during this period.

This article reports on the completion of the directed tasks and how these compare to demographic factors, connection speed and barriers to use. It investigates how users completed the tasks compared with how they report performing them and provides a summary of user behaviour within the website. It does not provide a detailed report of the entire evaluation as this is available in the evaluation report [14]. The next section describes the results observed.

3. Results

This section briefly discusses the general evaluation results, followed by investigation into the completion of the tasks and user behaviour within the website.

3.1. Response to the questionnaire

Twenty one respondents completed the online questionnaire from a total of 18 countries. This was out of a potential 60 website users among whom the questionnaire was promoted. Of these 21 respondents, 8 completed the questionnaire in French and 13 in English. Nine were from African countries, nine from Eastern Europe and the Russian Federation and three

from the Middle East. The geographical location did not have any statistical significance on the results obtained, perhaps because of the small sample size. Two thirds of the respondents ($n = 14$) had low speed access to the Internet and two thirds also had their Internet access paid for by an organisation such as WHO or their employer. Fifty percent of the respondents with low speed internet access thought that pages of the website were slow to download and 64% thought resources were slow to download, compared with 17 and 33% respectively of those with high speed access.

3.2. Satisfaction with the layout, navigation and content of the website

In general, respondents were satisfied with the website layout and navigation. Most ($n = 17$) were happy with the availability of the site in both the French and English languages. An average of nine respondents across all categories (standard deviation 2.2) strongly agreed and eight agreed (standard deviation 1.7) that categories and sub-categories were self-explanatory.

3.3. Information seeking behaviour

Figure 1 shows the top 5 websites listed by respondents when looking for public health related information. 61.9% of respondents listed WHO among their top 5 and a third listed the Labresources website.

When asked 'In which context do you search for information?' most ($n = 13$) responded that they need information fast in their area of work, one third search for information for documentary follow-up in their usual area of work, while only 5% need information fast in an area other than their usual area of work.

3.4. User behaviour on the site

During the evaluation period (22 November 2005 to 22 February 2005) 178 visitors (comprising only visitors not taking part in the evaluation at the time of visiting) accessed the website making 6518 page requests in 383 sessions. It should be noted that the visitor statistics are unlikely to be wholly accurate due to changing and sharing of IP addresses during

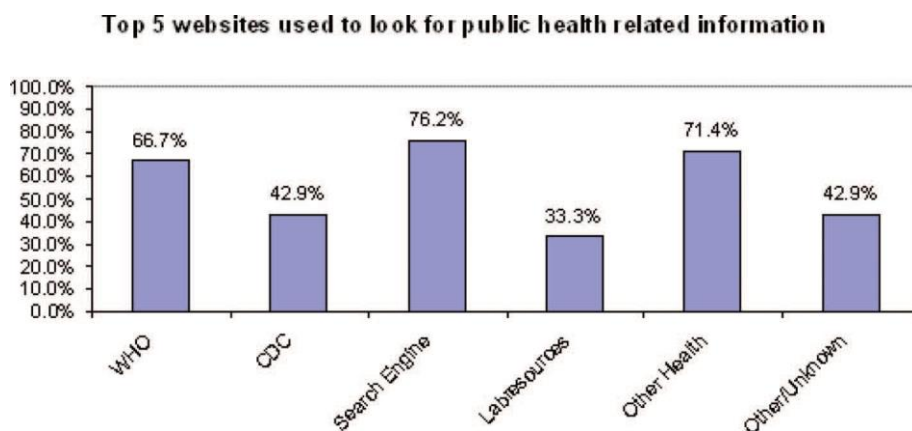


Figure 1. Top five websites used by respondents to find public health related information.

and between visitor sessions (Table I). However this provides an indication of the use of the website during this period. The average session length was 11 min and 27 sec and users are accessing at an average of 13.2 pages per session. These statistics are for all visits made to the website during the evaluation period not just those sessions that were part of the evaluation. Twenty seven percent of users visit the site via links within emails (identified from the referring URL e.g. hotmail or yahoo mail addresses), 9% from the evaluation questionnaire and 2% from search engines and 2% from other websites. The remainder of referrer information was not available from the log data. This could be due to users typing in the URL directly or opening a link in a new window.

Browsing is more popular than searching as shown in Figure 2, where the number of sessions where users browse the information resources is almost three times more than the number of users who search the resources.

Twenty of the 21 respondents agreed or strongly agreed that they were satisfied, in general, with the resource centre. The remaining one did not answer this question. The main barriers to use of the site were that respondents felt they did not have enough time or that there were connection problems. Two comments were made by respondents: 'Don't have access to a laptop for several months: recurrent technical problems' and 'Because at the beginning the resources were very limited. I did not take the time to consult these resources until recently'. There was no indication that those who felt the website was too complex was unhappy with the organisation of categories or descriptions of resources.

Table I. General website access statistics.

Measure	No. of minutes
Page requests	6518
Visitors	178
Sessions	383
Average session length	11 min 27 sec
Average no. pages accessed in a session	13.2

Comparison of searching & browsing in sessions

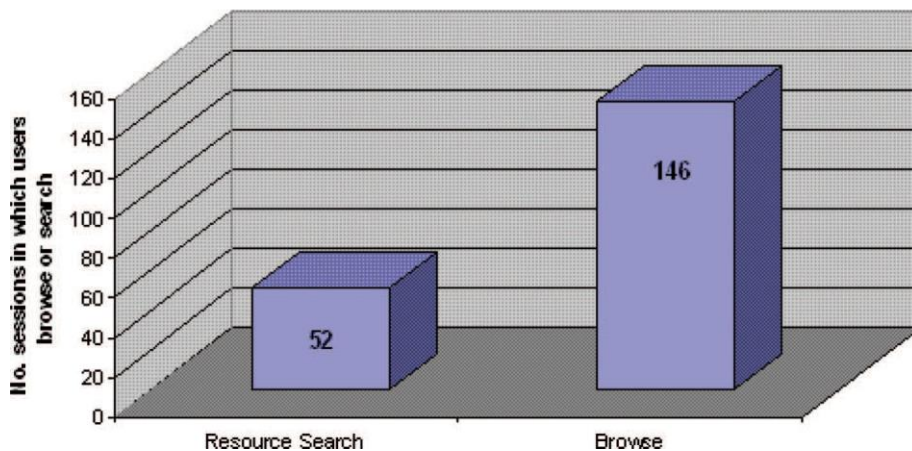


Figure 2. Comparison of searching and browsing behavior.

How often respondents access the site varies, with 10% accessing it at least five times a week and nearly a quarter of respondents only accessing the site less than once a month. Two respondents who said they spend over 5 h a week running information searches and two who spent between 2 and 5 h a week only report visiting the Resource Centre less than once a month. One of these experienced connection problems (the only one of these four who listed the resource amongst his top five public health websites), two said lack of time was a barrier to use despite the large amount of time they spend on information searching, and the fourth said they had not realised so many resources were available as these were limited at the outset.

3.5. Completion of tasks

This part of the study provided the most interesting results with differences between what users reported doing and how easy they perceived the tasks and what they actually did. This supports previous research by authors that suggested there was a difference between how users reported using a digital library with how they actually used it (in progress).

3.6. User perception of the tasks

- Seventeen of the respondents reported that the tasks were easy, four said they were difficult.
- Nineteen claimed that they found the material they were looking for, only two said they didn't (both of which had reported that the tasks were difficult).

3.7. Actual activity during the tasks

- Weblogs were collected to analyse respondents' actual activity while completing the tasks. Although seventeen respondents reported that the tasks were easy the weblogs indicate that only nine respondents completed task 1 with even fewer respondents going on to complete tasks 2 and 3. Five of those who said they found the tasks easy did not complete any of them. One person completed all four tasks, five completed three, two completed two tasks and four respondents completed just one task.
- Twelve respondents completed at least one task. Of the remaining nine respondents, three did visit the Labresources website from the link in the questionnaire but did not go on to complete the tasks. Only one of the twelve who completed a task reported it being difficult. Three of the respondents who didn't complete a task reported the tasks to be difficult but only one of these actually followed the link to begin the tasks in the questionnaire.
- Of the nine who did not complete any tasks, when asked to state barriers to use of the website, four reported the website as being too complex, two stated lack of time as an issue, two had connection problems and one reported that Internet costs are too high.

3.7.1. Task 1

- The weblogs report that only nine respondents actually uploaded a resource as directed in this task. According to the website, there was one extra participant who uploaded a resource for this task but did not complete the questionnaire.
- Of the twelve who did not complete this task, only one respondent felt that the upload wizard was not easy to use as asked in a previous question.

3.7.2. Task 2

- Both the website and the weblogs indicate that six respondents attached a file to a discussion message for the second task. Two of these respondents attached a file twice and an extra respondent posted a message but did not attach a file and when the process was checked by the evaluator it was noted that it is not clear before posting whether the attachment of the file has been successful or not. Another user completed this task but did not complete a questionnaire.
- Of the 15 who did not complete this task only one felt it was not easy to post a discussion message (this was not the same person who felt the upload wizard was not easy to use) and two did not comment on this question.

3.7.3. Task 3

- Seven respondents completed the first part of the third task finding the training material on descriptive epidemiology. Three used the browser menus to find it, while four used the resource search.
- Four respondents completed the final part of the task finding the software for quality control with one browsing to find it and three using the search function.
- Of the 12 respondents who did not find either of these resources only one felt the resource list was unclear, this was the same person who did not complete task 1 and reported that the upload wizard was not easy to use.

4. Discussion

In general, Labresources was seen to be a useful and satisfactory resource with users able to navigate and understand navigation headings. It was perceived to a popular site amongst respondents with one third listing it among their top five websites for public health information. There were several suggestions for improvements to content, frequently asked questions and news coverage although with some of these suggestions it is unclear exactly what the respondents mean, so some suggestions may benefit from further clarification perhaps by email or telephone discussion. Website users (not those doing the evaluation) are spending an average of over 11 min on the site in one session and visiting over 13 pages. Users spent more time browsing than searching, this may be partly a reflection of them having more success searching and not needing to search as often although there were almost three times as many sessions where users browse rather than search. This is something not investigated in depth in the questionnaire and it may have been useful to clarify why browsing is more popular, perhaps the search facility is not easy to find or use?

Internet access speed is mainly low-speed and there were some issues with pages or files downloading slowly particularly PDF and PowerPoint files. This was less of a problem in the Eastern European countries than it was in African and Middle East countries. However, there is little the Labresources providers can do about this, other than keep file sizes to a minimum where possible and alert users to the opportunities provided by WHO for funding for faster Internet connections.

Because of the discrepancy between respondents' self-reporting of the directed tasks and their actual behaviour retrieved from the weblogs it may be appropriate to investigate this further with more qualitative research such as an interview or observation techniques. However, this may not be possible with 'real' users due to the wide geographical area that the

website users are based across but a laboratory-based investigation could provide a useful insight into how people navigate the site and perform common activities within it.

All respondents who attempted the tasks were successful in completing the tasks except for one who failed to attach a file to their discussion message in task 2. Despite the somewhat low response for this part of the evaluation, the experience of those who did complete it appeared positive. It is possible, given the responses of those who did not complete the tasks to other related questions in the questionnaire, that a factor influencing their lack of response was that they felt confident performing such tasks already. Another reason for lack of response is that of the barriers to use of the website discussed above.

In conclusion, this was a positive evaluation with constructive comments by respondents for website improvements. Areas for potential further evaluation have also been identified. Labresources is obviously a key resource for these respondents and in general they are satisfied with it and the information it provides.

The results of this evaluation were discussed with a sub-set of users from the Middle-East countries during a face to face session of the WHO laboratory training programme that took place in February 2007. This allowed for further confirming the relevancy of such a website to support public health capacity building in resource-limited countries and identifying more topics of interest (i.e. accreditation, laboratory-epidemiology interaction, etc.). Further, apart from the connectivity problems encountered by some users and the linked need to more systematically control the size of posted documents, no real technical issues were reported by the users. The cited barriers of use were linked rather to the moderation of the site and the need to organise more systematically interaction among users. Since then, new activities have been launched such as the development of a newsletter and the testing of live virtual conferencing tools that will value the contents of the site and multiply the opportunities for networking, placing Labresources at the centre of an active network of public health laboratory professionals.

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