Webometric Analysis Of Departments Of Librarianship And Information Science

Owen Thomas and Peter Willett[1]

Department of Information Studies, University Of Sheffield,

Western Bank, Sheffield S10 2TN, UK

Abstract

This paper describes a webometric analysis of the linkages (or 'sitations') to websites associated with departments of librarianship and information science (LIS). Some of the observed sitation counts appear counter-intuitive, and there is only a very limited correlation with peer evaluations of research performance, with many of the sitations being from pages that are far removed in subject matter from LIS. Our conclusions are that sitation data are not well suited to the quantitative evaluation of the research status of LIS departments, and that departments can best boost their Web visibility by hosting as wide a range of types of material as possible.

1. Introduction

The availability of large volumes of citation data [1-4] has led to widespread interest in their use to provide performance indicators in the quantitative evaluation of academic institutions and departments [5, 6], with several such studies focusing on the research activities of departments of librarianship and information science (hereafter LIS) [7-9]. The development of the Web has encouraged the development of analogous methods that are based on the idea that a Web link to a specific URL is analogous to a conventional citation to an individual academic paper, monograph, report, *etc*. Such 'sitations' (to use Rousseau's appropriate name [10]) lie at the basis of 'webometric' [11] studies, of which there are an increasing number in the literature [12-17]. An important concept in webometrics is the Web Impact Factor (or WIF). This was introduced by Ingwersen and is defined (when calculated for some particular Web entity such as a domain or a site) as the sum of the number of sitations to that entity (whether emanating from within that site or from external Web pages) divided by the number of pages found in that entity at a given point in time [13]. A WIF thus provides a natural Web-based analogue of the Impact Factor (IF) that has been extensively used for evaluating traditional printed journals [1], most obviously in the annual *Journal Citation Reports* published by the Institute for Scientific Information (at URL http:www.isinet.com). The main difference

[1] To whom all correspondence should be addressed. Email: p.willett@sheffield.ac.uk

[13] is that IFs are calculated with respect to a given time period, typically by considering the citations attracted within two years of an item's publication, whereas WIFs are not temporally constrained.

Ingwersen's original study calculated WIF values for a few selected countries, domains, universities and journals [13]. He concluded that reliable values could be obtained for the first two types of entity, but that inconsistencies in the search engine used in his experiments (AltaVista as in all of the cited Webometric studies to date and in the work reported below) meant that the results for the last two types of entity needed to be treated with some degree of caution. A later study by Smith [16] highlighted potential errors in the way that AltaVista handles sitations to countries and concluded that it was thus not possible to calculate reliable WIF values for them; problems were also encountered with Australasian electronic journals, but reasonable results were obtained for sitations to Australasian universities. In this brief communication, which is based on an MSc dissertation by Thomas [18], we report a sitation analysis of individual academic departments, specifically of the Web pages of UK LIS departments. Webometric rankings are compared with those resulting from the Research Assessment Exercise (RAE), an evaluation of UK academic departments carried out by the Higher Education Funding Councils (HEFC) in the UK [19], and samples of the sitations are classified using methods developed by Almind and Ingwersen [11].

2. Analysis of sitation counts

The UK LIS departments we have studied are listed in Table 1, together with their corresponding URLs. These were obtained by accessing each department's homepage individually through its parent university website, the latter being reached *via* the University of Wolverhampton's clickable map of higher education institutions (at URL http://www.scit.wlv.ac.uk/ukinfo/uk.map.html). URLs were truncated to the greatest level of generality that would still uniquely identify the department in question, and these URLs were then checked against the University of Sheffield world list of LIS departments (at URL http://www.shef.ac.uk/~is/publications/worldlist/wlist1.html), in order to retrieve other possible addresses that might be used to link to the departments under consideration. As the examples in Table 1 show, in some cases, the same page may be accessed by using different addresses.

Following Rousseau [10] and Ingwersen [13], we have used the **link:address** and **url:address** features in AltaVista Advanced Search to obtain counts of the numbers of links to a specific site. Thus, taking the URL for Manchester Metropolitan University's Department of Information and Communications (http://www.mmu.ac.uk/h-ss/dic/) as an example, the various search strings required for the sitation counts were constructed as detailed in Table 2 (the "http://www." prefix is omitted from these search strings as it is not required in AltaVista Advanced Search). Data collection was carried out over a series of on-line snapshots of no more than 2 hours each during the early summer of 1999. The searches took place in the morning, as retrieval times are fastest and as recall is more stable when advanced Boolean search strings are submitted at this time[2]; a similar time-dependency in the reliability of AltaVista search results has been

[2] Private communication from the AltaVista online support team to O. Thomas on 12th May 1999, stating that the search engine returns an approximation of results, with the best recall being obtained between 0300

reported by Smith [16]. At this time (mid-1999), AltaVista Advanced Search included a counts facility which, when set to on, returned just the number of sitations, rather than the sitations themselves. A referee suggested that setting this parameter to on would have yielded more stable counts than would otherwise be the case; however, this was not done owing to the need to retrieve the sitations themselves for the analysis described in the third section of this paper. There is also a question-mark over the longer-term stability of citation counts [20, 21]; we found that searches carried out in June 1999 and September 1999 gave broadly comparable, but generally non-identical, results for most of the UK schools.

Several different types of sitation count can be obtained for a department's website, including:

- 'Simple' sitations, (*L*): all of the links to a particular departmental site
- 'Self-sitations' (*S*): links that occur between two pages in the same departmental website
- 'External' sitations (*E*): links from outside the department's website
- 'Calculated' sitations (*C*): the sum of links within and without the department's homepage
- 'Host-institution' sitations (*H*): links that originate within the host University, but from outside the department in question
- 'Residual sitations' (*R*): links that originate outside the host University of which the department is a member.

The last of these, *R*, is the best Webometric analogue of the residual citations that are used in traditional citation studies and that remove all self-citations from the counts used in an analysis. We thus believe, as does Smith [16], that *R* provides the best estimate of the utility of a website and we have thus used this type of sitation as the main basis of comparison here, although we have also quoted *L* values on the grounds of their simplicity; counts for all of the other sitation types are presented by Thomas [18].

The WIF values for a particular department are obtained directly from the counts. If the total number of URLs for that department's site is *U* then we define the simple and residual WIF values by

$$WIF_S = \frac{L}{U} \quad \text{and} \quad WIF_R = \frac{R}{U},$$

respectively. Values for *U*, *L*, *R*, WIF_S and WIF_R for the UK LIS departments are listed in Table 3, with the table being ranked in order of decreasing value of *R*. This ordering is not very different to that obtained from use of *U*, rather than *R*, as the sort key, which suggests that the number of residual sitations is related to a site's size. Ingwersen suggested that WIF values should be calculated using *C* (which is numerically equal to the sum of *S* and *E*), rather than *L*, as he found that the former counts were more reliable [13]; we, however, normally found little or no variation between the two types of WIF. Specifically, there was no difference between the 'simple' and 'calculated' WIF values figures except in the cases of Brighton and Robert Gordon, where slight discrepancies were observed (6.25 (simple) as against 6.50 (calculated) for Brighton, with the corresponding figures for Robert Gordon being 2.86 and 3.25). It may be that the AltaVista **link:address** operator is now more reliable than at the time of Ingwersen's initial study, and this

---

and 1300 3 GMT.

simple method of data collection would hence appear to be sufficient to retrieve representative total sitation figures.

It will be seen that there are no entries in Table 3 for the departments at Queen's University, Belfast and at the University of Central England at Birmingham, this arising from AltaVista not retrieving anything when the **url:address** strings were entered for these departments. Moreover, brief manual inspections of the websites for UCL, North London and Brighton revealed substantially more pages than the *U* values returned by the AltaVista searches (owing to many of the pages within a site being given the same URL). The distribution of the *U* values in Table 3 is highly skewed, with the Strathclyde site comprising 29.6% of all of the UK LIS URLs. Strathclyde, Sheffield and Robert Gordon dominate the sitation counts, with the other nine departments attracting only 13.3% (*L*) and 8.2% (*R*) of the sitations. These three departments (Strathclyde, Sheffield and Robert Gordon) are all well towards the top of the WIF rankings, but the manner of calculation of the WIF values means that other departments can also figure highly. Thus the low *U* value for North London results in it having the highest WIF_R and second highest WIF_S values, despite attracting only a very few sitations, and similar comments apply to UCL; the converse behaviour is observed for Loughborough, where the very low *L* and *R* values that were obtained in the searches result in correspondingly poor WIF_S and WIF_R values. Indeed, the measured sitation counts for this highly-regarded, research-active department are so low as to lead us to believe that they cannot be correct.

Similar behaviour is observed if we consider USA, rather than UK, LIS departments. The departments were taken from a conventional citation analysis by Budd and Seavey [22] and their homepages then processed as for the UK departments. The resulting sitation and WIF values are listed in Table 4, which is similar in character to Table 3. Thus: a few departments (Michigan, Illinois and Indiana) attract the great bulk of the residual sitations, with the majority attracting only small numbers; there is a strong correlation between the *U* and *R* rankings; and there is again a highly-regarded, research-active department, Rutgers, that has an unrealistically low value for *R*. The very high *U* value for Michigan arises from the department hosting a number of associated sites covering, *inter alia*, a 1919-20 expedition by a university professor, a comprehensive set of Internet telecom resources, alumni information, religious group materials, and a creative writing programme at a local prison.

Conventional citation data has been successfully correlated with RAE ratings for several disciplines [6], including LIS [8, 9] and we have thus attempted a comparable analysis using the sitation data in Table 3 and the HEFC ratings for LIS departments (at URL http://www.niss.ac.uk/education/hefc/rae96/1_96/t61.html). These ratings have been included in the final column of Table 3 and are on a seven-point scale: 1 (lowest), 2, 3b, 3a, 4, 5 and 5* (there are also sub-divisions within these ratings depending on the percentage of the staff of a department that were submitted for consideration in the exercise but we have not included these here). No data are available for the University of North London as it did not make a submission to the 1996 RAE. The RAE data is inherently

ordinal in nature and the Spearman rank correlation coefficient is hence appropriate for identifying any significant correlations that exist. The Spearman coefficients were calculated for the relationship between the HEFCE rankings and, in turn, the *U*, *L*, *R*, WIF_S and WIF_R values. None of the coefficients were significant at the 0.05 level (two-tailed) of statistical significance. The analyses were repeated, omitting Loughborough (owing to the very low value of *R*): in this case, a single significant correlation was observed ($\rho = 0.81$, $p \leq 0.005$) for the correlation between the HEFCE ratings and *L*, the number of simple citations. The webometric data collected here thus correlates far less well with peer assessments of departmental research performance than does conventional citation analysis. Although the basis of comparison is different, it is interesting to note that Smith was equally unsuccessful in seeking to establish a correlation between WIF_R values for entire Australasian universities (rather than individual departments within UK universities, as here) and the mean number of publications for each faculty member of those universities [16].

3. Classification of sitations

Table 3 provides information about the volume of sitation for each of the UK LIS websites considered here; in this section we have classified samples of the pages for the residual sitations. The classification scheme used is that described by Almind and Ingwersen [11] in which siting pages are allocated to one of the following groups:

- Personal home page: a home page whose main purpose is to represent an individual
- Institutional/organisational home page: a home page whose main purpose is to represent an organisation
- Subject-defined home page: a home page whose main purpose is to represent a subject
- Pointer document/index page: a page whose function is primarily to make a number of hyperlinks available
- Resources: web pages that primarily make data available, for example, in the form of text, sound, pictures or film

Each of these classes was divided into two, depending whether a particular page was, or was not, within the LIS subject domain, so as to provide some insights into the sorts of sitations that occur. Thomas describes the detailed criteria used to assign pages to classes: for example, a subject-defined page would be one that dealt with a specific subject area, rather than containing many links to other resources, and an LIS-related page would deal with topics in the general areas of librarianship, information management and information systems [18].

A random sample of 100 siting pages, or the total population of siting pages if there were less than 100 of them, was examined for each of the LIS departments. In those cases where all of the siting pages were checked, the total number of pages actually classified was smaller than the population size, since there were always some pages that were inaccessible or where the siting page was not traceable. We will exemplify the procedure by considering two sites, those of Strathclyde and of Northumbria, the results for which are summarised in Tables 5 and 6, respectively.

One very frequently sited page in the Strathclyde website is *Business Information Sources on the Internet*, which accounts for a large number of non-LIS linkages from marketing, management, business and economics pages; indeed, this particular resource attracted over one-half of all of the sitations to the Strathclyde website. Other frequently sited pages are a resource representing European action on *Lyme Borreliosis*, which is sited by biological and medical pages, and an article on censorship and controlling access to the Internet, which is part of a personal home page in the department and which attracts sitations from a range of sources, including both aggressive censorship action groups and more LIS-related pages that discuss Web authoring practices. Table 5 makes clear that the majority of the sitations to the Strathclyde website originate in sites outside the LIS subject domain. Some of these non-LIS sitations highlight a problem inherent in any type of Webometric analysis, *viz* the many reasons for which a sitation can be made [14] (see also the continuing interest in reasons for conventional literature citations [2, 23, 24]). Specifically, many sitations are not related to scholarly material and are thus not meant to make a statement of intellectual acknowledgement; for example, the Strathclyde site attracts many links from scouting pages and from Scottish, travel and cultural pages, as a result of the department hosting the homepage of the 16th Glasgow Scout Group and the *Pure Dead Glasgow* city guide, respectively, One may question the appropriateness of such sitations for inclusion in a quantitative evaluation of academic research performance. The Northumbria website presents a very different picture, as demonstrated by the figures in Table 6 where 90.2% of the sitations are from LIS-related sites. The most sited pages are those associated with the IMPEL-2 project, which considers the impact of electronic libraries on people, and there are also a fair number of LIS-related links from sites related to records management.

Tables 5 and 6 demonstrate that the Strathclyde site has a large number of sitations, with many of these coming from non-LIS sites, while Northumbria has far fewer sitations, with many of these coming from LIS sites. This apparent link between sitations and the fraction of non-LIS material is observed for all of the UK LIS sites, as detailed by Thomas [18] and as summarised in Table 7. This table lists the percentage of non-LIS sitations for each of the departments (percentages are used, rather than actual counts, owing to the different numbers of sitations for each of the departments) and the corresponding residual sitation counts (Loughborough is again omitted from the analysis). There is a strong, statistically

significant Pearson product-moment correlation ($r = 0.94$, $p \leq 0.001$ in a two-tailed test) and we hence conclude that the greater the number of residual sitations to a particular department's website, the greater the number of these that come from non-LIS websites.

4. Conclusions

Citation methods are widely used to evaluate the research performance of academic entities of all kinds, and it seems natural to extend these methods to enable the processing of the sitation counts resulting from an analysis of the links between Web pages. Following previous such analyses of larger types of Web entity (including countries, domains, universities and journals), this paper reports a Webometric analysis at a higher level of granularity, specifically an analysis of individual LIS departments in UK universities.

It is important to note the limitations in such an analysis. Most obviously, as has been noted by several workers [13, 15-17, 20, 21], current search engine technology cannot be relied upon to provide comprehensive, reliable sitation data. We have already noted the counter-intuitive sitation counts obtained in some of the searches and this is hardly surprising given the known lack of comprehensiveness of existing search machines [20, 25]. However, we have found less inconsistency in the search engine used (AltaVista) than has been claimed previously, especially if care is taken to carry out the necessary search operations when the load on the search engine is at its lowest. Another technical question relates to the presence of servers, often associated with individual research groups within a department, that are not hierarchically linked to that department's homepage and that accordingly cannot be included using search strings such as those shown in Table 2. Thus, within our own department in Sheffield, there are research-group servers covering dental education and chemoinformatics that were not included in the sitation counts, despite attracting almost as many residual sitations on their own as the departmental figures reported in Table 3. There may well be analogous, seemingly discrete sets of pages for the other LIS departments considered here. Taken with the varied reasons for which sitations are made, it seems hardly surprising that we were unable to identify any significant correlation between our sitation data and the peer evaluations of research excellence embodied in the RAE rankings (whereas such correlations are easily demonstrated when conventional citation data are used [6, 8, 9]). We hence believe that it is premature to use sitation data for evaluating the research performance of individual academic departments; our other principal conclusion is that if an LIS department wishes to boost its Web visibility, it can best achieve this by hosting as wide a range of types of material as possible.

Acknowledgement We thank the Humanities Research Board of the British Academy for the award of a studentship to OT, and the referees for comments on an earlier draft of this manuscript.

References

1. E. Garfield, *Citation Indexing: Its Theory and Applications in Science, Technology and the Humanities* (Wiley, New York, 1979).
2. B. Cronin, *The Citation Process: the Role and Significance of Citations in Scientific Communication* (Taylor Graham, London, 1984).
3. M. Liu, The complexities of citation practice: a review of citation studies, *Journal of Documentation* 49 (1993) 370-408.
4. L.M. Baird and C. Oppenheim, Do citations matter?, *Journal of Information Science* 20 (1994) 2-15.
5. B. Cronin and K. Overfeld, Citation-based auditing of academic performance, *Journal of the American Society for Information Science* 45 (1994), 64-72.
6. C. Oppenheim, The correlation between citation counts and the 1992 research assessment exercise ratings for British research in genetics, anatomy and archaeology, *Journal of Documentation* 53 (1997), 417-487.
7. S.J. Bradley, P. Willett and F.E. Wood, A publication and citation analysis of the Department of Information Studies, University of Sheffield, 1980-1990, *Journal of Information Science* 18 (1991) 225-232.
8. L.B.Seng and P. Willett, The citedness of publications by United Kingdom library schools, *Journal of Information Science* 21 (1994) 68-71.
9. C. Oppenheim, The correlation between citation counts and the 1992 research assessment exercise ratings for British library and information science university departments, *Journal of Documentation* 51 (1995) 18-27.
10. R. Rousseau, Sitations: an exploratory study, at URL http://www.cindoc.csic.es/cybermetrics/articles/vol1iss1.html. Site visited 16/05/00.
11. T.C. Almind and P. Ingwersen, Informetric analyses on the World Wide Web: methodological approaches to 'Webometrics', *Journal of Documentation* 53 (1997) 404-426.
12. R.R. Larson, Bibliometrics of the World Wide Web: an exploratory analysis of the intellectual structure of cyberspace. In: S. Hardin (ed.), *Global Complexity: Information, Chaos and Control. Proceedings of the 59th Annual Conference of the American Society for Information Science* (American Society for Information Science, Baltimore:MD, 1996).
13. P. Ingwersen, The calculation of web impact factors, *Journal of Documentation* 54 (1998) 236-243.
14. B. Cronin, H.W. Snyder, H. Rosenbaum, A. Martinson and E. Callahan, Invoked on the web, *Journal of the American Society for Information Science* 49 (1998) 1319-1328.
15. H. Snyder and H. Rosenbaum, Can search engines be used as tools for Web-link analysis? A critical review, *Journal of Documentation* 55 (1999) 375-384.
16. A.G. Smith, A tale of two Web search spaces: comparing sites using Web impact factors, *Journal of Documentation* 55 (1999) 577-592.
17. M. Thelwall, Web Impact factors and search engine coverage, *Journal of Documentation* 56 (2000) 185-189.
18. O. Thomas, *Bibliometrics of the WWW: an Exploratory Study of the Web Presence of LIS Schools*, Unpublished MSc dissertation, University of Sheffield, 1999.
19. J. Elkin and D. Law, The 1996 Research Assessment Exercise: the Library and Information Management Panel, *Journal of Librarianship and Information Science* 29 (1997) 131-141.
20. S. Nicholson, Raising reliability of Web search tool research through replication and chaos theory, *Journal of the American Society for Information Science*, 51 (2000) 724-729.
21. R. Rousseau, Daily time series of common single word searches in AltaVista and NorthernLight, at URL http://www.cindoc.csic.es/cybermetrics/vol2iss1.html. Site visited 05/08/00.
22. J.M. Budd and C.A. Seavey, Productivity of US library and information science faculty: the Hayes study revisited. *Library Quarterly* 66 (1996) 1-20.
23. L. Leydesdorff, Theories of citation?, *Scientometrics* 43 (1998) 5-25.
24. D.O. Case and G.M. Higgins, How can we investigate citation behaviour? A study of reasons for citing literature in communication, *Journal of the American Society for Information Science* 51 (2000) 635-645.
25. S. Lawrence and C.L. Giles, Accessibility of information on the Web, *Nature* 400 (1999) 107-109.

LIS School	Home URL
City University: Department of Information Science	http://web.soi.city.ac.uk/informatics/is/
Leeds Metropolitan University: School of Information Management	http://www.lmu.ac.uk/ies/im/
Manchester Metropolitan University: Department of Information & Communications	http://www.mmu.ac.uk/h-ss/dic/
Queen's University Belfast: School of Management & Information Systems	http://www.qub.ac.uk/mgt/mis/
Robert Gordon University: School of Information & Media	http://www.rgu.ac.uk/~sim/
University College London: School of Information and Library Studies	http://www.ucl.ac.uk/SLAIS/ OR http://www.ucl.ac/uk/~uczw11/slais/
University of Brighton: School of Information Management	http://www.it.bton.ac.uk/im/ OR http://bton.ac.uk/academic/sim.html.
University of Central England: School of Information Studies	http://www.cis.uce.ac.uk/faculty/cis_info.htm
University of Loughborough: Department of Information Science	http://www.lboro.ac.uk/departments/dis/ OR http://.lut.ac.uk/departments/Is/
University of North London: School of Information & Communication Studies	http://legacy.unl.ac.uk/SICS/
University of Northumbria: Department of Information & Library Management	http://ilm.unn.ac.uk/
University of Sheffield: Department of Information Studies	http://www.shef.ac.uk/uni/academic/I-M/is/
University of Strathclyde: Department of Information Science	http://www.dis.strath.ac.uk/
University of Wales: Department of Information & Library Studies	http://www.dil.aber.ac.uk/

Table 1. UK LIS departments considered in the study, together with the corresponding home pages

For retrieving the number of web pages held under a department's general URL (denominator of 'simple' WIF): **url:mmu.ac.uk/h-ss/dic/**

For retrieving the number of links to web pages under the general URL (numerator of 'simple WIF'): **link:mmu.ac.uk/h-ss/dic/**

For retrieving the number of self-links (links within the department's general URL): **(link:mmu.ac.uk/h-ss/dic/ AND url:mmu.ac.uk/h-ss/dic/) OR (url: mmu.ac.uk/h-ss/dic/ AND link:mmu.ac.uk/h-ss/dic/)**

For retrieving the number of external links only (links from sites outside the general URL): **(link:mmu.ac.uk/h-ss/dic/ AND NOT (link:mmu.ac.uk/h-ss/dic/ AND url: mmu.ac.uk/h-ss/dic/)) OR (link:mmu.ac.uk/h-ss/dic/ AND NOT (url: mmu.ac.uk/h-ss/dic/ AND link:mmu.ac.uk/h-ss/dic/))**

Table 2. AltaVista Advanced Search strings used to obtain counts of the numbers of links to the Web site for the Department of Information and Communications at Manchester Metropolitan University. As detailed by Ingwersen [13], we have used ORed search statements when retrieving the numbers of self-links and external links, to alleviate any of the ordering effects that can occur when totalling sitation counts.

Department	*U*	*L*	*R*	WIF_S	WIF_R	RAE Rating
Strathclyde	463	2386	1920	5.15	4.15	4
Sheffield	226	1331	1222	5.89	5.41	5*
Robert Gordon	330	944	889	2.86	2.69	3a
Manchester	244	139	119	0.57	0.49	3b
Northumbria	80	113	68	1.41	0.85	3a
Aberystwyth	71	98	48	1.38	0.68	3b
UCL	10	88	34	8.80	3.40	2
North London	4	30	26	7.50	6.50	N/A
City	34	175	24	5.15	0.71	5*
Leeds	86	34	22	0.40	0.26	2
Brighton	4	25	16	6.25	4.00	3b
Loughborough	12	14	3	1.17	0.25	5

Table 3. Sitation counts, WIF values and HEFCE 1996 RAE ratings for UK LIS departments. The N/A entry for North London's RAE rating reflects the fact that this department was not assessed in the Exercise.

Department	*U*	*L*	*R*	WIF_S	WIF_R
Michigan	9128	7347	4132	0.80	0.45
Illinois	749	2264	1476	3.02	1.97
Indiana	139	698	623	5.02	4.48
Arizona	404	536	391	1.33	0.97
Pittsburgh	463	644	332	1.39	0.72
Louisiana	58	171	137	2.95	2.36
SUNY	64	154	80	2.41	1.25
Hawaii	19	98	64	5.16	3.37
Oklahoma	54	90	45	1.67	0.83
Maryland	134	95	43	0.71	0.32
Missouri	137	67	39	0.49	0.28
Rutgers	339	74	6	0.22	0.02
Simmons	23	71	16	3.09	0.70

Table 4. Sitation and WIF values for USA LIS departments.

Type Of Page	LIS	Non-LIS
Subject-defined homepage	4	9
Organisational homepage	1	3
Personal homepage	1	2
Pointer documents	16	52
Resources	9	3
Total	31	69

Table 5. Classification of a sample of 100 pages siting the Strathclyde website from a total siting population of 1920 pages.

Type Of Page	LIS	Non-LIS
Subject-defined homepage	2	0
Organisational homepage	4	0
Personal homepage	1	0
Pointer documents	24	5
Resources	15	0
Total	46	5

Table 6. Classification of 51 pages siting the Northumbria website from a total siting population of 68 pages.

Department	*R*	%
Strathclyde	1920	69.0
Sheffield	1222	53.0
Robert Gordon	889	46.0
Manchester	119	25.9
Northumbria	68	9.8
Aberystwyth	48	12.1
UCL	34	3.1
North London	26	8.7
City	24	4.3
Leeds	22	25.0
Brighton	16	0.0

Table 7. Residual sitations and the percentage of those originating from non-LIS-related sites.