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Prof P.A. van Brakel
Conference Chair
7th Annual Conference on WWW Applications
c/o Faculty of Business Informatics
Cape Peninsula University of Technology
Cape Town

+27 21 469-1015 (landline)
+27 82 966-0789 (mobile)

A study on the correct usage of webpage keywords to improve search engine ranking

W.T. Kritzinger
Faculty of Business Informatics
Cape Peninsula University of Technology
Cape Town
South Africa
kritzingerw@cput.ac.za

M. Weideman
Faculty of Business Informatics
Cape Peninsula University of Technology
Cape Town
South Africa
meliusw@yahoo.com

Abstract

The primary objective of this research project was to investigate and report on the importance of keywords as a ranking factor for e-Commerce websites.

An e-Commerce website needs to attract visitors and the website designer needs to ensure the website is visible to search engines. Websites that are not ranked highly by search engines are less likely to be visited by potential customers. Users tend to examine only the first page of search results and once they find a good match for their search, they normally do not look further down the list. Most search engines display only 10 to 20 of the most relevant results on the first page.

Thus, it is important to understand how search engines use the information contained on websites to index and rank them in their databases. Several key pieces of information are being used by search engines to list and rank a website, namely: webpage title, META keyword tag, META description tag, text on the webpage and keyword density. Every one of these elements involves keywords in one way or another.

The methods employed in this project include the review of literature and secondly, empirical work has been done to determine whether or not the relative location of a keyword within the "body area" of a webpage has any bearing on its ranking.

Results seem to indicate that more weight is attached to keywords appearing towards the beginning of a webpage. In some cases it appeared as if a webpage is penalized in terms of ranking if important keywords appear in the centre or at the bottom of the page.

Keywords: website visibility, keyword, search engine, search engine optimization

1. Introduction

According to Weideman and Kritzinger (2003:231), the amount of data available on the Internet cannot be measured. New and existing webpage authors constantly add more by uploading new and revised webpages to web servers, some on an hourly basis.

Also, there is no central body responsible for categorising, validating or censoring data on the Internet. It is these factors that contribute to the rather chaotic situation Internet users face when attempting to retrieve relevant information from the Internet (Weideman & Kritzinger, 2003:231).

Thelwall estimates that around 80% of users utilise search engines to locate information on the Internet. This of course places emphasis on the underlying importance of webpage owners being listed with search engines. An important strategy for any website owner is planning how a visitor would/could find their way to their particular site (Thelwall, 2001:114-124).

In a similar vein, other authors claim:

“Basically, every Internet web publisher wants good webpage visibility in search engine results so as to increase accessibility of their webpages. Unfortunately, many websites have poor visibility in search engine rankings or may not be listed at all due to various reasons” (Zhang & Dimitroff, 2004:310-320).

2. Literature survey

2.1 Business aspect

Commerce on the Internet is growing at a high rate according to Podesta (2000:73), and those companies that cannot or will not capitalize on this interconnected electronic marketplace could be destroyed by it. Simeon (1999:297) claims that the Internet has become a powerful business tool. This new approach to the communication and distribution of information and services has transformed the fundamental dynamics behind many social and business interactions. The barriers and obstacles, which often accompanied traditional commerce, are giving way to new business approaches. Consumers, producers and distributors now all have flexible, fast and inexpensive ways of participating in the market for products and services around the world (Simeon, 1999:297).

According to Podesta (2000:73), what really matters about the Internet can be summarised in one word – speed – and speed is the lifeblood of business success in the 21st century.

“Product development cycles are measured in months; product ramp-up is measured in days; and product lifetimes are approaching that of the mosquito.

The Internet can help us keep up, and that is why our industry needs to use the Internet to keep pace with the new demands for speed” (Podesta, 2000:73).

The commercial potential of the web is a subject of widespread discussion, with many predictions of continuing rapid growth in the future. A web presence for a company should mean that potential clients using the web to search for a product or service that they provide, will see the Company’s site appear whichever search engine the client uses. If there are a lot of competitors on the web, the company would like their own name to appear at the top of the list.

Of great concern, therefore, is the question of how to produce a successful web intervention for a business. One useful model summarising the findings of previous research is Simeon’s attracting, informing, positioning and delivering (AIPD) approach to evaluating websites (Simeon, 1999:299-300). The main assertion of the AIPD model is

that in order for a firm to develop or maximize the strategic potential of its website, it should enhance and integrate the site's overall capacity to attract, inform, position, and deliver (Simeon, 1999:299).

According to Simeon (1999:299) after establishing a presence on the Internet, one of the primary objectives of a new website is to attract a variety of interested parties to visit the company's online presence. This is being done in a variety of ways. Some of the most popular techniques include registration with search engines, providing free software, locating entertaining activities on the site, developing advertising campaigns, or establishing general information and service portals (Simeon, 1999:299).

The informing ability of the website, according to Simeon (1999:300), is also the most fundamental capability. It is possible to evaluate the extent to which an organization fulfills the informing function by examining the efforts to exchange information with key stakeholders. In addition to providing information on the company's vision, history, products, and services, many website include information on organizational structure, financials, recruiting, executive teams and customer surveys (Simeon, 1999:300).

The positioning function relates to the ways in which the services that an organization provides help create an image or market position. Factors which can be used to examine this strategy include an analysis of website design, transaction types, market targeting, community relations, and links to domestic and international activities (Simeon, 1999:300).

The delivery capability of the website is tightly linked to its technical infrastructure. The extent, to which the web technology provides for interactivity, reliability, security, and speed, helps to determine the strategic potential of the site. Because of its inherent speed, global reach, and constant accessibility, the Internet provides unparalleled delivery flexibility (Simeon, 1999:300).

According to Thelwall, the first hurdle for any website is the first aspect: attracting visitors. "If the site does not get visited then its content is irrelevant" (Thelwall, 2000b:150). Certain steps need to be taken to make websites visible.

2.2 Search engines

Instead of a central catalogue, the Web offers the choice of dozens of different search tools, each with its own database, search capabilities and method of displaying results (Tyner, 2001). Searching for relevant information on the web can be a time consuming and frustrating process. Search engines are used to locate information on the web, whether relevant or not (Alimohammadi, 2003:238).

They are intended to assist in helping people find information that is at least slightly relevant. With the estimated 1.3 billion websites available (Zhang & Dimitroff, 2004:310-320), search engines are intended to assist searchers sort through the large amount of information that is available on the Internet, playing an important role in the process of information retrieval.

Search engines provide the average Internet user with a (mostly) free, apparently easy way to find general information on the Internet. They are programs which offer interaction with the Internet through a front end, where the user can type in a search term, or make successive selections of relevant directories. The search engine software then compares the search term against an index file, which contains information about many websites.

Matches found are returned to the user via the front end. The index is updated regularly either by human editors or by automated programs (called spiders, robots or crawlers). Both humans and spiders simply collect information of new websites by visiting as many websites as possible, and then building them into the index (Weideman, 2005).

Search engines have been praised because of their ability to quickly locate a vast array of information on an extraordinary range of topics (Rowland, 1998:222). Despite this fact, they have fallen victim to extensive criticism. Most feel that search engines tend to retrieve information that is totally irrelevant and contrary to what the user is looking for. They have also been criticized for the tendency to retrieve duplicates (Green, 2000:124-137). In view of the fact that there are many different types of search engines, the issue of what ranking criteria they use to decide which website is good enough to be included in their database surfaces. Each has its own rule for searching and of establishing which websites to include in their database (Synder & Rosenbaum, 1999:375-384).

Most web users employ search engines as part of at least one of their strategies to find new websites (CyberAtlas, 1999). Any website owner who wants to attract new visitors should therefore be concerned whether or not his site is registered in the major search engines.

Having a page indexed, the essential first stage of being recognized by search engines is extremely important according to Introna and Nissenbaum.

“Without much exaggeration one could say that to exist is to be indexed by a search engine”. If a webpage is not in the index of a search engine, a person wishing to access it must know the complete Uniform Resource Locator (URL) – also known as the webpage address (Introna and Nissenbaum, 2000).

There is a number of design and other issues that need to be addressed in order to get the page registered with search engines, states Thelwall (2000a:152). Some search engines such as Yahoo! have a large number of human site reviewers, and the business needs to submit the address of the site in order to have it reviewed and registered so that it can be found in a search. Other search engines such as HotBot use automated programs known as ‘spiders’ to trawl the web and index pages (Thelwall, 2000a:152).

Search engines create a map of the web by indexing webpages according to keywords and then create enormous databases that link page content to keywords to URLs. Keywords are not determined a priori by the designers of the search engines’ databases nor, explicitly, by some other authority, but rather they are “deduced” from webpages themselves in the process of indexing (Introna and Nissenbaum, 2000:169-186). In a particular webpage a keyword can be any of the following:

- Actual keywords indicated by the webpage designer in an HTML meta tag.
- All or some of the words appearing in the title that is indicated by the HTML title tag.
- The first x number of words in a webpage.
- All the words in the webpage.

Being listed in a search engine index is, however, no guarantee that a user will be able to find the website, even if the website qualifies as a candidate for the user’s search. Websites that are not ranked highly are less likely to be visited (Courtois & Berry, 1999:39-46; Notess, 1999:84-86). Users tend to examine only the first page of search results and once they find a good match for their search, they tend not to look further down the list.

Most search engines display only 10 of the most relevant results on the first page. Thus, exclusion from the top 10 results means that only a small number of search engine users will actually see a link to the website (Introna & Nissenbaun, 2000:169-186; Henzinger et al, 2002). Yet another study indicated that searchers spent a relatively short amount of time searching for one topic: the average search session seemed to last between five and 10 minutes only (Cooper, 2001). There is serious competition for those top ten seats.

2.3 Body area

The body area is the main area of an HTML page which contains all the visible text and images that appear in the browser window. The body area begins with the body tag, which is coded <body>, with a closing tag of </body>, and is divided into a number of sub areas. See Figure 1.

Figure 1: Example of body area of a HTML page

```
<body>

<div id="down">
  This is the first sentence a web-crawler will see.
</div >
<div id="top">
This is the first sentence a person will see.
  </div >

</body >
```

Search engines constantly change the tags on which they place emphasis. One aspect about crawlers seldom changes; they index title tags and body text, hence the importance of placing keywords throughout the visible-body text on webpages to guarantee that search engines can find and record all the relevant keywords (Thurrow, 2003:21, 70-86).

2.4 Keywords

The issue of visibility is one that is easy for the inexperienced to ignore. An otherwise excellent website may be completely ignored because few potential customers ever find it (Thelwall, 2000a:152).

The foundation of an effective search engine marketing campaign is selecting the best keywords that your potential customers use to find your site. Thus, selecting the right keywords requires research (Thurrow, 2003:49-70). Some search engines are case sensitive, which means that searching for Chinese might yield different search results than searching for chinese (Thurrow, 2003:49-70).

According to Beal, like any successful marketing strategy, it is vital to ensure that one knows your audience and how to reach them. In the same way traditional advertising agencies survey their demographic audience, search engine marketers must ensure that their search engine optimization campaign targets the correct keywords or search phrases. Target the wrong search phrase and one could end up with good search engine rankings for keywords that have no search requests (Beal, 2003).

According to Sullivan, one of the main rules in a ranking algorithm involves the location and frequency of keywords on a webpage (Sullivan, 2003). Sullivan refers to it as the "location/frequency method". Pages with the search terms appearing in the HTML title tag, according to Sullivan, are often assumed to be more relevant than others to the topic. Search engines will also check to see if the search keywords appear near the top of a webpage, such as in the headline or in the first few paragraphs of text. Search engines assume that any page relevant to the topic will mention those words right from the beginning. Accordingly, a document with a high frequency of keywords in the beginning of a document is seen as more relevant (relative to the keyword entered) than one with a low frequency lower down in the document.

All the search engines consider the words at the top of a webpage more important than the words on the rest of the webpage. How high up a keyword is on a webpage is called keyword prominence (Thurrow, 2003:71-73).

These last two references are central to this research project, and the authors have set out to prove or disprove exactly these claims by Sullivan and Thurrow. No empirical evidence could be found in the literature to substantiate their premises.

3. Methodology

The authors decided to conduct an experiment to test whether the prominence of a keyword has a measurable effect on a website's visibility to search engines. According to Nielsen (2004) 97% of all web searches are performed on Google, Yahoo!, MSN, Ask Jeeves, Lycos, AltaVista and AOL (Nielsen, 2004). The authors chose Google, Yahoo!, MSN and Ask Jeeves to conduct the experiment on.

The authors then visited these search engines and did a single-word search, using the keyword "books". The top ten search results from the respective search engines were then visited and inspected. All the text in the "body area" of the source code within the webpages was divided into three equal areas, namely top, middle and bottom. This was done by counting the number of characters in the "body area" and dividing it by three. The keyword "books" was then counted in each of the three areas and a percentage was calculated of the occurrence of the keyword in each of the three areas.

Furthermore, the authors used WebPosition Gold 2 to calculate the visibility percentage of each of the top ten search results in the respective search engines using the keyword "books". If the website had a first place ranking for the keyword "books" then the visibility percentage should be 100%. As indicated in Appendix 1, Table 1 – 4, WebPosition Gold 2 visibility percentage decreases as each respective search engine's ranking decreases. This means that the search engines rankings agree with WebPosition Gold 2. See Appendix 1, Tables 1 – 4, for a summary.

Since the data is not normally distributed, the best way to determine whether a relationship between two variables (e.g. keyword prominence and visibility percentage) exists is to use the Spearman Rank Correlation Coefficient.

"The Spearman's correlation analysis compares the order, rather than the numeric magnitude, of the variables and is mostly used to examine the strength of the relationship between two variables" (Hirsch & Riegelman, 1996).

Using the figures in Appendix 1, Tables 1 – 4, a Spearman Correlation was calculated for each of the four search engine result sets. The authors repeated the calculation on groups of two and three search engines. The Spearman Correlation calculated will indicate whether there is a significant relationship between the Visibility percentage of the website and the location of the keywords. Lastly the authors grouped all four search engines together which provided a large enough sample to calculate a Pearson Correlation, which will produce an overall result.

Furthermore, to test the results the authors then decided to do the same experiment again using seven search engines namely Google, Yahoo!, MSN, Lycos, Ask Jeeves, AltaVista and AOL. For this second experiment the top 20 search results of each to the respective search engines were used. See Appendix 2, Tables 1 – 7, for a summary of the results.

4. Results and Conclusion

The statistical results of the first experiment are summarised in Appendix 3.

When the statistical results were viewed individually it was found that with Yahoo! and AskJeeves there was a negative significant relationship between the visibility percentage and keywords listed at the bottom area of the webpage. This indicates that the ranking of websites listed at Yahoo! or AskJeeves will decrease if their keywords are listed in the bottom area of the webpage.

It was also noted that when Yahoo! and Google are grouped there was a positive significant relationship between the visibility percentage and keywords listed at the top area of the webpage. This will indicate that a website's ranking will increase with Yahoo! and Google when the keywords are more densely grouped in the top area of the webpage. See Appendix 3 for more detail.

When Yahoo! and AskJeeves were grouped it was found that there was a positive significant relationship between the visibility percentage and keywords listed at the top of the webpage and a negative significant relationship between the visibility percentage and keywords listed at the bottom of the webpage. This will indicate that the ranking of websites listed with Yahoo! and AskJeeves will increase when the keywords are listed at the top area of the webpage and that ranking will decrease when the keywords are listed at the bottom area of the webpage. See Appendix 3 for more detail.

When investigating Yahoo!, Google and MSN, a positive significant relationship exists between the visibility percentage and keywords placed at the top area of a webpage. Thus, ranking will increase at these three search engines when the keywords appear at the top area of the webpage. See Appendix 3 for more detail.

When investigating Yahoo!, Google and AskJeeves as a group and Yahoo!, MSN and AskJeeves as a group, it was found that there is a positive significant relationship between the visibility percentage and keywords placed at the top area of the webpage and a negative significant relationship between the visibility percentage and keywords placed at the bottom of the webpage. Thus, it is true to say that ranking will increase when keywords are placed at the top of the webpage and ranking will decrease when keywords are placed at the bottom of the webpage. See Appendix 3 for more detail.

Lastly, a Pearson Correlation was calculated with all four of these search engines grouped to get an overall view. It was found that there exists a positive significant relationship

between the visibility percentage and keywords placed at the top of the webpage. Thus, ranking/visibility will increase when the keywords are placed in the top area of a webpage.

For the first experiment, it therefore appears as if the concentration of keywords should be at the top rather than the bottom of a webpage to enhance visibility to search engine crawlers.

The statistical results of the second experiment are summarised in Appendix 4.

These results indicated no effect for Yahoo!, or any other search engine that was grouped with Yahoo!. This makes it difficult to determine what effects keyword prominence on body text has on Yahoo!. One possible conclusion is that Yahoo! ignores keyword prominence. See Appendix 4 for more details.

When MSN and AltaVista were grouped it was found that there was a positive significant relationship between the visibility percentage and keywords listed at the top of the body text area and a negative significant relationship between the visibility percentage and keywords listed at the bottom of the body text area. This indicates that the ranking of websites listed with MSN and AltaVista will increase when the keywords are listed at the top area of the body text area and that the ranking will decrease when the keywords are listed at the bottom area of the body text area. The same applied for MSN and Lycos. See Appendix 4 for more details.

When investigating Ask Jeeves and AOL, a significant positive relationship was evident between the visibility percentage and keywords that are listed in the middle of the body text area and a negative relationship between the visibility percentage and keywords that are listed in the bottom of the body text area. This indicates that the ranking of websites listed with Ask Jeeves and AOL will increase if the keywords are placed in the middle section of the body text area, and will decrease if they are placed at the bottom section of the body text area. See Appendix 4 for more detail.

The statistical results showed a negative relationship between the visibility percentage and keywords that are listed in the bottom of the body text area for AltaVista and Lycos, for AltaVista and AOL, for Google and MSN, Google and AltaVista, Google and AOL, Google and Lycos as well as MSN and Ask Jeeves. This indicates that the ranking with these search engine combinations decreases if the keyword density is concentrated in the bottom section of the body text area. See Appendix 4 for more detail.

When experimenting with Google and Ask Jeeves, there was a negative relationship between visibility and keywords that are listed in the middle section of the body text, as well as a negative relationship between visibility and keywords that are listed at the bottom of the body text area. See Appendix 4 for detail.

It was found that for all the search engines used in this experiment, with Yahoo! being the only exception, that there were significant negative relationships between the visibility percentage and the keywords listed at the bottom area of the body text. This indicates that the ranking of websites listed with these search engines will decrease if the keywords are listed in the bottom area of the body text area. Yahoo! when tested alone did not display any results.

In conclusion, both experiments produced a similar result. When keywords are used at the bottom area of the body text the ranking of websites will decrease. It therefore appears as

if the concentration of keywords should be at the top rather than the bottom of a webpage to enhance visibility to search engine crawlers.

Designers of e-commerce based websites should pay close attention to the use of keywords on webpages. For every separate HTML page, the relevant keywords should be identified and placed inside the top text areas. Care should be taken to assure that the keyword density does not lead to spam penalties by search engine algorithms. Finally, alternative spelling of common words should also be included, to match spelling mistakes made by searchers.

It is recommended that further research be undertaken using an even larger samples. In this paper the research was limited to the top twenty search results of only seven search engines. More search engines could be explored with more keyword search results.

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6. Appendices

Appendix 1

Table 1: Google summary

GOOGLE					
Website	Rank	Keyword Position			Visibility Percentage
		Top	Mid	Bot	
www.barnesandnoble.com/	1	50%	25%	25%	100.00%
www.amazon.com	2	100%	0%	0%	96.67%
digital.library.upenn.edu/books	3	40%	20%	40%	93.33%
www.powells.com	4	46%	37%	17%	90.00%
www.bartleby.com	5	0%	0%	100%	86.67%
www.abebooks.com	6	36%	21%	43%	83.33%
www.borders.com	7	66%	34%	0%	80.00%
www.scholastic.com	8	0%	100%	0%	76.67%
www.oreilly.com	9	50%	17%	33%	73.33%
www.cs.cmu.edu/Web/books.html	10	40%	20%	40%	70.00%

Table 2: Yahoo! summary

Yahoo!					
Website	Rank	Keyword Position			Visibility Percentage
		T	M	B	
www.amazon.com	1	100%	0%	0%	100.00%
www.barnesandnoble.com/	2	50%	25%	25%	96.67%
www.borders.com	3	66%	34%	0%	93.33%
www.bookfinder.com	4	43%	43%	14%	90.00%
www.booksense.com	5	43%	0%	57%	86.67%
onlinebooks.library.upenn.edu	6	40%	20%	40%	83.33%
www.allbookstores.com	7	45%	28%	27%	80.00%
www.barnesandnoble.com/bookbrowser	8	57%	14%	29%	76.67%
www.powells.com	9	46%	37%	17%	73.33%
www.bartleby.com	10	0%	0%	100%	70.00%

Table 3: MSN summary

MSN					
Website	Rank	Keyword Position			Visibility Percentage
		T	M	B	
www.amazon.com	1	100%	0%	0%	100.00%
www.abebooks.com	2	36%	21%	43%	96.67%
www.books.com	3	50%	25%	25%	93.33%
digital.library.upenn.edu/books	4	40%	20%	40%	90.00%
www.nytimes.com/pages/books	5	56%	12%	32%	86.67%
www.powells.com	6	46%	37%	17%	83.33%
www.addall.com	7	50%	25%	25%	80.00%
www.promo.net/pg	8	64%	27%	9%	76.67%
www.alibris.com	9	86%	14%	0%	73.33%
www.ivillage.com/books	10	61%	33%	6%	70.00%

Table 4: AskJeeves summary

AskJeeves					
Website	Rank	Keyword Position			Visibility Percentage
		T	M	B	
www.amazon.com/	1	100%	0%	0%	100.00%
www.bookfinder.com/	2	43%	43%	14%	96.67%
www.barnesandnoble.com	3	50%	25%	25%	93.33%
www.borders.com	4	66%	34%	0%	90.00%
www.abebooks.com	5	36%	21%	43%	86.67%
www.powells.com	6	46%	37%	17%	83.33%
www.amazon.co.uk/	7	48%	26%	26%	80.00%
www.allbookstores.com	8	45%	28%	27%	76.67%
www.freebooknotes.com/	9	50%	0%	50%	73.33%
www.bythebooks.com/	10	23%	54%	23%	70.00%

Appendix 2

Table 1: Yahoo! Keyword Position Results

Yahoo!	Keyword Position			Rank	Visibility Percentage
	T	M	B		
www.amazon.com	43%	43%	14%	1	100.00%
www.barnesandnoble.com	55%	36%	9%	2	96.67%
www.borders.com	40%	20%	40%	3	93.33%
www.bookfinder.com	67%	11%	22%	4	90.00%
www.booksense.com	56%	22%	22%	5	86.67%
www.onlinebooks.library.upenn.edu	50%	50%	0%	6	83.33%
www.allbookstores.com	24%	64%	12%	7	80.00%
www.barnesandnoble.com/bookbrowser	29%	42%	29%	8	76.67%
www.powells.com	41%	37%	22%	9	73.33%
www.bartleby.com	100%	0%	0%	10	70.00%
www.nybooks.com	25%	0%	75%	11	66.67%
www.nytimes.com/pages/books/index.html	45%	55%	0%	12	63.33%
www.bibliofind.com	0%	29%	71%	13	60.00%
www.bookpage.com	14%	57%	29%	14	56.67%
www.bomc.com	0%	0%	0%	15	53.33%
www.oprah.com	29%	71%	0%	16	50.00%
www.digital.library.upenn.edu	60%	40%	0%	17	40.00%
www.abebooks.com	37%	43%	20%	18	46.67%
www.books.com	55%	36%	9%	19	43.33%
www.addall.com	35%	6%	59%	20	36.67%

Table 2: Ask Jeeves Keyword Position Results

ASKJEEVES	Keyword Position			Rank	Visibility Percentage
	T	M	B		
www.amazon.com	43%	43%	14%	1	100.00%
www.books.bc.ca	0%	0%	0%	2	96.67%
www.bookfinder.com	67%	11%	22%	3	96.67%
www.barnesandnoble.com	55%	36%	9%	4	93.33%
www.borders.com	40%	20%	40%	5	90.00%
www.abebooks.com	37%	43%	20%	6	86.67%
www.allbookstores.com	24%	64%	12%	7	76.67%
www.amazon.co.uk	43%	43%	14%	8	80.00%
www.powells.com	41%	37%	22%	9	83.33%
www.freebooknotes.com	29%	14%	57%	10	73.33%
www.bythebooks.com	27%	66%	7%	11	70.00%
www.digital.library.upenn.edu/books	60%	40%	0	12	90.00%
www.digital.library.upenn.edu/books/banned-books.html	33%	18%	49%	13	90.00%
www.alibris.com	24%	48%	28%	14	73.33%
www.ilab-lila.com	100%	0%	0%	15	66.67%
www.bartleby.com	100%	0%	0%	16	70.00%

www.bibliofind.com	0%	29%	71%	17	60.00%
www.sunsite.unc.edu/ibic/IBIC-homepage.html	25%	30%	45%	18	50.00%
www.bookbrowse.com	18%	27%	55%	19	76.67%
www.ccel.org	27%	46%	27%	20	43.33%

Table 3: AltaVista Keyword Position Results

ALTAVISTA	Keyword Position			Rank	Visibility Percentage
	T	M	B		
www.amazon.com	43%	43%	14%	1	100.00%
www.powells.com	41%	37%	22%	2	93.33%
www.abebooks.com	37%	43%	20%	3	96.67%
www.books.com	55%	36%	9%	4	86.67%
www.k-books.co.jp	0%	0%	0%	5	63.33%
www.digital.library.upenn.edu/books	60%	40%	0	6	90.00%
www.books.or.jp	0%	40%	60%	7	46.67%
www.nytimes.com/pages/books	24%	63%	13%	8	86.67%
www.addall.com	35%	6%	59%	9	80.00%
www.amazon.co.uk	40%	30%	30%	10	70.00%
www.promo.net/pg	82%	9%	9%	11	73.33%
www.gutenberg.net	47%	33%	20%	12	76.67%
www.onlinebooks.library.upenn.edu	33%	67%	0%	13	66.67%
www.booksamillion.com	20%	20%	60%	14	50.00%
www.borders.com	40%	20%	40%	15	80.00%
www.arts-books.com	57%	14%	29%	16	73.33%
www.alibris.com	24%	48%	28%	17	56.67%
www.netlibrary.com	0%	50%	50%	18	53.33%
www.calendarlive.com/books	63%	31%	6%	19	53.33%
www.bartleby.com	100%	0%	0%	20	43.33%

Table 4: MSN Keyword Position Results

MSN	Keyword Position			Rank	Visibility Percentage
	T	M	B		
www.amazon.com	43%	43%	14%	1	100.00%
www.abebooks.com	37%	43%	20%	2	96.67%
www.powells.com	41%	37%	22%	3	90.00%
www.books.com	55%	36%	9%	4	93.33%
www.digital.library.upenn.edu/books	60%	40%	0	5	86.67%
www.addall.com	35%	6%	59%	6	83.33%
www.nytimes.com/pages/books	24%	63%	13%	7	80.00%
www.promo.net/pg	82%	9%	9%	8	76.67%

www.gutenberg.net	47%	33%	20%	9	73.33%
www.booksamillion.com	20%	20%	60%	10	56.67%
www.netlibrary.com	0%	50%	50%	11	60.00%
www.calendarlive.com/books	63%	31%	6%	12	53.33%
www.salon.com/books	40%	40%	20%	13	50.00%
www.oreilly.com	38%	38%	24%	14	70.00%
www.amazon.com/exec/obidos/ats-query-page	0%	33%	67%	15	66.67%
www.ivillage.com/books	81%	0%	19%	16	46.67%
www.alibris.com	24%	48%	28%	17	63.33%
www.bartleby.com	100	0%	0%	18	36.67%
www.ncbi.nlm.nih.gov/entrez/query.	50%	50%	0%	19	0.00%
www.magickeys.com/books	59%	23%	18%	20	43.33%

Table 5: Keyword Position Results

AOL	Keyword Position			Rank	Visibility Percentage
	T	M	B		
www.barnesandnoble.com/	55%	36%	9%	1	93.33%
www.amazon.com/exec/obidos/subst/home/home.html	43%	43%	14%	2	100.00%
www.digital.library.upenn.edu/books/	60%	40%	0	3	96.67%
www.powells.com/	41%	37%	22%	4	90.00%
www.abebooks.com/	37%	43%	20%	5	83.33%
www.bartleby.com/	100%	0%	0%	6	86.67%
www.scholastic.com/	60%	20%	20%	7	80.00%
www.borders.com/	40%	20%	40%	8	76.67%
www.oreilly.com/	38%	38%	24%	9	73.33%
www.nybooks.com/index	20%	0%	80%	10	66.67%
www.promo.net/pg/	82%	9%	9%	11	63.33%
www.magickeys.com/books	59%	23%	18%	12	60.00%
www.netlibrary.com/	0%	50%	50%	13	56.67%
www.ipl.org/div/books/	50%	50%	0%	14	0.00%
www.addall.com/	35%	6%	59%	15	40.00%
www.bookfinder.com/	67%	11%	22%	16	46.67%
www.cnn.com/SHOWBIZ/	0%	100%	0%	17	53.33%
www.alibris.com/	24%	48%	28%	18	43.33%
www.gutenberg.net/	47%	33%	20%	19	0.00%
www.nytimes.com/pages/books/	24%	63%	13%	20	86.67%

Table 6: Google Keyword Position Results

Google	Keyword position			Rank	Visibility Percentage
	T	M	B		
www.barnesandnoble.com	55%	36%	9%	1	93.33%
www.amazon.com	43%	43%	14%	2	100.00%
www.digital.library.upenn.edu	60%	40%	0	3	96.67%
www.powells.com	41%	37%	22%	4	90.00%

www.abebooks.com	37%	43%	20%	5	83.33%
www.bartleby.com	100%	0%	0%	6	86.67%
www.scholastic.com	60%	20%	20%	7	80.00%
www.borders.com	40%	20%	40%	8	76.67%
www.oreilly.com	38%	38%	24%	9	73.33%
www.cs.cmu.edu	50%	50%	0%	10	70.00%
www.nybooks.com	25%	0%	75%	11	66.67%
www.promo.net	82%	9%	9%	12	63.33%
www.magickeys.com	59%	23%	18%	13	43.33%
www.cnn.com	0%	100%	0%	14	56.67%
www.netlibrary.com/	0%	50%	50%	15	53.33%
www.ipl.org/div/books/	75%	25%	0%	16	0.00%
www.addall.com/	35%	6%	59%	17	46.67%
www.bookfinder.com	67%	11%	22%	18	40.00%
www.alibris.com/	24%	48%	28%	19	50.00%
www.gutenberg.net/	47%	33%	20%	20	76.67%

Table 7: Lycos Keyword Position Results

Lycos	Keyword Location			Rank	Visibility Percentage
	T	M	B		
www.barnesandnoble.com	55%	36%	9%	1	93.33%
www.store.aetv.com/html/catalog/bp01_1.jhtml?id=1103	38%	31%	31%	2	93.33%
www.powells.com	41%	37%	22%	3	90.00%
www.alibris.com	24%	48%	28%	4	76.67%
www.borders.com	40%	20%	40%	5	86.67%
www.barnesandnoble.com	55%	36%	9%	6	93.33%
www.powells.com	41%	37%	22%	7	90.00%
www.alibris.com	24%	48%	28%	8	76.67%
www.gutenberg.org	47%	33%	20%	9	73.33%
www.booksinprint.com/bip/	5%	20%	75%	10	70.00%
www.booksamillion.com	20%	20%	60%	11	56.67%
www.amazon.com/exec/obidos/tg/browse/-/283155	43%	43%	14%	12	66.67%
www.netlibrary.com	0%	50%	50%	13	53.33%
www.oreilly.com	38%	38%	24%	14	50.00%
www.salon.com/books	40%	40%	20%	15	50.00%
www.bartleby.com	100%	0%	0%	16	53.33%
www.ivillage.com/books	81%	0%	19%	17	46.67%
www.alibris.com	24%	48%	28%	18	76.67%
www.calendarlive.com/books	63%	31%	6%	19	53.33%
www.magickeys.com/books	59%	23%	18%	20	40.00%

Appendix 3

Table 1: The statistical results of the first experiment

Search Engine	Top	Middle	Bottom
Yahoo!	-	-	Negative
Google	-	-	-
MSN	-	-	-
AskJeeves	-	-	Negative
Yahoo! and Google	Positive	-	-
Yahoo! and MSN	-	-	-
Yahoo! and AskJeeves	Positive	-	Negative
Google and MSN	-	-	-
Google and AskJeeves	-	-	-
MSN and AskJeeves	-	-	-
Yahoo!, Google and MSN	Positive	-	-
Yahoo!, Google and AskJeeves	Positive	-	Negative
Yahoo!, MSN and AskJeeves	Positive	-	Negative
Google, MSN and AskJeeves	-	-	-
Yahoo!, Google, MSN and AskJeeves	Positive	-	-

Appendix 4

Table 1: The statistical results of the second experiment

Search Engine	Top	Middle	Bottom
Yahoo!	-	-	-
Google	-	-	Negative
MSN	-	-	Negative
Ask Jeeves	-	-	Negative
AOL	-	-	Negative
Lycos	-	-	Negative
AltaVista	-	-	Negative
Yahoo! and Google	-	-	-
Yahoo! and MSN	-	-	-
Yahoo! and Ask Jeeves	-	-	-
Yahoo! and AltaVista	-	-	-
Yahoo! and AOL	-	-	-
Yahoo! and Lycos	-	-	-
Google and MSN	-	-	Negative
Google and Ask Jeeves	-	Negative	Negative
Google and AltaVista	-	-	Negative
Google and AOL	-	-	Negative
Google and Lycos	-	-	Negative
MSN and Ask Jeeves	-	-	Negative
MSN and AltaVista	Positive	-	Negative
MSN and AOL	-	-	Negative
MSN and Lycos	Positive	-	Negative
Ask Jeeves and AltaVista	-	-	Negative
Ask Jeeves and AOL	-	Positive	Negative
Ask Jeeves and Lycos	-	-	Negative
AltaVista and AOL	-	-	Negative
AltaVista and Lycos	Positive	-	Negative
AOL and Lycos	-	-	Negative