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## Tutorials on Google Analytics: How to Craft a Web Analytics Report for a Library Web Site

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## PRACTICAL COMMUNICATION

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# Tutorials on Google Analytics: How to Craft a Web Analytics Report for a Library Web Site

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*Libraries, along with other information service institutions, have entered a digital era in which resources are presented electronically through various digital platforms. The library Web site functions as the main source of information to patrons as well as a community outreach tool. Many library services now either succeed or fail based on how well users interact with the institution's Web site. In order to evaluate the effectiveness of library services, it thus becomes important for libraries to measure the performance of library Web sites. Web analytics is the ideal tool to answer questions regarding the evaluation of Web site performance. However, Web analytics can be hard to understand for those who do not have the time to familiarize themselves with all the terms and data. Writing a thorough Web analytics report can help make Web analytics easier to digest for administrators or Web site stakeholders.*

*This tutorial provides step-by-step instructions on how to craft a Web analytics report. It provides suggestions on visualizing statistics, interpreting data, and customizing the report based on a real experience. The tutorial is facilitated with customized figures, charts, and tables from a real Web analytics report on the Texas Tech University Libraries Web site and concludes with recommendations on presenting the report to the administration and stakeholders.*

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**KEYWORDS** library Web site, Web site Analytics, Web Analytics Report, library Web site homepage, Internet research, university libraries, academic library

## INTRODUCTION

The library Web site not only presents electronic resources and information to patrons but also functions as a significant outreach tool to engage the community. Measuring Web site performance thus becomes a key factor in determining the relative success or failure of library service. Web analytics, an analysis and reporting tool of Web data, such as number of visits and number of users, is used to answer questions regarding evaluation of Web site performance. For administrators or Web site stakeholders who do not have the time to understand the significance of things such as “bounce rate” or “unique visitors,” Web analytics can be difficult to understand. An effective Web analytics report can further help ease communication between those who can interpret the data and the library administration and stakeholders.

The following tutorial provides step-by-step instructions on how to write a Web analytics report intended to gather, analyze, interpret, and discuss statistics from a library’s Web site to make the information easier to understand for administrators and Web site stakeholders. This instruction is facilitated by figures, charts, tables, and discussion from a real Web analytics report on the Texas Tech University Libraries Web site (Yang and Perrin 2013).

## LITERATURE REVIEW

Library Web site performance has become one of the key factors in evaluating library services. In his article, Steven J. Turner (2010) highlighted that library Web sites are extremely important to the success of their institutions because they not only provide access to resources but can also provide the user with information and service. Marshall Breeding (2008) emphasized the performance of library Web sites by pointing out that the balance between physical facilities and virtual presence in the library has leaned more toward access through the Web. Rutgers University’s digital librarian Wei Fang (2007) pointed out in his Web site redevelopment project that Web sites have become an essential component of library services as more and more digital content becomes available online. In addition, librarians within the institutions also want to demonstrate that digital resources made available through the Web sites are constantly responding to trends and user needs (Marek 2011a, 5). Measuring the performance of a library Web site, therefore, becomes a key factor in determining the relative success or failure of library service (Turner 2010, 262).

Web analytics can answer questions about how a Web site is performing. The implementation of Web analytics originates from commercial Web site design, where they are used to track and collect data on users' information-seeking behaviors. During the past decade, libraries have been successfully shifting to a business "return on investment" mindset, learning to justify and to demonstrate the value of the public and private funds invested in library services (Marek 2011a, 5–6). Librarians use Web analytics tools for evaluating Web presence and digital interfaces, as well as redevelopment of Web projects. Among the Web analytics tools being used, Google Analytics has become the one most broadly favored and utilized (Marek 2011a, 8).

Since Google released their analytics tool to the public in August 2006, many libraries have been using it to measure their Web site's performance and to analyze user behaviors. Google Analytics is attractive to libraries because of its free availability, tremendous features, and ease of use (Fang 2007; Marek 2011a). Unlike other Web analytics tools that use server log files, Google collects information by inserting simple Javascript codes into Web pages. The advantage of this method, as Turner (2010, 267) pointed out, is that Google Analytics can capture technical and demographic information that log files do not normally provide, such as the user's browser, operating system, screen size, resolution, and so on. In his book, *Advanced Web Metrics with Google Analytics*, Brian Clifton (2012) provided detailed information about implementing Google Analytics in order to begin gathering Web site data, including step-by-step set up tutorials, inserting tracking codes to the Web sites, advanced features, and using built-in report tools. Wei Fang (2007), Joe Morgan (2010), and Kate Marek (2011b) also presented tutorials about setting up Google Analytics in their articles.

The report detailing the findings of the Web analytics tool is an important component of Web site evaluation. Avinash Kaushik (2007) stressed his 10/90 rule, as Marek (2011a, 6) cited, that ten percent of an institution's cost for Web analytics is for the set up and tool itself, while 90 percent of the expense is for analyzing the data for actionable insights.

Borrowing from the e-commerce Web analytics world, Turner (2010, 262–3) introduced Key Performance Indicators, including metrics of visits, bounce rate, conversion rate, average pages per visit, and average time on site, which are defined by Google Analytics (2013), and Turner (2010, 263) quoted, as "an essential or primary measure of performance." However, Kaushik (2010) brought up a valid point, saying that the raw data only tell a portion of the story, which is "what." He continued to argue that one has to get into the mindset of the users to understand "why" and "how." Thus, other than conducting surveys and usability testing, the data retrieved from the Web analytics present only the factual statistics. Librarians must find their own ways to comprehend such information through measurable indicators and to interpret the data by using relevant Google Analytics metrics.

Besides studying user behaviors, libraries can also conduct analyses on the Web content itself. Some libraries choose to start their Web site evaluation by measuring the performance of their homepages because they believe that homepages should function as gateways for Web visitors. In a blog article about a seminar at the University of Oklahoma Library, Doug Clow (2009) noted that in order to understand how the library homepage functions, their librarians conducted an analysis of the homepage using the feature “In-Page Analytics.” By doing that, the librarians were able to generate reports outlining popular pages and density clicks based on the data “In-Page Analytics” provides.

## WHY CONDUCT A WEB ANALYTICS REPORT?

Google Analytics provides a number of built-in reports, charts, and tables, but visualizing the data in customized formats can be more appealing and understandable to stakeholders. Terminology used in standard Google Analytics reports can also be confusing unless users familiarize themselves with each term. Therefore, using clear-cut language and straightforward interpretation will make more sense to stakeholders in a Web analytics report. While vague terminology and wording can be overcome with some investigation and interpretation of the reports, expressing statistics to administrators or coworkers who do not have the time to become familiar with Web analytics on their own can be a problem.

In order to address these issues, a well-written Web analytics report can summarize information, reformat data into visuals that make them easier to understand, explain the implications of the data, and provide definitions of terms used in context. The report can also provide information about what is and is not tracked so that stakeholders can become more familiar with what the statistics can and cannot present. The missing contextual information from Web analytics, brought up by Kaushik (2010), can be added to the report to provide a more complete evaluation of a Web site than the statistics alone. Information gathered from usability studies or from observation can be included to provide context for the numbers.

## HOW TO CONDUCT A WEB ANALYTICS REPORT

### Step 1: Choose a Time Period

Writing a Web analytics report begins with deciding what time period the report should cover. In the example Web analytics report discussed here, the authors decided to work with a year’s worth of data. Academic libraries will find taking a whole year’s data useful because all the fluctuations of the year during both semesters and the summer will be considered, and as a result

Web analysts can get a good sense of the Web site's health as a whole. Analysts should pick shorter time periods if they must follow a particular problem and see the change over time, or if the library administration wants more immediate feedback about the site's performance. Texas Tech University Libraries, for example, also have a Web site committee that prepares a pared down report every quarter.

Taking the data collected over the course of an entire year is recommended for first-time Web analytics reports in order to establish a statistical baseline.

## Step 2: Decide What to Report on

What is included in the report depends on what kinds of statistics the library's administration and stakeholders are interested in seeing. Web analysts can decide to write a report based on all found statistics or can choose specific statistics that are representative of the administration's interests. In the example Web analytics report, the authors decided to write an overview report covering the homepage, audience, traffic source, and content statistics. Google may change Google Analytics' design, categories, and functions at any time without giving notice to its users; the example Web analytics report was using the current version of Google Analytics as of May 2013.

In the example report, the authors chose to start with the main Web page and conduct an evaluation of the links on the front page and their usage. Second, the authors discussed the "Audience" section by breaking down demographics of country, territory, and language, and focusing on audience behavior and technology. The report also focused on the "Traffic Sources" section, including direct traffic, referral traffic, and search engine traffic. The content section discussed the statistics about the top ten used content pages and the pages' specific statistics for a year. An overview report like this can help provide a general sense of how the Web site is performing over time.

If the library administration and stakeholders are more interested in assessment of services, then Web analysts might consider creating a document that lists the various URLs attached to particular services. If the organization is interested in using Google Analytics to assess how different services are performing, then the first step is to find the central URL or URLs for that service so that the statistics can be tracked accordingly. A "Service URL Map" may be a good idea to maintain outside of any reports written to help facilitate assessment and report writing in the future. In a "Service URL Map," exemplified in the appendix, Web analysts can clearly state what the statistics of the URLs are actually tracking. This information can then be added to the Web analytics report so that it is clear what the statistics are measuring and what they are not. For example, the service map can note that a

certain group of URLs are only tracking people looking up information about a service, not people using that service.

As Web sites change, the URLs sometimes change, too. Thus, this document is a good place to make notes of old URLs and new URLs, as well as the effective date that the URL changed. By doing so, statistics from different time periods can be compared even if the URL for the service changed during the report period. A “Service URL Map” can include old URLs if the time period includes them and can also point out if a service’s statistics have been moved to a separate system.

The “Service URL Map” document can also include how to search within Google Analytics for the pages of those documented URLs. The content pages provide the option to search for strings of text. If a service is associated with a particular string of text, that string can be included in the document so that Web analysts must not remember it every time, and other people will understand how the statistics can be gathered. These strings can be any words or characters that are unique to the service that appears in all the URLs associated with it. Some examples in the appendix are the catalog, which is associated with “/F,” and the personal librarian services, which is associated with the string “/personal librarians/.”

### Step 3: The Homepage: In-Page Analytics

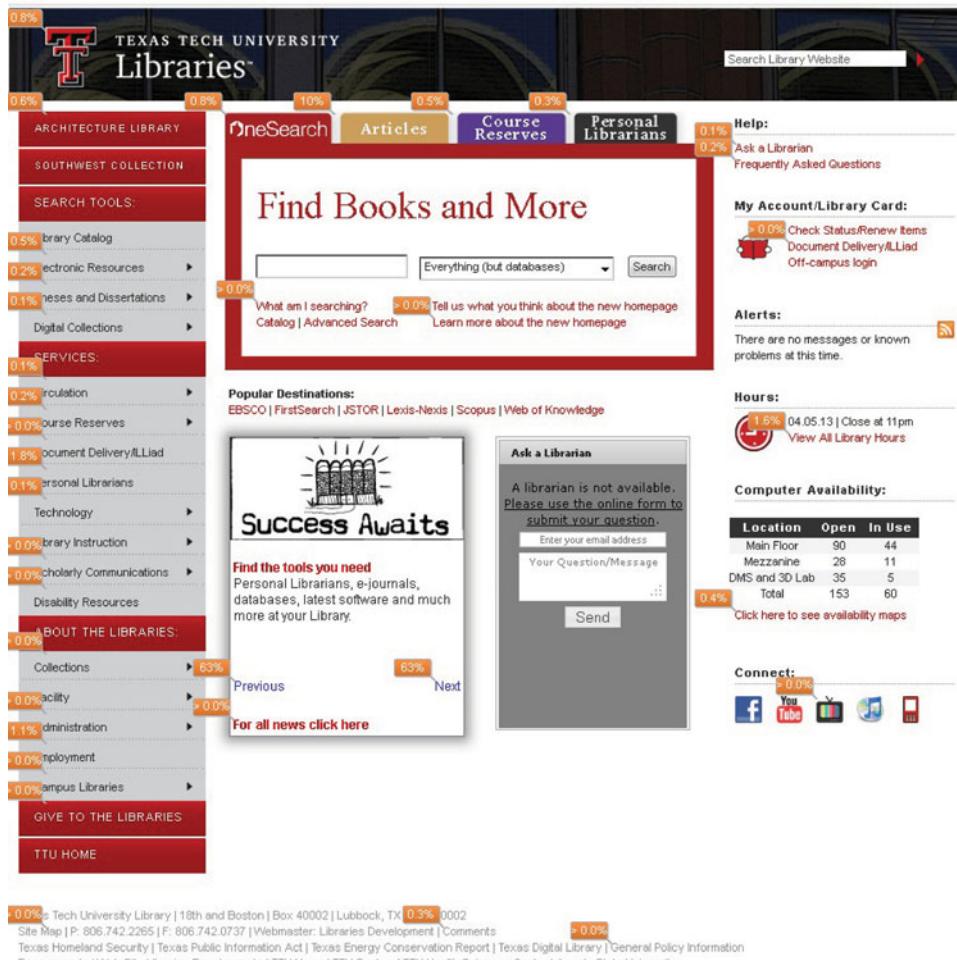
Sometimes, administrators and coworkers find dealing with Web site analytics easier if they start with something familiar. Beginning the Web analytics report with the homepage is a good way to ease into the statistics.

The most useful tool for the homepage is In-Page Analytics. This tool shows the percentage of clicks that happen for any URL that is linked on the homepage. The report looks like the example in Figure 1.

While this tool clearly shows the percentages of clicks for each link, interpreting these numbers quickly can be difficult. Google has an option for color-coding the links, but with only three colors it is hard to make use of the color-coding, especially for Web site stakeholders. Moreover, the total click rates for links with drop-down menus are not calculated by Google Analytics. In order to get statistics for individual links in the drop-down menu, Web analysts must manually move the cursor over the links and find data for each one.

This situation highlights one of the major problems with Google Analytics: It does not easily let people compare different pages or links together. Web analysts can see the numerical values of the statistics for each page, but the pages are easier to compare when the numbers are integrated in a chart, as is demonstrated in Figure 2.

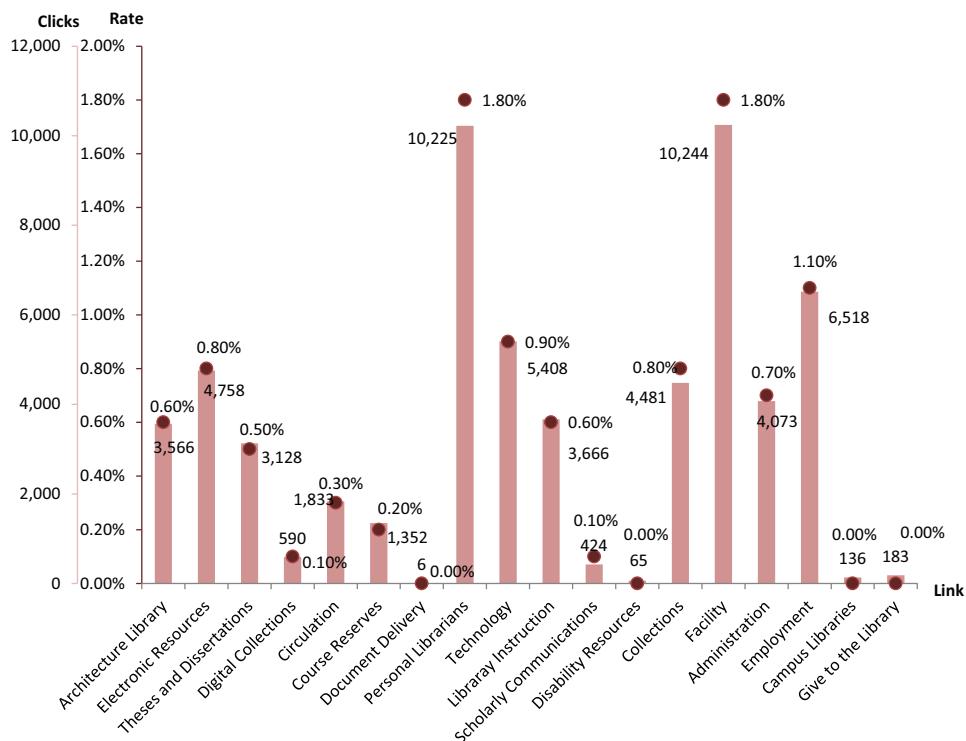
In order to provide a direct comparison of different links, the authors of the example report used Microsoft Excel to record both click-through count



**FIGURE 1** Google In-Page Analytics for TTU Libraries homepage.  
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and the percentage for each link on the library Web site's left navigation bar. For those links having drop-down menus, the authors added up the counts and recalculated the percentage for the whole group, then generated a chart (see Figure 2) that has two groups of data together, the click-through count and the click rate percentages for a direct reflection.

Figure 2 shows the click rates organized in the same order as the links on the library's left-hand navigation bar to illustrate that some links that are rarely used take up prime positions in the navigation bar. In the ideal situation, the results in the chart should be in the ranked order, where the left-to-right on the Link-axis should reflect highest-to-lowest clicks and rates. Reviewing this chart in Figure 2, the library might consider moving some of



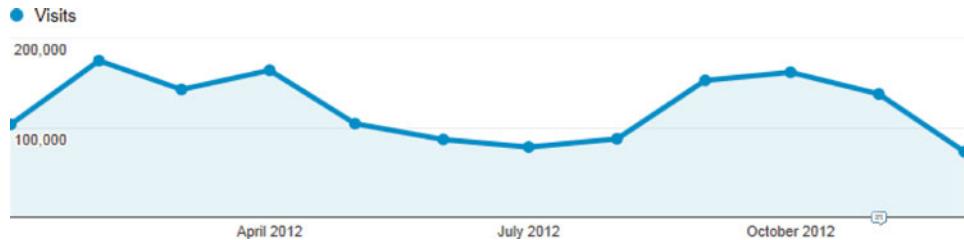
**FIGURE 2** Click rates on the left navigation bar.

the more heavily used links up the page and maybe even grouping them together so that they are easier to access. The library might also consider moving the lesser-used pages off the front page and onto a secondary page. Important to note in this example is that the “Document Delivery” page links out to another system for the interlibrary loan service. The report has the page at zero clicks because Google Analytics is not gathering statistics for that URL with this account. This is the kind of context that should be added in to help administrators and Web site stakeholders make sense of the data.

Starting the Web analytics with the homepage is a good way to introduce the concept of Google Analytics while explaining what pages the report can and cannot collect statistics on. Web analysts may want to present this information visually or just with a listing of services and links that cannot be tracked.

#### Step 4: Summarizing Specific Statistics Summarizing by Month in Order to Show Change

While Google Analytics can show data by selected timeframes, it will typically only display the total visits in a way that is not easy for readers to view. For

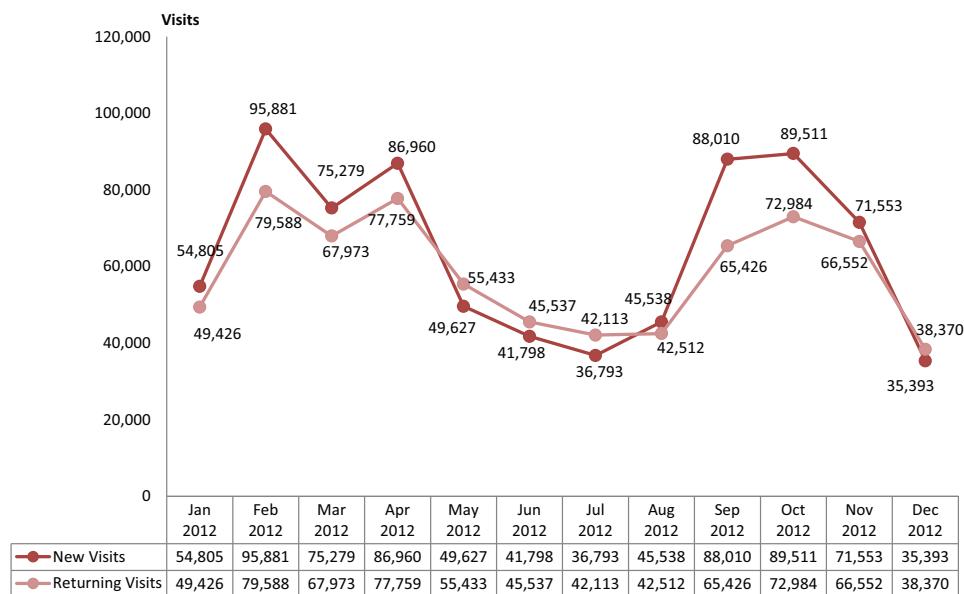


**FIGURE 3** New vs. returning visits per month from Google Analytics.

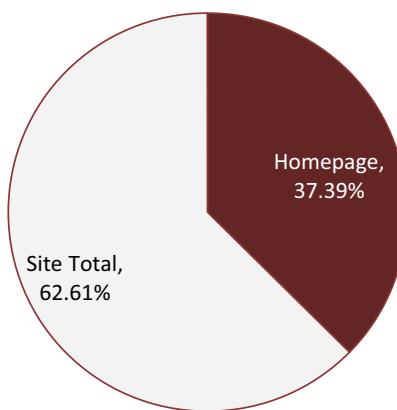
example, in Google Analytics when people look at “New vs. Returning” visits, they get a single chart with the total visits per month and a table containing the number of new visits and returning visits for the selected timeframe. The chart provided in Google Analytics is represented in Figure 3.

To make this report more useful and reader friendly, Web analysts can choose to change the date range, get the numbers for each month, and put those numbers in a customized chart. As shown in Figure 4, the customized chart compares the new visits to the returning visits and shows in a visual way that the Web site receives fewer new visits and more returning visits during the summer months of May, June, July, and August.

Providing some statistics in customized charts such as the ones pictured can help administrators and stakeholders understand how Web site statistics behave. Moreover, using customized charts and tables will also help make



**FIGURE 4** New vs. returning visits by month.



**FIGURE 5** Pageviews: Percentage of homepage vs. site total.

the presentation of statistics consistent over time, so they are not affected by Google's constant metrics name and data output changes.

### Representing Percentage of Data in Pie Charts and Tables

Some of the Google Analytics statistics represented as pie charts and tables can better facilitate the interpretation of the statistics. For example, when comparing the number of visits on the homepage to the total number of visits, the homepage easily reveals itself as the "portal" for the whole Web site. Figure 5 shows that the Texas Tech University Library's homepage gets a large percentage of use. In the report, the authors explain that one of the reasons for this usage phenomenon is because the library's homepage automatically loads on library computers when launching Internet browsers.

Details of the comparison between the homepage usage percentages and the site's total percentages can be facilitated with a table that includes statistics for each metric in order to provide a more precise analysis of why the homepage is accessed as often as it is. Table 1 provides a direct reflection of data on different metrics between the homepage and the site total.

For the Audience section of Google Analytics, some of the "behavior" statistics, such as Frequency, Recency, or Engagement, can be hard to compare with numbers alone. For example, in a Google Analytics report, the

**TABLE 1** Metrics for the Homepage vs. Total Site

	Pageviews	Unique pageviews	Avg. time on page	Avg. page load time	Bounce rate	% Exit
Homepage	1,525,133	1,070,815	0:04:48	1.89sec	68.62%	60.96%
Site Total	4,078,831	2,890,525	0:03:33	1.56sec	63.42%	36.16%

**TABLE 2** Customized Metrics for the Frequency of Visits

Count of visits	Visits	1,474,821	Pageviews	4,078,831
1	771,148	52.29%	1,753,950	43.00%
2	143,791	9.75%	406,466	9.97%
3	61,928	4.20%	206,350	5.06%
4	39,370	2.67%	137,072	3.36%
5	28,984	1.97%	102,849	2.52%
6	23,277	1.58%	82,543	2.02%
7	33,449	2.27%	87,930	2.16%
8	19,733	1.34%	63,274	1.55%
9-14	68,444	4.64%	244,313	5.99%
15-25	63,056	4.28%	232,311	5.70%
26-50	66,288	4.49%	243,959	5.98%
51-100	53,958	3.66%	207,525	5.09%
101-200	42,049	2.85%	147,293	3.61%
201+	59,346	4.01%	162,996	3.99%

Frequency statistic provides only the number of visits and is illustrated with blue bars that do not show percentages. For the convenience of administrators and stakeholders, authors of the example report gathered the data from Google Analytics and calculated the percentage, then integrated this data into a Microsoft Excel table.

By doing this, the report on the number of people/IP addresses that visited the site, how often they visited, and how long they stayed is much easier to understand because it is presented with percentages and a bar graph, as shown in Table 2.

In the Audience section, Web analysts must be aware that most data, such as details of technologies and locations, are harvested from the end user's computers. In order to avoid possible legal problems when utilizing such data in the Web analytics report, Web analysts must inform the visitors by posting a privacy warning on the library's Web site or modifying the library policy.

## CONCLUSION: PRESENTING A WEB REPORT

To a Web analyst, the data presented in Web analytics may suggest obvious changes. Those changes, however, might not be as obvious to administrators and stakeholders. Web analytics reports can be vital for giving people the background on any recommendations Web analysts may have.

In the example report, the authors discussed each section and made recommendations for future usability studies or recommendations for future

development of the site. The authors also included those recommendations at the beginning of the report in an executive summary. If library administrators and stakeholders wonder why such recommendations were made, they could read that section of the report and get a good sense of the data and context behind the recommendation. Many people might not want to read past the recommendations, but having the data to back up a recommendation makes a difference when people have differing opinions about what should and should not happen on the Web site.

In conclusion, a well-written Web analytics report provides evaluation of the Web site performance and helps determine the relative success or failure of library service. Moreover, a well-written report can help the authors' arguments for change because terminology can be explained, the data can be presented for analysis and added context, and recommendations for Web improvements can be further supported.

## ABOUT THE AUTHORS

Le Yang is a metadata librarian of Digital Resources Library at Texas Tech University. Le earned his MA and MLIS at the University of Rhode Island. Le Yang's research interests include digital services, metadata, information architecture, Web analytics, and Web site development.

Joy M. Perrin is the head of Digital Resources Library Unit at Texas Tech University. She earned her MLS at University of North Texas. Joy M. Perrin manages the digitization of collections at Texas Tech and oversees the institutional repository. Her research interests include project management in libraries, digital library assessment, library Web site design and assessment, and user experience.

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## APPENDIX: SERVICE URL MAP

The following is a sample of a Service URLs Document

- Catalog
  - <http://iris.ttu.edu/F> (search for "/F")
- Federated search (Not Tracked with Main Web site) – Tracked with its own Google Analytics site.
- EBooks – (Not Tracked with Main Web site)
- Circulation – All of these URLs are tracked with the main library Web site can either represent people looking up information about services or going to form pages to use services. Circulation services that are not tracked are noted as below.
  - Faculty Delivery and Pickup: [http://library.ttu.edu/services/circulation/fac\\_delivery\\_pickup.php](http://library.ttu.edu/services/circulation/fac_delivery_pickup.php)
  - Loan Periods: [http://library.ttu.edu/services/circulation/loan\\_periods.php](http://library.ttu.edu/services/circulation/loan_periods.php)
  - Study Carrel checkout: <http://library.ttu.edu/services/circulation/carrels.php>
  - Information for Appealing Library Charges: [http://library.ttu.edu/services/circulation/appealing\\_lib\\_charges.php](http://library.ttu.edu/services/circulation/appealing_lib_charges.php)
  - Requesting the purchase of an item: [http://library.ttu.edu/services/circulation/request\\_item.php](http://library.ttu.edu/services/circulation/request_item.php)
  - Room reservations: <http://reserve.lib.ttu.edu/web/schedule.php> (Not tracked in Google Analytics. Statistics are provided by built-in tools in the reservation system.)
- Course Reserves – (Not Tracked with Main Web site)

- Document Delivery/ILLiad
  - Before April 25, 2012 – Not tracked
  - April 25, 2012 to now – Tracked by searching for “/docdel”
    - Example URL: <http://library.ttu.edu/docdel/>
- Personal Librarians – Search for “/personal librarians/“
  - Example URL: [http://library.ttu.edu/personal\\_librarians/accounting/articles.php](http://library.ttu.edu/personal_librarians/accounting/articles.php)
- Technology – These URLs only represent people looking up information about technology services in the library. Use of that technology is better represented with tracking programs.
  - <http://library.ttu.edu/services/technology/3dlab/index.php>
  - <http://library.ttu.edu/services/technology/dms/index.php>
  - ...