

## Click Analytics: Visualizing Website Use Data

Editor's Note: This paper is adapted from a presentation given at the 2010 LITA Forum

*Click analytics is a powerful technique that displays what and where users are clicking on a webpage helping libraries to easily identify areas of high and low usage on a page without having to decipher website use data sets. Click analytics is a subset of web analytics, but there is little research that discusses its potential uses for libraries. This paper introduces three click analytics tools, Google Analytics' In-Page Analytics, ClickHeat, and Crazy Egg, and evaluates their usefulness in the context of redesigning a library's homepage.*

**W**eb analytics tools, such as Google Analytics, assist libraries in interpreting their website usage statistics by formatting that data into reports and charts. The web services librarian at the Kraemer Family Library at the University of Colorado, Colorado Springs wanted to use website use data to reassess the Library's homepage that was crowded with redundant links. For example, all the links in the site's dropdown navigation were repeated at the bottom of the homepage to make the links more noticeable to the user, but it unintentionally made the page long. To determine which links the web services librarian would recommend for removal, she needed to compare the use or clicks the repetitive links received. At the time, the Library relied solely on Google Analytics to interpret website use data. However, this practice proved insufficient

because Google Analytics cannot discern between the same link repeated in multiple places on a webpage. Furthermore, she wanted to use website use data to determine the areas of high and low usage on the Library's homepage, and use this information to justify her webpage reorganization decisions. Although this data can be found in a Google Analytics report, the web services librarian found it difficult to easily identify the necessary information within the massive amount of data the reports contain.

The web services librarian opted to use click analytics, also known as click density analysis or site overlay, a subset of web analytics that reveals where users click on a webpage.<sup>1</sup> A click analytics report produces a visual representation of what and where visitors are clicking on an individual webpage by overlaying the click data on top of the webpage that is being tested. Rather than wading through the data, libraries can quickly identify what content users are clicking by using a click analytics report. The web services librarian tested several click analytics products while reassessing the Library's homepage. During this process she discovered that each click analytics tool had different functionalities that impacted their usefulness to the Library. This paper introduces and evaluates three click analytics tools, Google Analytics' In-Page Analytics, ClickHeat, and Crazy Egg, in the context of redesigning the Library's homepage and discusses the benefits and drawbacks of each.

### Literature Review

Library literature indicates that libraries are actively engaged in interpreting website usage data for a variety of purposes. Laura B. Cohen's study encourages libraries to use their website usage data to enhance their understanding of how visitors access and use library websites.<sup>2</sup> Jeanie M. Welch further recommends that all

librarians who create website content should have access to website usage statistics to measure their webpages' effectiveness and refine the pages as necessary.<sup>3</sup>

With web analytics libraries can increase the effectiveness of their websites, and as Marshall Breeding has observed, libraries can regularly use website statistics to determine how new webpage content is actually being used and make revisions to the content based on this information.<sup>4</sup> Several recent studies used Google Analytics to collect and report website usage statistics to measure website effectiveness and improve their usability.<sup>5</sup> While web analytics are useful in a website redesign process, several studies concluded that web usage statistics should not be the sole source of information used to evaluate a website. These studies recommend using click data in conjunction with other website usability testing methods.<sup>6</sup>

### Background

A lack of research on the use of click analytics in libraries motivated the web services librarian to explore their potential by directly implementing them on the Library's website. She found that there are several click analytics products available and each has its own unique functionality. However, many are commercially produced and expensive. With limited funding, the web services librarian selected Google Analytics' In-Page Analytics, ClickHeat, and Crazy Egg because they are either free or inexpensive. Each tool was evaluated on the Library's website for over a six month period.

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## In-Page Analytics

Google Analytics is a popular, comprehensive web analytics tool that contains a click analytics feature called In-Page Analytics (formerly Site Overlay) that visually displays click data by overlaying that information on the current webpage (see figure 1). Site Overlay was used during the Library's redesign process, however, it was replaced by In-Page Analytics in October 2010.<sup>7</sup> The web services librarian reassessed the Library's homepage using In-Page Analytics, and found that the current tool resolved some of Site Overlay's shortcomings. Site Overlay is no longer accessible in Google Analytics, so this paper will discuss In-Page Analytics.

Essentially, In-Page Analytics is an updated version of the Site Overlay (see figure 2). In addition to visually representing click data on a webpage, In-Page Analytics contains new features including the ability to easily segment data. Web analytics expert, Avinash Kaushik, stresses the importance of segmenting website use data because it breaks down the aggregated data into specific data sets that represents more defined groups of users.<sup>8</sup> Rather than studying the total number of clicks a link received, an In-Page Analytics report can segment the data into specific groups of users, such as mobile device users. In-Page Analytics provides several default segments, but custom segments can also be applied allowing libraries to further filter the data that is constructive to them.

In-Page Analytics also displays a complementing overview report of statistics located in a side panel next to the typical site overlay view. This overview report extracts useful data from other reports generated in Google Analytics without having to leave the In-Page Analytics report screen. The report includes the webpage's Inbound Sources, also called top referrals, which are links from other webpages leading



Figure 1. Screenshot of Google Analytics' Defunct Site Overlay



Figure 2. Screenshot of Google Analytics' In-Page Analytics

visitors to that page, and Outbound Destinations, links that navigate visitors away from that webpage. The Inbound Sources and Outbound Destinations reports can track outbound links, which are links that have a different domain or URL address from the website tracked within Google Analytics. For

libraries, outbound links include library catalogs or subscription databases. Additional javascript tags must be added to each outbound link for Google Analytics to track that data.<sup>9</sup> Once Google Analytics recognizes the outbound links, their click data will be available in the In-Page Analytics report.

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## Evaluation of In-Page Analytics

In-Page Analytics' advanced segmenting ability far exceeds the old Site Overlay functionality. Segmenting click data at the link level helps web managers to see how groups of users are navigating through a website. For example, In-Page Analytics can monitor the links mobile users are clicking, allowing web managers to track how that group of users are navigating through a website. This data could be used in designing a mobile version of a site.

In-Page Analytics integrates a site overlay report and an overview report that contains selected web use statistics for an individual webpage. Although the overview report is not in visual context with the site overlay view, it combines the necessary data to determine how a webpage is being accessed and used. This assists in identifying possible flaws in a website's navigation, layout, or content. It also has the potential to clarify misleading website statistics. For instance, Google Analytics Top Exit Pages report indicates the Library's homepage is the top exit page for the site. Exit pages are the last page a visitor views before leaving the site.<sup>10</sup> Having a high exit rate could imply visitors were leaving the Library's site from the homepage and potentially missing a majority of the Library's online resources. Using In-Page Analytics, it was apparent the Library's homepage had a high number of exits because many visitors clicked on outbound links, such as the library catalog, that navigated visitors away from the Library's website. Rather than finding a potential problem, In-Page Analytics indicated that the homepage's layout successfully led visitors to a desired point of information. While the data from the outbound links is available in the data overview report, it is not displayed within the site overlay view. It is possible to work around this problem by creating internal redirect

pages, but it is time consuming and may not be worth the effort since the data are indirectly available.<sup>11</sup>

A major drawback to In-Page Analytics is that it does not discern between the same links listed in multiple places on a webpage. Instead it tracks redundant links as one link, making it impossible to distinguish which repeated link received more use on the Library's homepage. Similarly, the Library's homepage uses icons to help draw attention to certain links. These icons are linked images next to their counterpart text link. Since the icon and text link share the same URL, In-Page Analytics cannot reveal which is receiving more clicks. In-Page Analytics is useless for comparing repetitive links on a webpage, but Google reports that they are working on adding this capability.<sup>12</sup>

As stated earlier, In-Page Analytics lays the click data over the current webpage in real-time, which can be both useful and limiting. Using the current webpage allows libraries to navigate through their site while staying within the In-Page Analytics report. Libraries can follow in the tracks of website users to learn how they interact with the site's content and navigation. The downside is that it is difficult to compare a new version of a webpage with an older version since it only displays the current webpage. For example, the web services librarian could not accurately compare the use data between the old homepage and the revised homepage within the In-Page Analytics report because the newly redesigned homepage replaced the old page. Comparing different versions of a webpage could help determine whether the new revisions improved the page or not. An archive or export feature would remedy this problem, but In-Page Analytics does not have this capacity. Additionally, an export function would improve the ability to share this report with other librarians without having them login to the Google Analytics website. Currently, the web

services librarian uses a screen capture tool, such as the Firefox add-on Screengrab<sup>13</sup>, to collect and archive the In-Page Analytics reports, but the process is clunky and results in the loss of the ability to segment the data.

## ClickHeat

Labsmedia's ClickHeat is an open source heat mapping tool that visually displays the clicks on a webpage using color to indicate the amount of clicks an area receives. Similar to In-Page Analytics, a ClickHeat heat map displays the current webpage and overlays that page with click data (see figure 3). Instead of listing percentages or actual numbers of clicks, the heat map represents clicks using color. The warmer the color, such as yellows, oranges, or reds, the more clicks that area receives; the absence of color implies little to no click activity. Each heat map has an indicator that outlines the number of clicks a color represents. A heat map clearly displays the heavily used and underused sections on a webpage making it easy for people with little experience interpreting website usage statistics to interpret the data. However, a heat map is not about exact numbers, but rather general areas of usage. For exact numbers, a traditional, comprehensive web analytics tool is required. ClickHeat can stand alone or be integrated into other web analytic tools.<sup>14</sup> To have a more comprehensive web analytics product, the web services librarian opted to use the ClickHeat plugin for Piwik, a free, open source web analytics tool that seeks to be an alternative to Google Analytics.<sup>15</sup> By itself Piwik has no click analytics feature, therefore ClickHeat is a useful plugin.

Both Piwik and ClickHeat require access to a web server for installation and knowledge of PHP and MySQL to configure them. Because the Kraemer Family Library does not maintain its own web servers, the

web services librarian worked with the campus' Information Technology Department to install Piwik with the ClickHeat plugin on a campus web server. Once installed, Piwik and ClickHeat generate javascript tags that must be added to every page that website use data will be tracked. Although Piwik and ClickHeat can be integrated, the tools work separately so two javascript tags must be added to a webpage to track click data in Piwik as well as in ClickHeat. Only the pages that contain the ClickHeat tracking script will generate heat maps that are then stored within the local Piwik interface.

### Evaluation of ClickHeat

In-Page Analytics only tracks links or items that perform some sort of action, such as playing a flash video,<sup>16</sup> but ClickHeat tracks clicks on internal links, outbound links, and even non-linked objects, such as images. Hence, ClickHeat is able to track clicks on the entire webpage. Tracking non-linked objects was unexpectedly useful in identifying potential flaws in a webpage's design. For instance, within a week of beta testing the Library's redesigned homepage, it was evident that users clicked on the graphics that were positioned closely to text links. The images were intended to draw the user's attention to the text link, but instead users clicked on the graphic itself expecting it to be a link. To alleviate possible user frustration, the web services librarian added links to the graphics to take visitors to the same destinations as their companion text links.

ClickHeat treats every link or image as its own separate component, so it has the ability to compare the same link listed in multiple places on the same page. Unlike In-Page Analytics, ClickHeat was particularly helpful in analyzing which redundant links received more use on the homepage. In addition, the heat map also revealed that users ignored the site's

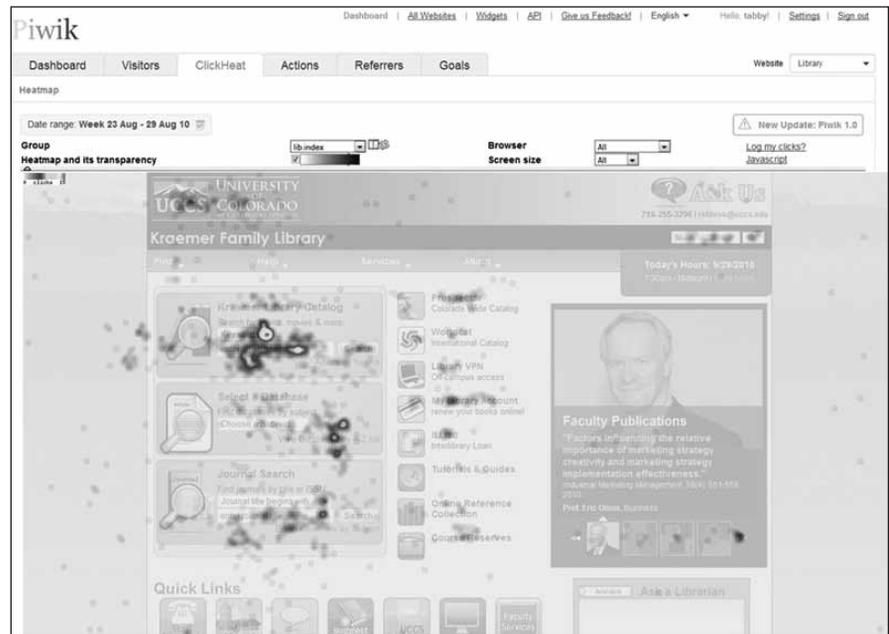


Figure 3. Screenshot of ClickHeat's heat map report

main navigation on the homepage and opted to use links prominently displayed within the homepage's content. This indicated that either the users did not notice the main navigation dropdown menus or that they chose to ignore them. Further usability testing of the main navigation is necessary to better understand why users do not utilize it.

ClickHeat is most useful when combined with a comprehensive web analytics tool, such as Piwik. Since ClickHeat only collects data where visitors are clicking, it does not track other web analytics metrics, which limits its ability to segment the click data. Currently, ClickHeat only segments clicks by browser type or screen resolution. Additional segmenting ability would enhance this tool's usefulness. For example, the ability to segment clicks from new visitors and returning visitors may reveal how visitors learn to use the Library's homepage. Furthermore, the heat map report does not provide the actual number of clicks on individual links or content areas since heat maps generalize click patterns.

The precise number of clicks is available in traditional web analytics reports.

Installing and configuring ClickHeat is a potential drawback for some libraries that do not have access to the necessary technology or staff to maintain it. Even with access to a web server and knowledgeable staff, the web services librarian still experienced glitches implementing ClickHeat. She could not add ClickHeat to any high trafficked webpage because it created a slight, but noticeable, lag in response time to any page it was added. The cause was an out-of-box configuration setting that had to be fixed by the campus' Information Technology Department.<sup>17</sup> Another concern for libraries is that ClickHeat is continuously being developed with new versions or patches released periodically.<sup>18</sup> Like any locally installed software, libraries must plan for continuing maintenance of ClickHeat to keep it current.

Just as with In-Page Analytics, ClickHeat has no export or archive function. This impedes the web

services librarian’s ability to share the heat maps and compare different versions of a webpage. Again, the web services librarian manually archives the heat maps using a screen capture tool, but the process is not the perfect solution.

## Crazy Egg

Crazy Egg is a commercial, hosted click analytics tool selected for this project primarily for its advanced click tracking functionality. It is a fee-based service that requires a monthly subscription. There are several subscription packages based on the number of visits and “snapshots.” Snapshots are webpages that are tracked by Crazy Egg. The Kraemer Family Library subscribes to the standard package that allows up to twenty snapshots at one time with a combined total of 25,000 visits a month. To help manage how those visits are distributed, each tracked page can be assigned a specific number of visits or time period so that one webpage does not use all the visits early in the month. Once a snapshot reaches its target number of visits or its allocated time period, it automatically stops tracking clicks and archives that snapshot within the Crazy Egg website.<sup>19</sup>

The snapshots convert the click data into three different click analytic reports: heat map, site overlay, and something called “confetti view.” Crazy Egg’s heat map report is comparable to ClickHeat’s heat map; they both use intensity of colors to show high areas of clicks on a webpage (see figure 4). Crazy Egg’s site overlay is similar to In-Page Analytics in that they both display the number of clicks a link receives (see figure 5). Unlike In-Page Analytics, Crazy Egg tracks all clicks including outbound links as well as nonlinked content, such as graphics, if it has received multiple clicks. Every clicked link and graphic is treated as its own separate entity,



Figure 4. Screenshot of Crazy Egg’s heat map report



Figure 5. Screenshot of Crazy Egg’s site overlay report

allowing Crazy Egg to differentiate between the same link or image listed multiple times on a webpage. Crazy Egg displays this data in color-coded plus signs which are located next to the link or graphic it represents. The color is based on the percentage of

clicks that area has received with the brighter colors representing the higher percentage of clicks. The plus signs can be expanded to show the total number of clicks an item has received, and this number can be easily filtered into eleven predefined

segments that include day of week, browser type, and top referring websites. Custom segments may be applied if they are set up within the Crazy Egg profile.

The confetti view report displays every click the snapshot recorded and overlays those clicks as colored dots on the snapshot as shown in figure 6. The color of the dot corresponds to specific segment value. The confetti view report uses the same default segmented values used in the site overlay report but here they can be further filtered into defined values for that segment. For example, the confetti view can segment the clicks by window width and then further filter the data to display only the clicks from visitors with window widths under 1000 pixels to see if users with smaller screen resolutions are scrolling down long webpages to click on content. This information is hard to glean from Crazy Egg's site overlay report because it focuses on the individual link or graphic. The confetti view report focuses on clicks at the webpage level, allowing libraries to view usage trends on a webpage.

Crazy Egg is a hosted service like Google Analytics, which means all the data are stored on Crazy Egg's web servers and accessed through its website. Implementing Crazy Egg on a webpage is a two-step process requiring the web manager to first set up the snapshot within the Crazy Egg profile and then add the tracking javascript tags to the webpage it will track. Once the javascript tags are in place, Crazy Egg takes a picture of the current webpage and stores that as the snapshot on which to overlay the click data reports. Since it uses a "snapshot" of the webpage, the website manager needs to retake a snapshot of the webpage if there are any changes to it. Retaking the snapshot requires only a click of a button to automatically stop the old snapshot and regenerate a new one based on the current webpage without having to change the javascript tags.

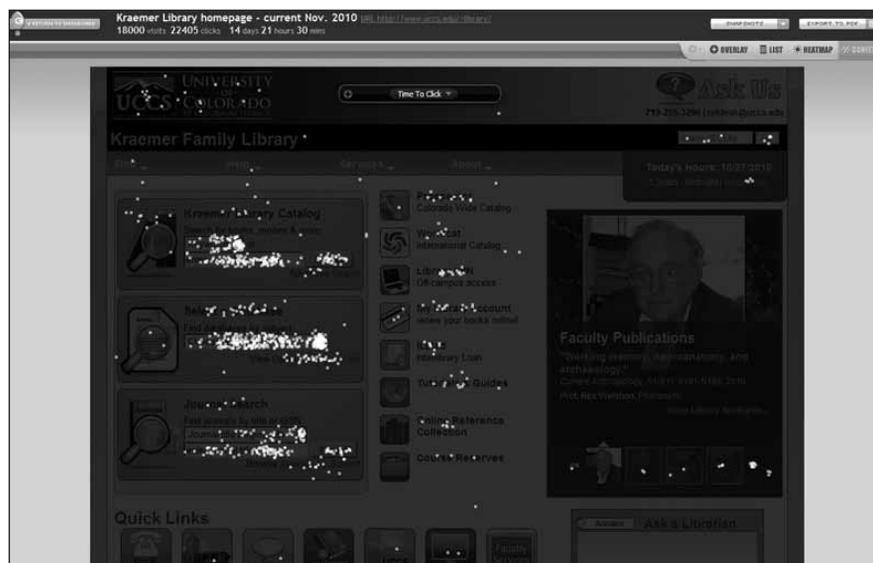


Figure 6. Screenshot of Crazy Egg's confetti view report

## Evaluation of Crazy Egg

Crazy Egg combines the capabilities of In-Page Analytics and ClickHeat in one tool and expands on their abilities. It is not a comprehensive web analytics tool like Google Analytics or Piwik, but rather is designed to specifically track where users are clicking. Crazy Egg's heat map report is comparable to the one freely available in ClickHeat, however, its site overlay and confetti view reports are more sophisticated than what is currently available for free. The web services librarian found Crazy Egg to be a worthwhile investment during the Library's homepage redesign because it provided additional context to show how users were interacting with the Library's website. The site overlay facilitated the ability to compare the same link listed in multiple locations on the Library's homepage. Not only could the web services librarian see how many clicks the links received, but she could also segment and compare that data to learn which links users were finding faster and which links new visitors or returning visitors preferred. This data helped her

to decide which redundant links to remove from the homepage. The confetti view report was useful for studying clicks on the entire webpage. Segmenting this data allowed the web services librarian to identify click patterns on the webpage from a specific group. For example, the report revealed that mobile device users would scroll horizontally on the homepage to click on content, but rarely vertically. She also focused on the time to click segment, which reports how long it took a visitor to click on something, in the confetti view to identify links or areas that took users over half a minute to click. Both segments provided interesting information, but further usability testing is necessary to better understand why mobile users preferred not to scroll vertically or why it took users longer to click on certain links.

Crazy Egg also has the ability to archive its snapshots within its profile. This is useful for comparing different versions of a webpage to discover if the modifications were an improvement or not. One goal for the Library's homepage redesign was to shorten the page so users did not have to scroll

down too much to get to needed links. By comparing the old homepage and the new homepage confetti reports in Crazy Egg, it was instantly apparent that the new homepage had significantly fewer clicks on its bottom half than the old version. Furthermore, comparing the different versions using the time to click segment in the site overlay showed that placing the link more prominently on the webpage decreased the overall time it took users to click on it. Crazy Egg's main drawback is that archived pages that are no longer tracking click data count toward the overall number of snapshots that can be tracked at one time. If libraries regularly retest a webpage, they will easily reach the maximum number of snapshots their subscription permits in a relatively short period.

Once a Crazy Egg subscription is cancelled data stored in the account is no longer accessible. This increases the importance of regularly exporting data. Crazy Egg is designed to export the heat map and confetti view reports. The direct export function takes a snapshot of the current report as it is displayed, and automatically converts that image into a PDF. Exporting the heat map is fairly simple because the report is a single image, but exporting all the content in the confetti view report is more difficult because the report is based on segments of click data. Each segment type would have to be exported in a separate PDF report to retain all of the content. In addition, there is no export option for the site overlay report so there is not an easy method to manage that information outside of Crazy Egg. Even if libraries are actively exporting reports from Crazy Egg, data loss is inevitable.

## Summary and Conclusions

Closely examining In-Page Analytics, ClickHeat, and CrazyEgg reveals that each tool has different levels of click

tracking abilities, however, all provide a distinct picture of how visitors use a webpage. By using all of them, the web services librarian was able to clearly identify and recommend the links for removal. In addition, she identified other potential usability concerns, such as visitors clicking on nonlinked graphics rather than the link itself.

A major bonus of using click analytics tools is their ability to create easy to understand reports that instantly display where visitors are clicking on a webpage. No previous knowledge of web analytics is required to understand these reports. The web services librarian found it simple to present and discuss click analytics reports with other librarians with little to no background in web analytics. This helped increase the transparency of why links were targeted for removal from the homepage.

As useful as click analytics tools are, they cannot determine why users click on a link, only where they have clicked. Click analytics tools simply visualize website usage statistics. As Elizabeth Black reports, these "statistics are a trail left by the user, but they do not explain the motivations behind the behavior."<sup>20</sup> She concludes that additional usability studies are required to better understand users and their interactions on a website.<sup>21</sup> Libraries can use the click analytics reports to identify a problem on a webpage, but further usability testing will explain why there is a problem and help library web managers fix the issue and prevent repeating the mistake in the future.

The web services librarian incorporated the use of In-Page Analytics, ClickHeat, and Crazy Egg in her web analytics practices since these tools continue to be useful to test the usage of new content added to a webpage. Furthermore, she finds that click analytics' straightforward reports prompted her to share website use data more often with fellow librarians to assist in other decision-making processes for the Library's

website. Next, she will explore ways to automate the process of sharing of website use data to make this information more accessible to other interested librarians. By sharing this information, the web services librarian hopes to promote informed decision making for the Library's web content and design.

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