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The purpose of this paper is to evaluate the effect of image size on number of user interactions across different blogging platforms. Earlier studies (Kornejeva, 2012; Liao et al., 2013) indicate that visual components of blogs can impact readers' experiences with blog content. This study aims to further explore the ways in which visual components impact readers.

The number of images, sizes of the images, number of comments and number of non-comment interactions per post were collected from 400 WordPress posts and 400 Blogger posts. While no effect of image size was detected, an effect of image presence was detected. Opportunities for further research were discussed, as were the implications of the findings of this study.

#### Headings:

Blogs

Information-Science – Social aspects

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Web design

THE INFLUENCE OF IMAGE QUALITY ON USER INTERACTIONS.

by  
Jaleesa M Powell

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Approved by

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Robert Capra

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## Introduction

Blogging has rapidly increased as a form of self-expression and marketing, as “blogs are easy to use, [allowing] people [to] rapidly share their daily diaries, discuss the latest news, and express their opinions on numerous topics” (Lin and Hung-Yu, 2010, p. 41). Blogging has increased so quickly that it “has definitely hit the mainstream” and it is thus becoming increasingly difficult to stand out among the many voices in the blogosphere (Gonçalves, 2010, p. 42). While earlier researchers (Lu and Lee, 2010) have indicated that content quality is a major factor in attracting readers to a blog, the recent surge in blogs with high quality writing has created an environment in which “only a few blogs in the blogosphere have been added...by a large number of readers” (Ko, 2012 p. 402).

I argue that visual components are influential in catching the attention of readers. Blogs, like other websites, need to include visual characteristics and images that meet the same standards for quality as the rest of the site. Thus, I hypothesize that blogs with high-resolution images have more visitor interactions than blogs with no images or images of lesser quality. Blog popularity is a blog’s “ability to prompt interactive behaviors in other bloggers” and therefore visitor interactions will be used as a measure for a blog’s popularity (Lin and Hung-Yu, 2010, p. 43). Visitors who have made a connection with the content in a way that is meaningful for them may be more likely to interact with or subscribe to the blog.

Before any reader can interact with or subscribe to a blog, the blog has “to be found in the first place” (Wright-Porto, 2011, p. 163). Finding a specific blog among other blogs can be difficult enough, as “with the growth of the blogosphere comes the need to provide effective access to the knowledge and experience contained in many tens of millions of blogs out there” (Weerkamp et al., 2008, p. 1). Most popular search engines, though, search the entire web and not just the blogosphere, meaning that blogs have to compete with not only other blogs, but also other websites “that are principally devoted to a given topic” (Weerkamp et al., 2008, p. 5). There are some alternatives to being found via popular search engines, such as networks like Bloglovin with its tagline of “Discover the most popular blog posts in United States on bloglovin,” (Bloglovin, 2013). Some bloggers use other popular forms of social networking like Facebook and Twitter in order to draw readers to their website. Another, more recent trend is the use of Pinterest – a social networking site with a focus on sharing images, to promote individual blog posts.

Still, blogs “are generally found by someone searching for something, using a search engine like Google or Bing” (Wright-Porto, 2011, p. 163). Bloglovin’s tagline suggests a limitation for bloggers outside of the United States, though further inspection of the website reveals that a reader can access blogs all over the world through the website. Some may be put off by the site’s attempt to personalize the user experience through contextual information about the user, or misunderstand the tagline as it suggests that a user can only search for blogs in their own geographical location. Using other forms of social networking to find blogs on a particular topic can prove difficult for the same reason finding blogs on a particular topic can be difficult using a search engine in

that the retrieval methods for both strategies rely on metadata provided by the blog owner to identify the topic of the blog. A blog owner may not provide adequate metadata, assuming they provide any metadata at all, and thus it becomes difficult to find blogs that are on a particular topic “as opposed to blogs that merely happen to discuss the topic in passing” (Weerkamp et al., 2008, p. 1).

Given the current limitations in efficient blog retrieval, blog quality is incredibly important. Analysis of site visitors is also important, as regardless of “whether you are creating your blog for personal use or to help promote and build your business, you want to keep readers coming back” (Wright-Porto, 2011, p. 163). There is so much data present in the interactions readers have with websites, particularly in the blogosphere “as in any other social environment” (Gonçalves, 2010, p. 43). This data is presented in the form of the “trails of user and community behavior...left behind, registered in various blog features such as posts, comments, tags, and bookmarks” (Gonçalves, 2010, p. 43). Analysis of visitor interactions can provide information “related to how users express themselves, how they perceive blog content, their interests and intentions, and how they interact with each other” (Gonçalves, 2010, p. 43). This analysis can provide information that can help “you...make better marketing decisions, improve your site’s design, or try to turn blog visitors into customers if you are using your blog for business purposes” (Wright-Porto, 2011, p. 200).

As rapid dynamic publishing of articles on websites becomes increasingly popular, some organizations are beginning to explore the various opportunities blogging represents. News organizations that publish articles with a specific focus which requires them to take their time publishing more involved articles see blogs as an opportunity to

post more urgent content that they expect to be relevant for a shorter period of time. A blog can help them keep their edge as the most relevant, active, and up-to-date content provider on the scene.

Individuals or organizations with expertise on a particular subject are using blogs as a way to demonstrate their knowledge and expertise about a given topic. Beauty product lines are taking advantage of the popularity of beauty bloggers in the blogosphere to sell their products. Some would even consider “instagrammers...the new brand influencers,” for example (Beltrone, 2012, p. 1). Higher quality blog content that draws in the most consumers possible is becoming increasingly important with the rise of the professional use of weblogs because a “website communicates volumes about your brand, your values and the way you do business” (Brueckner, 2013, p. 26). Just as “a user would be likely to participate in a blog activity if the interactive process is fun and enjoyable,” customers may be more likely to patronize a business if the process of doing so is “fun and enjoyable” (Liao et al., 2013, p. 625). One way to make customer interaction fun and enjoyable and to draw in consumers is visually, and “some of the most visually effective presentations...have included full-frame photographs and very little embellishment or graphic accents” (Terberg, 2004, p. 1).

The use of high quality images is important, especially for “visually driven brands in industries like fashion and travel” (Beltrone, 2012, p. 2). If a consumer is able to see the product or its results, they may be more likely to invest in that product. The anticipated result is that higher quality images will lure in more consumers – not just consumers of blog content but also consumers of that which the content is oriented around selling. This is particularly important for the aforementioned populations, which

are looking to use their blogs as a tool to sell some aspect of their brands. Overall, “understanding how users behave when they connect to social networking sites creates opportunities for better interface design” (Benevenuto et al., 2009, p. 49). Whether the reason for improving interface design is to increase sales or to simply increase readership, getting users to interact with the content on a website can prove to be incredibly useful and important for site and business owners.



## Literature Review

### The power of social networks

Social networks continue to grow in size and centrality to our lives to this day. In 2012 Facebook reached one billion active users, as compared to the one million active users at the end of 2004 (Associated Press, 2013). This continuous substantial growth has presented opportunities for organizations and companies to capitalize on the connections inherent in these networks to reach and understand both existing customer bases and potential customer bases. These opportunities have grown with the number of users and connections on these sites, as "the revenue of most sites ties directly to the number of registered users" (Gangadharbatla, 2008, p. 5). With the increase in users of social networking sites come more opportunities for the generation of quality content. Since "the success of a social networking site is directly associated with the quality of content users share," it is important to understand how this growth happens and what it is about interactions on social networks that retains users and keeps them satisfied (Benevenuto et al., 2009, p. 61).

Due to the fact that "online social media draws heavily on active reader participation...user feedback is invaluable for ranking, filtering, and retrieving high quality content" (Bian et al., 2008, p. 53). Researchers (Kulkarni et al., 2013; Hsieh, et al., 2010) have analyzed social networks and discovered a variety of reasons that users participate in social networks, ranging from basic satisfaction with site quality to the "affective response to the overall...usage experience," respectively (Hsieh et al., 2010, p. 1435). A key feature of most, if not all, social networks is user-generated content as, "in general, a user's activities in OSNs include authoring content, viewing, and networking"

(Guo et al., 2009, p. 369). Users generate even more content simply by interacting on these networks.

This sort of "on-going collective conversation" is the network (Kornejeva, 2012, p. 48). The user interactions shape the network. Researchers (Cha et al., 2010) found that "popular users [with a large amount of followers] are not necessarily influential in terms of spawning retweets or mentions," which supports the notion of user interactions shaping the network (p. 1). In other words, users with lots of silent followers are not necessarily as influential as users with few active followers. Active followers are more able to spread influence than silent followers. Silent followers also do not contribute to the number of connections in a network the way that active followers do, as active followers are increasing access points for the network when they generate or share content.

However, other researchers (Benevenuto et al., 2009) found that "silent interactions, such as browsing a profile page or viewing a photo of a friend" are also interactions within the bounds of a social network (p. 61). This suggests that the network is not purely restricted to the space on the web. It seems that users can still "be a part of the network" without actually ever commenting, liking, or linking to a particular user-generated resource. Simply by viewing the content and identifying with it, they can still belong to the network which makes it "unclear what exactly influence means" (Cha et al., 2010, p. 2). There is also the problem of "malicious users...trying to 'game the system' by selectively promoting or demoting content for profit, or fun," which causes "the quality of the user feedback [to degrade]" (Bian et al., 2008, p. 53). The variety of types of and

reasons for user interactions not only make social networks rich information grounds, but also make social networks great places for analysis of human-information interactions.

According to Correa et al social media can be "a mechanism for the audience to connect, communicate, and interact with each other and their mutual friends" (Correa et al., 2010, p. 248). Keenan and Shiri define social networking sites as "websites that encourage social interaction through profile-based user accounts" (Keenan and Shiri, 2009, p. 439). Each definition points out essential pieces of what makes a social networking website different from a traditional website that may just be used and set up for dissemination of information. What makes social networks so powerful is that while they are still websites on which dissemination of information occurs, they also enable and encourage users to contribute their knowledge.

Given that "people in the new information age make choices based on the opinions of their peers and friends," social networks where users generate the content, like "blogs and web forums, social bookmarking sites, [and] photo and video sharing communities" are prime information resources for many people (Cha et al., 2010, p. 2; Agichtein, 2008, p. 183). Therefore, dissemination of information on social networking platforms is likely more effective than dissemination of information via traditional media since "the information comes from a friend [users] perceive they can trust" (Gangadharbatla, 2008, p. 6). In particular, "blogs have become an important source for consumers to search for information because they believe that information in blogs has more credibility and reliability compared to traditional media" (Hsiu-Chia, 2012, p. 402).

## Blogs as social networks

There are many different types of social networks. Facebook is a type of social network that “[provides] a variety of services, such as users' own unique ‘space’” where they can “share photos and videos, maintain blogs, and encourage group interactions through...instant messaging (IM), and e-mail” (Gangadharbatla, 2008, p. 5). This type of social network would be referred to as a “user-centered” social network (Keenan and Shiri, 2009, p. 439). There are “activity focused” social networks as well, which are centered on a single interest or particular activity (Keenan and Shiri, 2009, p. 440). Activity focused social networking sites include photography sites like Flickr, bookmarking sites like del.icio.us, dating sites like Lavalife, video sites like Youtube, and music sites like Soundclick (Keenan and Shiri, 2009, p. 440). Each website has its own focus, but generally follows similar formats: pages with user-generated content in which other users can place comments or express their sentiments in other ways. Another type of social network is one with perhaps a less specific focus, like blogs.

Blogs are, though, undoubtedly still networks. A user posts content in reverse-chronological entries, and readers respond to it (Chuenchom, 2011, p. 1). Readers may subscribe or generally come back out of habit, but regardless, there is a key element of connectedness there that makes the blogosphere a network (Lu and Lee, 2010, p. 33). The fact that a user can still be a part of a network without ever even commenting or “liking” any piece of particular user-generated content calls into question what the “social” part of “social networking” actually means. According to Benevenuto et al., intentionally viewing updates on a friend is considered social interaction (Benevenuto et al., 2009, p. 58). Silent interactions of this type are really human-information interactions, but the

nature of the information makes it social. These kinds of silent interactions with the network are just as valuable as, if not more valuable than, the explicit interactions with the network because a silent reader who spends a lot of time on a network is still very invested in the network and has the potential to directly or indirectly interact with or act on the information presented in the user-generated content at any moment.

Some bloggers choose to capitalize on the sense of connectedness that holds the blogosphere together and use it to “convert popularity into a profit source” (Ko, 2012, p. 401). Some bloggers with influence may intentionally use their voices to promote products, while others may do so indirectly by sharing detailed information about their life choices and experiences. In either circumstance, a portion of the blogger’s influence on their readers may be attributed to the “sameness” readers establish with the blogger (Kornejeva, 2012, p. 23). This feeling of “sameness” can also be conceptualized as “social identity,” which “refers to an individual's ability to identify themselves as a part of a larger group,” which is the feature of blogs that can allow them to be considered a social network (Liao et al., 2013, p. 623).

#### Reasons bloggers blog

According to earlier researchers, bloggers blog for a variety of reasons. Some research has found that bloggers blog to feel connected to others. There is a need to belong that motivates some bloggers, particularly bloggers who have reported loneliness in their "real-world" relationships (Correa et al., 2010, p. 248). Bloggers are also likely to be people with high neuroticism, extroversion, or openness scores. Each category of blogger is also likely to blog for reasons specific to their category. Neurotic bloggers tend to blog about their lives and use their blogs as a way to vent (Gill et al., 2009, p. 23).

Extroverted bloggers tend to blog about themselves as well, though in a different way. They are more likely to blog about the positive experiences in their lives with a focus on self-actualization and generally just wanting to share and connect with others. Openness to new experiences is another category that seems to be similar to the extroverted category, in that bloggers who are open to new experiences tend to blog about those experiences. This category seems to be less about the self, though, and more about the experiences alone (Gill et al., 2009, p. 23).

Other reasons noted in existing research are tightly coupled with the types of blogs in the blogosphere. Some bloggers blog for "fame" while others blog just because it is fun or a way to avoid boredom (Bughin, 2007, p. 1). Others blog to connect with customers or to develop a personal brand. Overall, "blogs are used for both utilitarian and hedonic reasons, [like] enhancing work/learning/life performance and engaging in fun/entertainment" (Liao et al., 2013, p. 621). There is some tension in findings on what motivates bloggers to blog, like whether or not external motivators like money and fame are as influential as the internal motivators like fun or a desire for self-actualization. Researchers (Stoeckl et al., 2007) have come to the conclusion that intrinsic motivations are responsible for today's range of [user-generated content]" (p. 410).

Another point of tension lies in determining the ways in which extroverts use social media. Correa et al found that extroverts were likely to capitalize on blogs and social networks as well as, if not more than, introverted people (Correa et al., 2010, p. 250). However, earlier researchers (Amichai-Hamburger et al., 2002) found that introverts were more likely to use blogs and social networks to alleviate the loneliness they experience in their personal lives, and assumed that extroverts were less likely to

want to spend time social networking because they would rather be out in the world experiencing things (Correa et al., 2010, p. 252). It seems, though, that extroverts enjoy connecting with people in all forms, and that sometimes blogs are used to connect with other real-life friends who also have blogs (Kornejeva, 2012, p. 35).

Lastly, some bloggers blog to log their reactions to or interactions with other ideas or information they have come in contact with either on other blogs or online information resources, or in their daily lives (Shao, 2009, p. 10).

#### Reasons users interact

The research on the reasons users interact with social networking sites - blogs in particular - is diverse and has gradually become increasingly specific. Hsieh et al operationalized a user's motivation to interact with a blog as expectation and disconfirmation. The findings of the Hsieh et al study "Assessing blog-user satisfaction using the expectation and disconfirmation approach" were that users had preconceived notions of what their experience on a particular blog was going to be, and if the experience met or exceeded their expectations, they were likely to return to the blog (Hsieh et al., 2010, p. 1436). However, if the experience failed to meet their expectations, they were not likely to return to the blog (Hsieh et al., 2010, p. 1435).

Kulkarni et al "investigates the linkage between blog quality and blog-user satisfaction" in the study on "Blog content and user engagement", which is also a crucial part of understanding the research on expectation-disconfirmation (Kulkarni et al., 2013, p. 2722). The two ideas are essentially the same - quality is defined as "degree or standard of excellence," and standard is defined as "a rule or principle that is used as a

basis for judgment" ("Standard", 2014). While the rules or principles could be standardized all on their own, each individual user has their own set of standards they use to determine whether or not a blog meets their needs - in part because needs change over time. Quality as it applies to the evaluation of blogs in particular "refers to the extent to which the blog meets users' needs and the overall excellence of the blog site" (Liao et al., 2013, p. 623). Therefore, taking the user's needs into account – regardless of the fact that those needs may be different for each user, or change each time a particular user visits the blog – is crucial to evaluating blog quality and obtaining "a better understanding of how blog quality affects users' perceptions about the blog, which may in turn lead to behavioural intention to use" (Liao et al., 2013, p. 623).

Another reason readers interact with blogs, according to research, is also a reason bloggers blog: they are looking to connect with others who have similar qualities and interests. Kornejeva's study of fashion blog readers in Sweden found that the women in the study connected with bloggers who were like them or had similar interests as them. The findings of this study are supported in "previous studies of virtual communities," which "have considered and proved social identity to be an important determinant of members' participation in the community" (Liao et al., 2013, p. 623).

While a sense of community can attract readers, a system or context that a reader finds unappealing or too difficult to interact with will likely influence the reader to seek information and connection from another blogger even if the content is otherwise great (Kornejeva, 2012, p. 42). If the context is so distracting that the reader cannot process or view the content in a way that meets their expectations, there is no way for them to evaluate the quality of the content or give quality content a chance. There is also the



possibility that the appearance of a blog “could act as a stimulus affecting cognitive and emotional states” (Liao et al., 2013, p. 622). A user's “perception of [a blog's] usefulness and playfulness [may result] in a positive cognitive appraisal,” giving the blog the appearance of being a higher quality blog than perhaps a blog that looks less “playful” (Liao et al., 2013, p. 622). Therefore “the design of [a] blog is important for attracting and retaining users,” which suggests that the idea that “content is still king” may be valid, but on a conditional basis (Chechen et al., 2013, p. 623; Lu and Lee, 2010, p. 32).

Lastly, readers interact with blogs to increase their own social capital. Making comments on other blogs while owning a blog is a way of networking and increasing visitor traffic for a blog. Catching the attention of someone with social capital could be incredibly lucrative given the “diffusion power” of blogs with high social capital (Ko, 2012, p. 415). The study of fashion blog users in Sweden found that in addition to interacting with blogs to increase social capital, readers also interacted if they had a negative sentiment they felt they needed to express, or a correction that they wanted to suggest (Kornejeva, 2012, p. 43). The only reason blog readers would leave a positive comment, for example, would be if they were commenting on a friend's blog (Kornejeva, 2012, p. 44).

While this is certainly interesting, this study did not evaluate whether or not the subjects of the study would interact with the content in more passive ways, such as “liking” a post or “reblogging” it. Perhaps these features were not as popular at the time of the study, which is a reason that it is important to continue to perform research in this area as it continues to evolve. The aforementioned research has narrowed down the scope of the issues gradually with the passage of time. Research has gone from defining what

social networks are to defining what makes specific social networking types different from the others (i.e. Blogs vs. Facebook). Then, research has offered many operationalizations for concepts such as "satisfaction" and "quality" of these resources. Satisfaction has been broken down into the expectation-disconfirmation model, while quality has generally remained subjective beyond the context-content model. There has even been work on conceptualizing what it means to interact with a blog. I seek to conduct research at the latter two levels - context vs content, and the conceptualization of interactions.

While unique site views are a useful measure of how well a website is doing, an analysis of the number of other forms of interactions can be more useful. Gaining an understanding of what makes a user respond in a tangible, quantifiable way can be helpful to blog owners who are seeking to increase readership and retainment. Also, I am interested in exploring the fine line between context and content that occurs as images are being treated as entire posts on websites like tumblr. Visual attributes like images convey information and can thus act as content, but they also contribute to contextual things such as the design or overall aesthetics of the blog.

The interviewees in Kornejeva's study about why women in Sweden are reading blogs suggested that "it's important that [a] blog has photos, and they should preferably be of good quality and personal" (Kornejeva, 2012, p. 42). One reason these women may have found that photos were an important component of blogs is illustrated in Lin and Huang's (2006) research on "internet blogs as a tourism marketing medium" (p. 1). In their research, they found that photos solicit intense affective responses from users in a shorter period of time than it takes to read and get the full affective affect from a blog

entry. The subjects of the study found that “a website presenting touching photographs and fine music helped bring calm, peace, courage and hope, while dispelling ...fears,” as many of them “were greatly touched and even cried after viewing the photographs” (Lin and Huang, 2006, p. 1204).

While it is unclear whether or not the women in Kornejeva's study were as emotionally moved by the images they interacted with on their blogs of choice, the images likely stirred some sort of emotional or other affective response in the readers that was of value to them at some level. The information in images is partially what is actually represented by the pixels on the screen, and partially the viewer's interpretation of those pixels on the screen, as “viewers...determine initially what the image represents to them before making any evaluations of its topicality, meaning and utility in regard to an information need” (Griesdorf and O'Connor, 2001, p. 7). This reaction and evaluation of representation may occur without any sort of verbalization, and yet images still have the ability to strongly compel viewers to “forward the URL address [of a website] to their friends and associates” (Lin and Huang, 2006, p. 1204).

Images can also compel viewers to learn more about the creator and publisher of the image, as occurred in the Lin and Huang study. Once the viewers realized that the photographer of the moving photographs was “simply an ordinary person,” they felt that they could perform the tasks he performed as well (Lin and Huang, 2006, p. 1204). This recognition of “sameness” with a content-generator was compelling enough to make the site viewers in Taiwan want and feel able to go to the same place the moving photographs were taken. They felt that they were able to do what the photographer did and have the same experience because they were “simply...ordinary” as well. These viewers were

essentially sold a product and interacted with the website to sell a product to their friends and associates. The Lin and Huang study is a great example of the power and usefulness of analyzing user interactions with user-generated content.

## Methods

The first step of the analysis was blog selection. A blog was selected from the Blogger and Wordpress platforms using the "View a random blog" features provided by both platforms. The URLs for these features were "http://www.blogger.com/next-blog?navBar=true&blogID={insert number here}" and "http://wordpress.com/next/", respectively. The number required to go to a random blog using Blogger was generated using the random string generator on "random.org". The URL for this feature was "http://www.random.org/strings/". The string was one seven-character random numeric string. This step was performed once, though it was fully expected that this step would be performed until there was a blog at the address which used the randomly generated number. After the seven-digit string was generated and a random blog was reached and evaluated, the "next" button provided in the taskbar of each blog was used to progress to the next blog.

The following ten random strings were generated: 8400283, 2412443, 3773325, 8472917, 8484619, 4043147, 3654403, 3423271, 9917613, and 4914637. 8400283 and 3773325 were used successfully, while 2412443 produced a URL that did not exist. Occasionally a blog was reached that did not have a navigation bar with the "next" link. In that case, the browser's "back" button was used to return to the previous blog so that the "next" link could be clicked again in order to generate another random blog.

Once a random blog had been reached on either platform, the most recent post from each blog was selected and evaluated. Posts older than five years were not collected as part of the sample. Posts without dates were also not collected as part of the sample.

Then, the posts were evaluated for the presence of images. Posts with images were evaluated for the number of images. Each image was evaluated using the “Image Size Info” Google Chrome browser extension in order to quickly determine its displayed dimensions. Next, the date, number of comments, number of non-comment interactions, number of images per post, and the width and height of images present in the post were recorded into a spreadsheet. “Non-comment interactions” included various non-comment interactions, including likes, Facebook shares, and other platform-specific interactions.

Posts for which both comments and non-comment interactions were disabled were not collected as part of the sample. For posts with an enabled mechanism for receiving comments but without an enabled mechanism for receiving non-comment interactions, a “-1” was recorded in the “number of non-comment interactions” column to represent a “not-applicable” value. For posts with an enabled mechanism for receiving non-comment interactions but without an enabled mechanism for receiving non-comment interactions, a “-1” was recorded in the “number of comments” column to represent a “not-applicable” value. This process was repeated until data for 400 posts was recorded for each blogging platform, resulting in a total of 800 records for the total data set.

Once all of the data was collected, the average height and width were calculated for each image. With these values, the average area was computed and compared with area qualifications for small, medium and large categories. The area for each of these categories was computed using the dimension qualifications from Flickr.com (“FAQ”, 2014). Images with an area of 102,400 square-pixels or less were categorized as small images. Images with an area between 102,401 and 480,000 square-pixels were categorized as medium images. Images with an area between 480,001 and 4,320,000

square-pixels were categorized as large images. A note of these nominal categories were made for each record.

Since only six of the 400 Wordpress posts had images which fit into the large category and none of the Blogger posts had images which fit into the large category, the large category was excluded from analysis. The sample was further categorized into posts with comments, posts with non-comment interactions, posts without comments, posts without non-comment interactions, posts with images, and posts without images.

The data set was analyzed using a variety of descriptive and non-parametric statistics. The number of comments and non-comment interactions was non-normally distributed, so non-parametric Kruskal-Wallis tests were used for many analyses. The sums and averages of comments and non-comment interactions for posts without images, with small images, and with medium images were compared. The sums and averages of comments and non-comment interactions for posts with images and posts without images were also compared. The results of these analyses are presented in the Results section.

## Results

The goal of this investigation is to determine if image size has an influence on the number of user interactions with a blog page. In order to make such a determination, 800 blog posts were evaluated (as described previously) for the number of comments and other user interactions in addition to the number of images in the post and the sizes of the images in each post. The entire collection of Wordpress blog posts is included in the sample, as each post has capabilities for both comments and non-comment interactions. As 74% of the Blogger posts collected for this study did not have a mechanism in place to allow for non-comment interactions, posts from each platform were evaluated separately for non-comment interactions. The sample of non-comment interactions for Blogger posts only includes the 26% of Blogger posts with the mechanisms in place to allow for non-comment interactions, while the sample of comments for Blogger posts includes all posts collected other than the 1.8% of posts with no mechanism for either comments or non-comment interactions. The averages and percentages this data set produced suggest that the impact of image size on number of user interactions differs across blogging platforms.



Figure 1. - Descriptive Statistics

		Posts with Small Images			Posts with Medium Images			Posts without Images			Posts with Images		
		M	Mdn	SD	M	Mdn	SD	M	Mdn	SD	M	Mdn	SD
Blogger	Non-Comment Interactions	6.70	0	28.72	2.93	0	7.87	1.10	1	1.57	5.00	0	21.87
	Comments	10.25	2	30.28	8.57	1	26.73	12.25	1.5	27.55	9.64	1	29.00
Wordpress	Non-Comment Interactions	4.51	0	15.61	26.18	1	121.73	2.79	0	15.61	17.01	1	93.32
	Comments	1.18	0	7.46	2.36	0	11.27	1.17	0	7.78	1.86	0	9.84

Figure 2. - Significance Statistics

		Effect of Image Size: Small vs Medium			Effect of Image Presence		
		<b>p</b>	<b>Z</b>	<b>r</b>	<b>P</b>	<b>Z</b>	<b>r</b>
<b>Blogger</b>	<b>Non-Comment Interactions</b>	0.94	0.07	0.009	0.80	0.26	0.03
	<b>Comments</b>	0.44	0.77	0.05	0.71	0.38	0.02
<b>Wordpress</b>	<b>Non-Comment Interactions</b>	0.26	1.13	0.07	<0.0001	5.30	0.27
	<b>Comments</b>	0.20	1.28	0.08	0.06	1.86	0.09

Figure 3. - Blogger

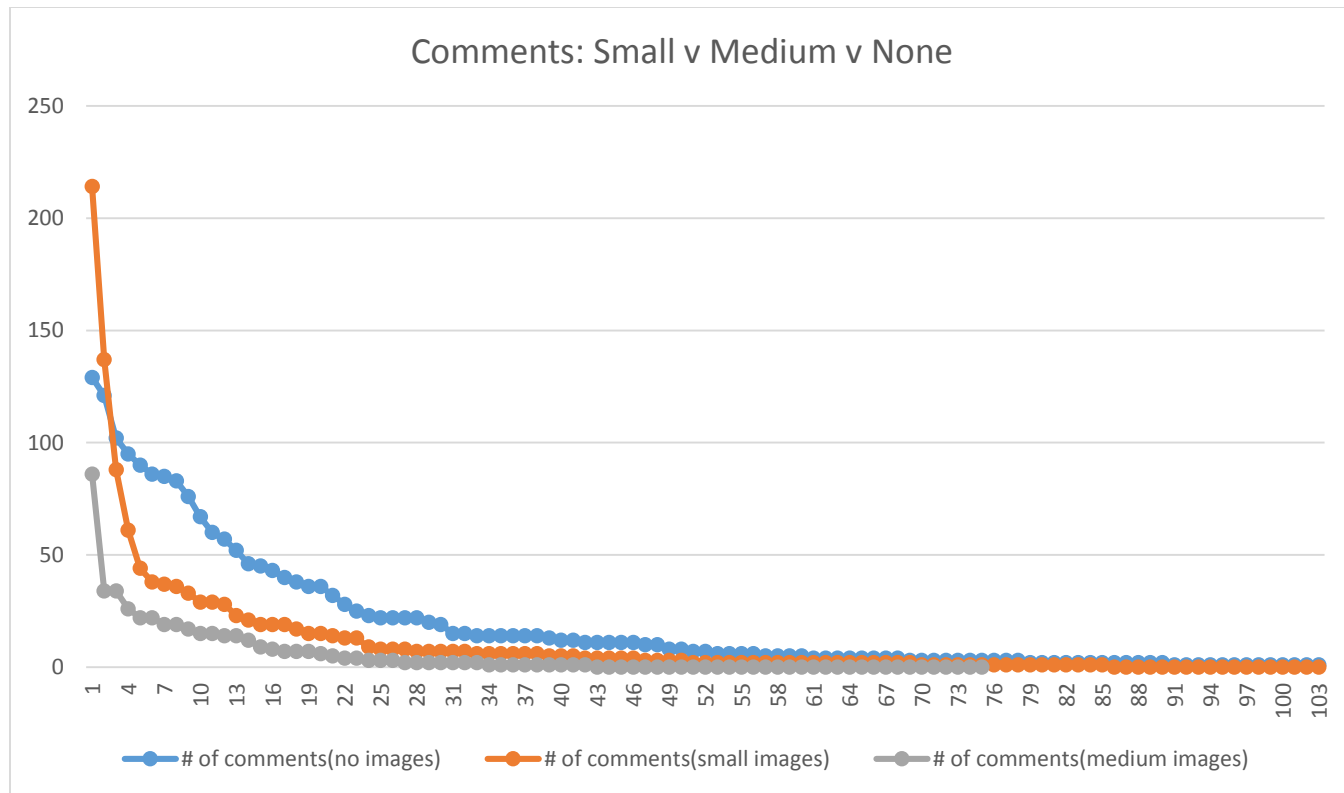


Figure 4. - Blogger

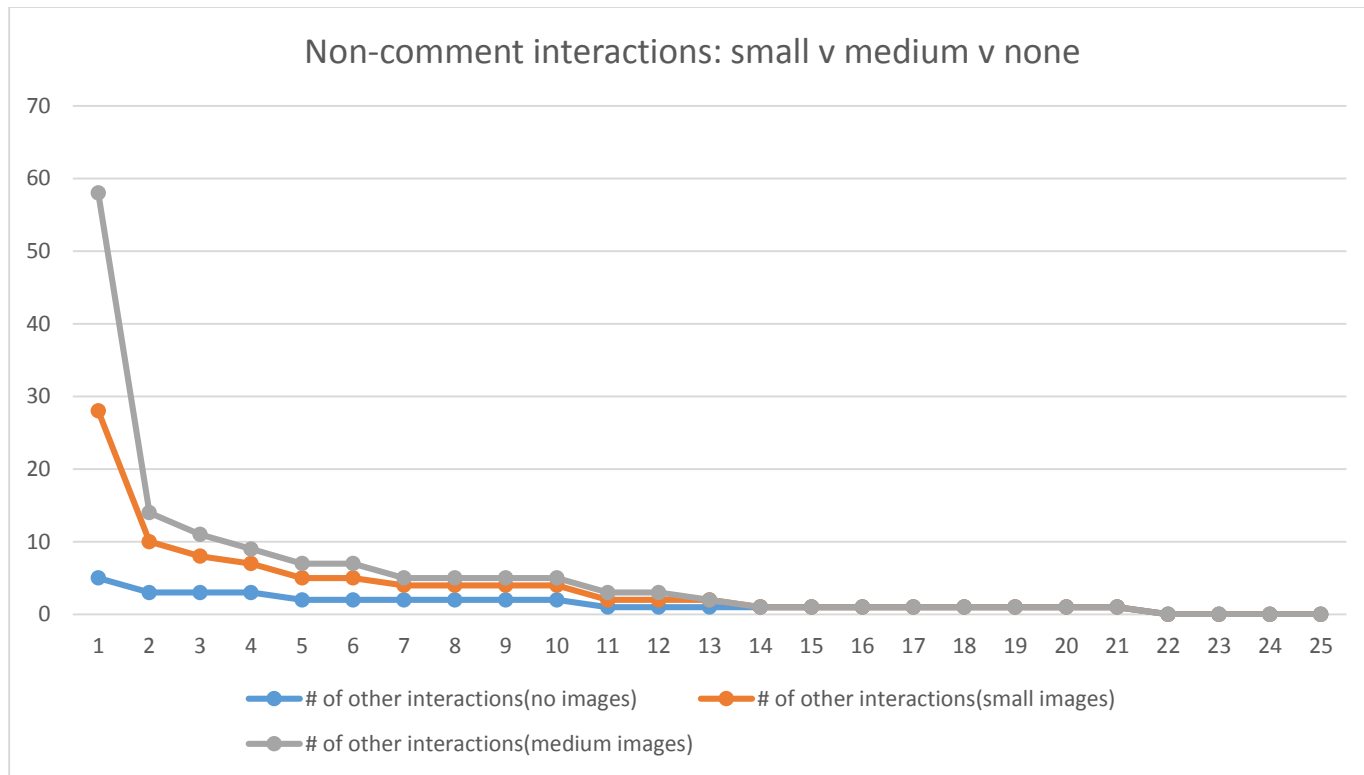


Figure 5. - Wordpress

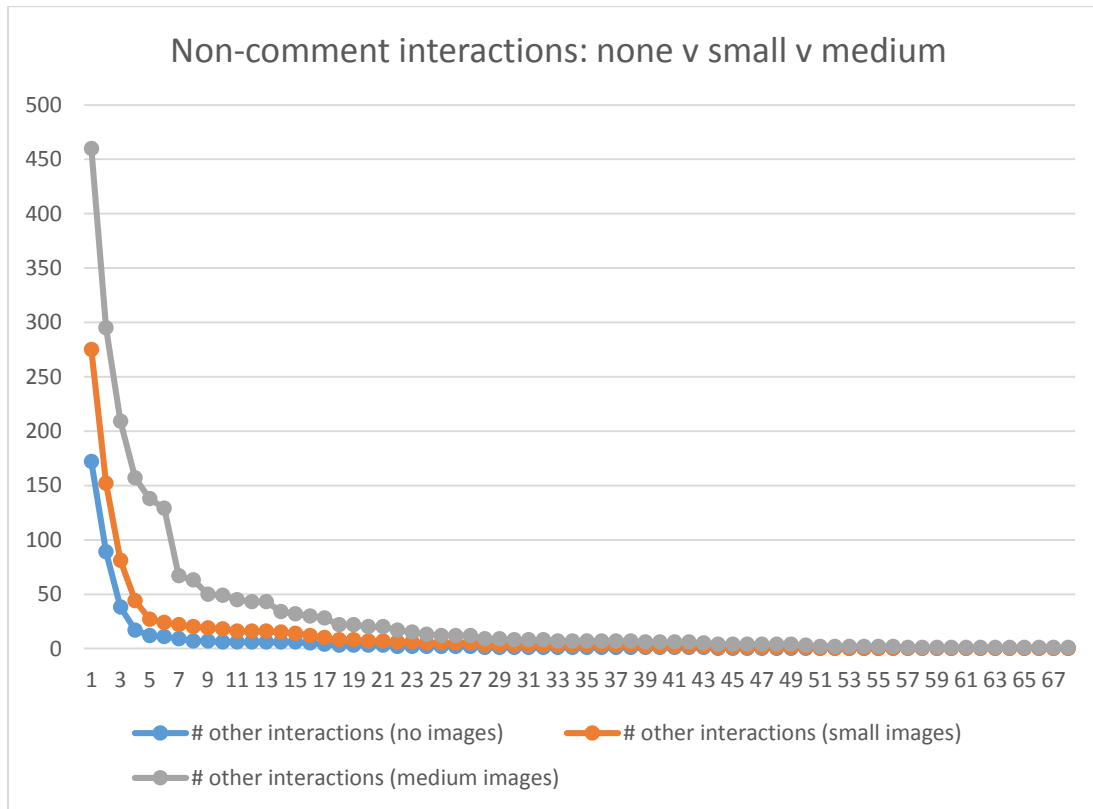
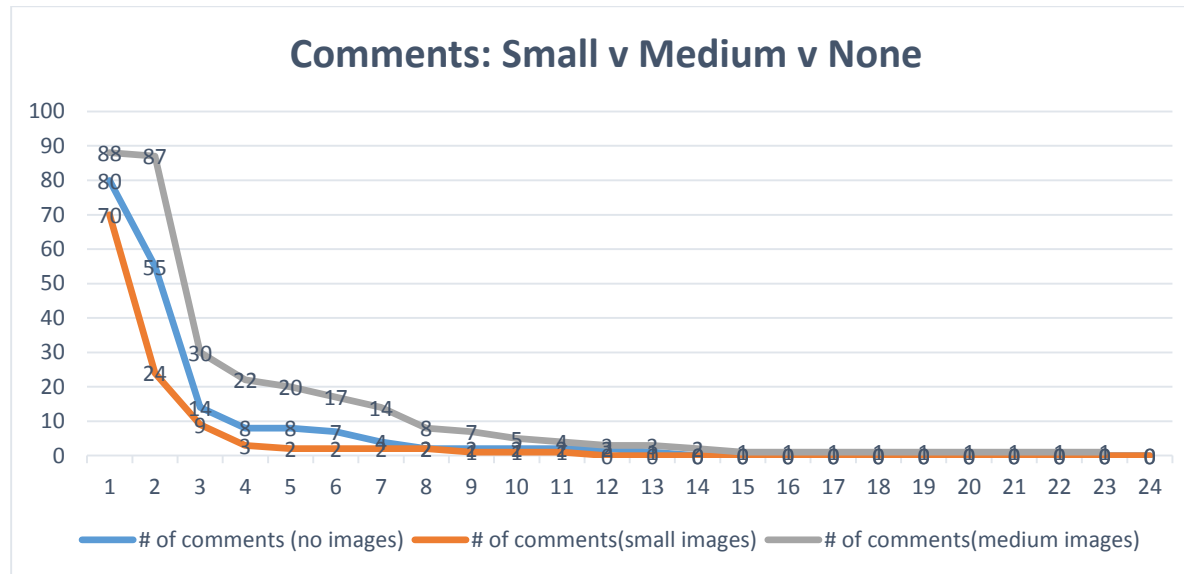


Figure 6. - Wordpress



For posts on the Blogger platform, Kruskal-Wallis tests did not detect a significant effect of image size on either number of comments or on non-comment interactions (Figure 2). Additionally, Kruskal-Wallis tests did not detect a significant effect of image presence on either the number of comments or on non-comment interactions (Figure 2).

For posts on the Wordpress platform, Kruskal-Wallis tests did not detect a significant effect of image size on user interactions of either type (Figure 2). However, a Kruskal-Wallis test did detect a significant effect of image presence on the number of non-comment interactions. The average number of non-comment interactions per post was higher when images were present ( $M=17.01$ ) than when they were not present ( $M=2.79$ ), see Figure 1. A Kruskal-Wallis test also detected a borderline significant effect of image presence on number of comments (Figure 2). The average number of comments per post with images ( $M=1.86$ ) was higher than the average number of comments per post without images ( $M=1.17$ ), see Figure 1.

Although Kruskal-Wallis tests did not detect a significant effect of image size on user interactions, trends in the data (see Figures 3-6) suggest that image size may still have influence on the number of user interactions. On average, Blogger posts with medium images had more non-comment interactions than Blogger posts with small images (Figure 5). Blogger posts with small images had more comments than Blogger posts with medium images (Figure 3). WordPress posts with medium images had more comments than WordPress posts with small images. WordPress posts with small images had even fewer comments than WordPress posts without images (Figure 6).

## Discussion

The effect of image presence on number of user interactions was limited to posts on WordPress. Though no other effects of image on number of user interactions were detected, there are trends in the data which suggest that perhaps further research could uncover such effects.

The majority of posts have absolutely no interactions. Some posts had large numbers of user interactions which could have been a result of spam inflation. Since these posts could offset the averages used in analysis, they were excluded. The number of exclusions in this study is a possible limitation, especially in the analysis of non-comment interactions on the Blogger platform. Future research could be conducted on a data set only comprised of Blogger posts with an enabled mechanism for collecting non-comment interactions. Non-comment interactions are more passive interactions that can take less time and effort than commenting or directly interacting with a person or information, which could make them more appealing to users who are otherwise more likely to silently interact with content (Benevenuto et al., 2009). The number of non-comment interactions so surpasses the number of comments that it could be argued that users prefer to perform more passive interactions when faced with the opportunity to comment on a post or to leave a sentiment with a single click. Therefore, further research could also be conducted on user interaction preferences, particularly across platforms.

System quality and presentation vary across platforms in ways that could affect both user interaction preferences and data collection. Such an effect of system on data collection may have influenced the results of this study. The majority of the WordPress posts collected for this study reflected the date of collection, which suggests that the



mechanism behind the WordPress random blog generator is not truly random. Therefore, future research should be conducted on a data set comprised of WordPress posts with greater variability among dates published.

Also worth studying further is the impact of the passage of time on the availability and popularity of tools which allow non-comment interactions. The passage of time may have also had an impact on the average area of images in posts, as well as an impact on the effect image size has on user interactions. This study could also be replicated in future research, but in a way that accounts for the possibilities of encountering spam blog entries and spam user interactions. Accounting for spam will reduce noise and make trends more apparent. Accounting for spam could also make effects more detectable.

The effect of community on number of user interactions could also be studied in future research. Before delving into the effect of community on how users interact with posts of varying content quality, studying the impact of community on blogging platform residence could be helpful. With each blogging platform offering a different set of tools and options, each platform serves user populations in different ways. Learning if, how, and/or why certain user communities thrive more on one platform than another could aid in the selection of blogging platforms to study, as well as the selection of communities to study.

## Observations

The purpose of this study was to contribute to the literature on the impact of visual design elements on human-information interaction, particularly in the blogosphere. This knowledge is important for bloggers with a stake in sustaining or increasing their number of readers. Bloggers can choose to apply the results of this study to their situations, or they can use this study as a template. The following observations are a product of the potential use of this study and the results of this study.

1. Overall there were more non-comment interactions than comment interactions, which implies that users are more likely to interact with posts when they do not have to leave a comment in order to do so. While some bloggers may prefer comments to interactions with less detailed feedback, non-comment interactions could be better feedback than absolutely no feedback. Non-comment interactions also have the ability to increase access to the post, as likes and shares can be visible to the user's friends, family and other associates on social networking sites like Google+ and Facebook. This can have a profound effect since "people in the new information age make choices based on the opinions of their peers and friends," (Cha et al, 2010, p. 2). Greater exposure could mean greater likelihood of receiving comments.
2. Images can be beneficial. While the results of this study suggest that blogging platform has an effect on the impact image size has on user interactions, trends in the data suggest that posts with images were more likely to have user interactions than posts without images across both platforms.

## Conclusion

While this study has produced results and ideas for ways to increase user interaction, it has also exposed many other areas for further study. Further dissection of the effect of variables like community and blogging platform would provide more targeted, low-level data in this area. However at a high-level, data from this study suggest that WordPress posts with images had higher numbers of comments and other measurable user interactions than posts with no images.

There are a variety of reasons bloggers want to increase user interactions. User interactions can give the blogger a sense of security, letting them know that people are actually reading their blog. They can also let bloggers know more about what prompts users to feel connected to their content, whether to keep them coming back or to simply offer the comfort of validation to a blogger who might otherwise feel alone in the world (Ko, 2012). Bloggers can start or participate in a dialogue with comments, likes and shares. Bloggers can also advertise products to their friends and family with comments, likes and shares. In an area like blogging, which is a function of social networking, integrating the product into the user's ordinary environment via the user's social interactions can compel the user to engage with the product more directly (Lin and Huang, 2006).

Increasing user interaction not only has the potential to increase profit, popularity and fame for bloggers (Ko, 2012), but also provides useful statistics for bloggers and companies to set and evaluate business goals. The number of user interactions can be a useful key performance indicator and can thus help shape the product. Users can also

shape the product with qualitative interactions like comments and shares. Users can describe their feelings in elaborate detail with comments, and shares can provide useful information about the user's response if taken with the context in which they have shared the item. Quantitative interactions such as "likes" can still have some qualitative value. While a simple one-click interaction such as a "like" does not necessarily provide explicit qualitative information about a user's response, a "like" can indicate that the user had an affective response to the content. Regardless of which of these benefits the blogger is seeking, user comments and non-comment interactions add value to the web community as a whole. Public user interactions with blog posts foster communication and help build the enormous network that is the world-wide web. They also add to the documentation of the collective history of the world. Thus, including images in blog posts does not only contribute to the goals of the organization or individual blogger responsible for the blog post. Including images in blog posts contributes to knowledge, information, and communication within the human community.

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