

Digital Public Library of America Service Hub Social Media Usage Analysis

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Introduction

Much research has been conducted on the use of social media by academic libraries and digital libraries in order to promote collections. Little has focused exclusively on the social media efforts involved in a national or global digital library built by distributed metadata aggregation of many local organizations' records. None have examined the social media efforts by the Digital Public Library of America (DPLA) and its many contributing organizations, known as hubs. In order to attempt to fill this void in the research, this paper examines the social media of a number of organizations that contribute records to the DPLA, known as hubs, in order to see if there are any trends or common strategies that hubs deployed in social media that may reveal new information about social media usage, digital collections promotion, and/ or outreach by organizations involved in a national distributed digital library.

Founded in 2013, the DPLA was modeled on the Europeana Library and like Europeana, relies on an immense network of local provider institutions across a vast geographic region. The DPLA gathers standardized metadata records provided by local contributors from thousands of providers and making them available in a single online catalog while providing links back to original records hosted by the provider institutions. The DPLA accomplishes this through intermediate metadata record aggregation by organizations that harvest and provide records from institutions for a specific organization or a geographic region. There are two types of hubs: content hubs and service hubs. Services hubs are state-wide or multi-state collaborative aggregation initiatives that also typically provide outreach, training, and promotion initiatives for their members. Some examples of service hubs include the Plains to Peaks Collective, which harvests records across the states of Colorado and Wyoming or PA Digital, which harvests records across the state of Pennsylvania. Content hubs on the other hand, are discrete institutions that do not necessarily need to aggregate their metadata in order to provide it to the DPLA from a single feed. Some examples of content hubs are Washington State University Library, the New York Public Library, and the Smithsonian Institution.

On a more immediate note, in 2019, the Illinois Digital Heritage Hub (IDHH), a metadata aggregating entity known as a Service Hub for the DPLA entered the outreach and promotion phase of its project lifetime. At this time, staff are considering social media as a component to the outreach and marketing push and seek to understand how digital libraries and other digital resource sharing projects develop, maintain, and grow a social media presence. In order to better understand the history of social media use by digital library initiatives, the IDHH conducted a review of literature and discovered

- 1) The benefit in promoting the digital library, collections, items, events, etc. through social media
- 2) Importance of developing a social media strategy for most effectively developing content and engaging users
- 3) Significance of taking different approaches to different social media platforms and considering different audiences that use each and coordinating content sharing among them
- 4) Importance of understanding user community in order to effectively engage them and facilitate productive engagement and interaction, such in the form of comments, likes, shares, re-tweets, re-pins, etc.

Next, the IDHH examined the social media presence of 27 of the DPLA's hubs, including all 25 service hubs actively providing content to the DPLA as of February 2019. Early analysis revealed that a majority of hubs surveyed have a social media presence in addition to or other than a blog. 16 of 27 surveyed have more than one social media account, such as Twitter and Facebook, not including blogs. Further analysis revealed similarities of usage, frequency of updates, and levels of user engagement across several platforms, such as Twitter and Facebook, with big differences in these categories across others (such as Twitter and Pinterest). Analysis revealed that several hubs have stopped updating one or more social media accounts, adopting newer more popular platforms, abandoning others that have lost ground, and/ or focusing attention elsewhere. Furthermore, a few hubs do not have dedicated social media and, instead, make use of their parent organizations' accounts, such as a state or academic library's social media.

Across many hubs, some trends are apparent. Twitter is the most popular choice among social media platforms with 19 of 27 hubs surveyed actively or formerly tweeting. Facebook is second with 15 active accounts. Other platforms used by hubs include Tumblr, Instagram, Pinterest, and Flickr, though only a handful of hubs rely on these platforms. Content generally does not vary significantly across the several social media accounts; most hubs with multiple social media accounts share the same general content in each platform on or around the same date and time with minor tweaks appropriate to the specific platform (such as shortened versions of text in Facebook posts for Tweets in order to adhere to Twitter's strict character limits). Most social media feeds received a good deal of interaction from users, in the form of likes, retweets, shares, re-pins, reblogs, etc. but very few consistently sparked comments by users and even fewer saw interactions among users or users and staff. While service hubs are primarily concerned with digital object metadata aggregation, most of their social media accounts demonstrate that digital object sharing is only a part of their content and priorities. Only Tumblr, Pinterest, and Flickr accounts are consistently devoted to almost entirely digital object or collection sharing. Other social media accounts are dedicated to this and other content, such as sharing information useful to hub providers or users, promotion of events, projects, or products, posts based around exigent events such as holidays or important moments in history, or posts purely for entertainment.

Literature Review

Although sharing digital objects was not hubs' only usage of social media, it was the most common usage and in line with one of the most common uses for social media by digital libraries, as observed by Shiri and McDonnell (2011), Xie and Stevenson (2014), Reilly and Thompson (2017), and Bosire-Ogechi (2018). This sharing, which includes posting images, audio, and/ or links to digital objects from digital libraries, is generally done in order to gain a wider or different audience than that afforded by the digital library in which the digital objects reside. This is especially true of media-sharing platforms like Flickr, Pinterest, and Tumblr. Content may be shared and curated by digital library staff or by users, either through social media enabled digital libraries (see Gu and Widén-Wulff (2011), McDonnell and Shiri (2011), Xie and Stevenson (2014), and Bosire-Ogechi (2018)), or through non-professional users or digital library staff sharing indirectly, by copying links to their feeds or walls. However, rather than content sharing, libraries, including digital libraries, tend to use social media for other purposes.

Xie and Stevenson (2014) report four primary uses:

- 1) providing general more-or-less static information like physical or digital locations and policies
- 2) providing new information/ updates like announcements and events
- 3) marketing and promotion
- 4) peer-to-peer connection.

By far, the first two categories, which may be summed up as knowledge/ information distribution/ communication, are the most common uses, findings corroborated by Ayu and Abrizah (2011), Wan (2011), Chen (2012), Khan and Bhatti (2012), Vucovich, et al. (2013), and Paul (2014). Outreach, promotion, and marketing are arguably more effective uses but are unfortunately more limited in their deployment among academic and digital libraries alike (see Taranto (2009), Starr (2010), Schrier (2011), Khan and Bhatti (2012), and Vucovich et al. (2013)). Library and digital library staff often fall into the information/ knowledge distribution pattern and do not make the most of the unique communication opportunities social media platforms provide, a point that will be returned to in detail below.

Benefits to digital libraries of using social media have been widely discussed. Social media can increase access to (Michel and Tzoc (2010), McDonnell and Shiri (2011), Baggett and Gibbs (2014), Vega and Green (2014), Bosire-Ogechi (2018)) and, in some cases, accessibility of (Cho (2013)) collections. McDonnell and Shiri note the wide adoption of and familiarity to social media platforms that will likely "make users feel more comfortable when using the digital library." They also recommend enabling digital libraries with the ability to share and save content with social media and note the opportunities afforded users to be able to discover new information they may have missed otherwise in the digital library itself through social media highlights of a certain digital library.

Numerous studies have shown that posting to social media links, images, or other data related to a digital library can increase traffic to the digital library. Michel and Tzoc noted

substantial increases in traffic to digital collections when images from the collections were posted to Flickr along with links back to the original object. Other studies have shown similar results that regularly posting images on Pinterest (Baggett and Gibbs (2014), Lamont and Nielsen (2015)) and Tumblr (Lamont and Nielsen (2015)), or links on Facebook (Garcia-Milian, et al. (2012)) and Twitter (Starr (2010)) from digital collections increases traffic to these collections. Starr (2010) notes that Twitter was instrumental not only in increasing awareness of the California Digital Library's collections to current users, but attracting a host of new users who may have not discovered the Library without its social media presence. Garcia-Milian, et al. (2012) report that "social networks such as Facebook allow libraries to be proactive in reaching their users", once again, attracting users through Facebook that otherwise would not have been aware of the libraries' digital collections. Cho (2013) describes the migration of one library's video digital library to the social media platform, YouTube. Not only did hosting videos on YouTube increase item visibility and access, it increased the accessibility of collections, introducing closed-caption options for people with hearing disabilities and much quicker loading times for users with slow connection speeds. YouTube in this case, as well as Flickr actually provide the opportunity to host entire digital libraries within a social network, which opens the door to new possibilities like crowdsourcing metadata production, and other opportunities, but also comes with a host of problems related to metadata quality and intellectual property ownership which is beyond the scope of this paper.

While social media has proven to be effective for increasing access to collections, broadening a digital library's user base, and heightening a library or digital library's profile, there are more (and less) effective ways of making use of social media in order to accomplish these and other goals. It's one thing to have one or more social media accounts on which staff post from time to time (a type of profile that Ayu and Abrizah (2011) call a "skater", as in, skating on the surface or edge of engaging content) and another thing to foster a community of users with frequent posts, engaging content and writing, and responsive interaction with users. These objectives are some of what researchers have widely touted as best practices in order to get the most out of social media usage (Harmon and Messina (2013)). First and foremost, much planning must go into creating one or more social media profiles. Starr (2010) lists some of the details that had to be discussed in order to create a Twitter account for the California Digital Library, including goals and scope of the planned content, a code of conduct for users re-tweeting the CDL's content, metadata and media for branding, and a plan on who to follow.

In addition to thinking through what may be considered required metadata before creating a social media presence, it is also important to devise a broader strategy: both a general approach to content and voice and tone on all channels but also more refined strategies for individual platforms. Schrier (2011) denotes several core best practices to incorporate in a social media strategy beyond simply creating a profile and posting content, also writing that is important to follow other blogs, pages, and profiles and to engage with them, such as commenting or re-tweeting in order to build community. Content should be created with users in mind and should only be posted when it is determined what users want. Moreover, social media is not self-contained and that word of mouth and other modes of communication are still important in conveying interest in and directing potential users to sites. Finally, users should be allowed to post, comment, and or re-tweet on social media and staff should be prepared to

respond promptly, despite the staffing time required both for responding to and moderating comments. Others, like Young and Rossman (2015) also emphasize the importance of two-way communication which ultimately becomes a way of building rapport and ultimately, community on Facebook. Young and Rossman also note that it is essential to post with personality; that is, to adopt a persona on social media that is both comfortable for the staff creating content and engaging with users and one that is also relatable to the user base.

Moreover, different approaches are required for different social media. Most social media users will be familiar with the different formats of Facebook and Twitter; posts tend to be far more verbose than tweets due to Twitter's strict character limit and therefore, content will be different. Furthermore, user demographics vary widely from network to network. Salomon (2013) notes that in order to reach urban undergraduates, the primary demographic at UCLA's Powell Library, library staff moved away from Facebook due to its falling popularity among young people and moved to Instagram, which is also an optimum medium for visually rich digital libraries.

This study builds on the work of Xie and Stevenson (2014) and examines DPLA Service Hub Social media based on four content categories first developed by Xie and Stevenson, information, digital resource sharing, marketing or promotion, and peer-to-peer communication, in addition to two new categories devised by the author, exigent topics and entertainment. This research is especially concerned with examining DPLA Service Hubs with multiple social media presences in order to describe approaches to coordinating managing different social media and to infer some common strategies among hubs in working with several social media channels. Moreover, instances of involving and engaging users in conversation, among themselves or between staff will be examined.

Data Collection Method

Data was gathered on all service hubs records of which were available in the DPLA catalog as of February 2019 in addition to a few of content hubs with a social media presence. For this study, service hubs were the primary focus as they are more numerous with respect to content hubs and more often have social media presences that focus specifically on the content they provide to the DPLA. Often, service hub organizations have particularly robust social media presences, such as that of the New York Public Library (NYPL) and the Smithsonian Institution. However, few posts are dedicated to or built around the DPLA or the material these institutions provide to the DPLA. On the other hand, two other content hubs, each maintain several social media accounts dedicated exclusively to their digital collections, many of which they provide to the DPLA. Only those content hubs that have social media presences based solely on the digital collections they provide to the DPLA, namely, the University of Washington and University of Southern California, were included in this research. Additionally, one service hub's website provides links to social media for the hub's parent institution, the Indiana State Library but does not appear to have its own dedicated social media. While some posts on the the Indiana State Library's website may be related to the DPLA or Indiana Memory, most content does not and therefore, it was excluded from the data.

In order to gather data, a list of hubs was created along with the URLs to their respective websites. Each website was investigated for links to social media, which were also collected. The social media platforms used by each institution, as well as the number of platforms used by each, were recorded. All this data and subsequent data gathered, discussed below, was kept in an Airtable database.

Once links to hub social network pages were collected, these social network accounts were investigated. For the sake of expediency due to the fact that among hubs there were 19 Twitter feeds and 15 Facebook pages, the social media pages of hubs with multiple accounts were prioritized. In all, 12 hubs' social media presences were examined in detail, including most with multiple social media feeds and all with three or more, in addition to a blog. The following data was collected between the dates of February 20 and March 26, 2019 for each social media account for each hub: the page URL; metadata describing the page, such as titles, handles, descriptions, @addresses, mission statements; statistics providing an overview of the page's usage and popularity, such as number of posts, followers, following, viewers; measurements of content such as the number of photos and videos, number of boards (for Pinterest pages), number of posts, tweets, pins, etc.; some measure of an accounts' age such as a join date or date of first post or upload; some measurements of update frequency, such as dates of latest content post, tweet, upload, etc.

It was unfortunately difficult to determine some temporal information from two social media networks, Pinterest and Flickr. None of the hub Pinterest or Flickr accounts had 'date uploaded' metadata visible. Thus, for these pages, it was impossible to record any temporal data directly and several other important derived categories could not be determined, such as metadata relating to update frequency, how much content was uploaded at once, when were item sets and exhibits created, sorting by date, and whether a page is currently being maintained and how up-to-date it is. Flickr at least provides a join date and the age of comment threads on most uploads indicates that much of the content on this social media is several years old, hinting that hub Flickr pages may not be kept up. Unfortunately, Pinterest does not provide even join date so it is difficult to discern the age of sites and how much time and upkeep has done into them. Following up with the institutions and individuals that maintain these pages will be essential for learning more about them. However, the total number of Pinterest and Flickr pages by hubs is only two each. Thus, the low number of sites being maintained by hubs may not justify further investigation.

The purpose of this study was strictly to gather data and make inferences based on the data. Due especially to the small sample size, it was not possible to say whether or not some hubs were more or less successful at their respective social media campaigns. This study cannot and should not make such judgments and certainly should not come across as applauding some accounts or hubs for successes while critiquing others for purported shortcomings. In order to better facilitate a less evaluative and more descriptive project, references to particular hubs have been limited.

Service Hub Social Media Usage Overview

21 out of 27 service hubs examined have some kind of additional web presence in the form of social media, such as blogs, Facebook pages, or Twitter accounts. Among these platforms, Twitter is the most popular, with 19 hubs having a Twitter account and linking to it from their website. Facebook was the next most popular, with 15 hubs maintaining a Facebook page. Blogs came in third at 13 hubs. After that, there is a steep drop in other social media sites, with only 3 hubs providing a Tumblr feed, 3 with an Instagram page, only 2 with a Pinterest page, and only 2 with a Flickr page. The latter is somewhat surprising as Flickr, an image posting and exchange social network, would seem to be a fitting solution for digital collections but whose popularity has fallen off sharply in recent years due to a decline in services offered, especially to free accounts (Pierce 2016) and several high-profile data breaches of user account information from Flickr’s former parent company, Yahoo (Trautman and Ormorod (2017)). Two hubs provide a YouTube channel though only one seems to actively maintain a channel.

Social Media	Total Usage of 27 Surveyed
Twitter	19
Facebook	15
Blog(s)	13
Tumblr	3
Instagram	3
Pinterest	2
Flickr	2
YouTube	1
GitHub	1
Slack	1
None	6

Table 1: Social media platforms and the total number of DPLA hubs among those surveyed that use them.

Some hubs maintain as many as 5 social media accounts. However, it should be noted that this is unusual and due to the large sizes and budgets of these operations. A large number of hubs maintain only two or three social media accounts and six hubs have none, including no blog. The average number of social media accounts among hubs is two, which includes a blog.

Data Analysis Overview

After collecting the larger quantitative figures above, the content of hub social media pages was examined. Content was classified into six categories, four of which are based on Xie and Stevenson's 2014 analysis of digital library social media with the addition of two new categories for posts which did not seem to fit. These categories are:

Information. Posts providing information not related to hub marketing.

Digital Resource Sharing. Posts or tweets about a hub's digital objects or collections.

Marketing and/ or Promotion. Posts or tweets about hub-related events, projects, or programs.

Peer-to-Peer Communication. Comment chains by users and/ or staff on posts, tweets, uploads, etc.

Exigent Topics. Posts based around a particular exigent topic, such as a holiday, historical event, etc. May also be digital resource sharing posts.

Entertainment. Posts mostly for entertainment. May also be digital resource sharing posts.

In order to get a sense of the kinds of interactions common on a page, as well as to understand the kind of time commitment, energy, and attention required in interacting with social media page users, data was then collected describing the interactions between users and content as well as between users and users and staff who maintain a given page. Interactions include user-to-content interaction, such as likes, reposts, re-pins, shares, retweets, reblogs, standalone comments, etc. Other interactions include user-to-user interactions, such as comment chains, as well as user-to-staff interactions, such as users replying to "conversation starters" posted by staff or staff replying to questions or other comments made by users.

Some 90 data points were collected for social media accounts across 11 provider institutions, including 14 categories for Twitter accounts, 14 for Facebook pages, nine for Tumblr blogs, 12 for Instagram profiles, 14 for Pinterest profiles, and 16 for Flickr accounts. Discussions below will focus on specific social media, focusing on a few key data points that generate discussion of the popularity and the how accounts tend to be kept up in terms of the amount of content as well as the frequency of updates. Finally, based on the generalizations made about service hub usage of each social media platform, comparisons will be made among platforms, again, based on upkeep and popularity.

Twitter was the most popular platform among Service Hubs and indeed, there is much more data on Twitter and Facebook (below) than on the usage of other social media platforms. Therefore, there is a bias toward Twitter and Facebook in terms of the amount of data gathered and the evidence behind generalizations about usage.

Moreover, there was some bias in the selection criteria for which service hubs' accounts to focus on. Because the IDHH is interested in comparing the usage of different social media accounts across a single organization in order to examine if and how content across multiple accounts was coordinated, a bias toward particular institutions that have the resources to support multiple accounts appears to be present. This can be seen in such statistics as the early

adoption of social media and the greater amounts of content as well as the higher rates of update frequency across the hubs with more social media accounts.

Twitter

The earliest adopters of Twitter created accounts in 2009, some three years after the social media network was released and several years before the development of the DPLA and, indeed, these organizations formally becoming service hubs. Seven of the 11 accounts examined were created before 2013 the year the DPLA began harvesting content. Several hubs had robust social media presences long before the advent of the DPLA as well as the formation of the other service hubs and their adoption of social media. However, many other accounts have been created more frequently. Among those examined, the most recently created Twitter account went live in July 2017, one of the four accounts created during or after 2013. This indicates that more recent adoption of Twitter less frequent among the sample biased toward institutions with a wider social media presence, but not unusual. The median join date among those sampled was March 2012.

Content on Twitter may come in the form of Tweets or media, such as photos and video. The amount of media varied widely across hubs and interestingly, cannot be attributed solely to the age of the hub; e.g., the age of the hub did not correlate to the number of videos and images uploaded as some older hubs posted less media through their lifetimes than several younger hubs. Two of the 11 twitter accounts examined have posted more than 1,000 photos and videos, representing the highest numbers, whereas four accounts have posted fewer than 100 photos and videos. This wide variance explains the gap between the median (212) and average (340) number of posted media. The number of tweets also varied significantly, with two hubs tweeted over 3,000 times and five others under 1,000. The lowest number is 95 tweets. There appears to be a rough correlation between the age of hubs and the number of tweets, with older hubs tending to have more tweets. However, there are some outliers, indicating a wide variance in the frequency at which Twitter accounts are updated. For example, among the three accounts created in 2009, one has 454 tweets while another has 1993. There was again, a wide disparity between the average number of tweets, 1311, and the median 777.

The number of followers are a way to quantify the relative popularity of Twitter accounts. Three Twitter accounts have more than 2,000 followers, with the most, as of March 26, 2019, of 2437. The fewest has 95 followers. The average number of followers was 1200 while the median was 989. There is not a strong correlation between the number of followers and the age of a hub. For example, the oldest account analyzed had only 706 followers, while the second newest had 989. There is a stronger correlation between tweets and followers and media uploads and followers, suggesting that update frequency plays a role in attracting followers.

Given the number of Tweets and media uploads per hub and the accounts' creation dates, it is possible to calculate the number of days between Tweets which can provide more clues in possible relationships between post frequency and popularity. There is a wide range of average days per tweet, ranging from .72 or just more often than one tweet per day and one tweet in just under 8 days. The average was a tweet per every 3.5 days and the median was every 2.4. Media uploads varied even more widely, with some accounts rarely uploading media

at all or perhaps ceasing to do so at some more in their lifetimes to uploads every other day. The average was one media upload every 22 days whereas the mean was just under every 16 days. The four accounts with the most frequent rates of tweets also had some of the highest numbers of followers, each being in the top five. However, there were some notable outliers. One account with only 365 followers tweeted every two days, whereas another account that tweeted an average of only 7.7 days had nearly 1500 followers, the fourth highest total. Days between uploads are strongly correlated with followers. The accounts with the five highest rates of uploads were also among the most followed. Four of the five accounts with the lowest rates of media uploads also were the four with the least amount of followers. The exception is, once again, the institution with nearly 1500 followers, the fourth highest total, but the lowest rates of media uploads.

It must be emphasized that the above correlations in the data does not prove causation. It is not certain if tweets, media uploads, and followers are correlated and, if so, which stat influences the other or if the stats are multidirectional. For instance, it is not clear if a hub's Twitter account may gain followers from posting more content or if posting more content is a result of gaining followers. Perhaps gaining a large number of followers can make a hub feel compelled to post more content or make it seem more worthwhile.

Other possible influences on popularity warrant examination in further studies, such as the size of a hub's geographic area and the population of that region. However, due to the importance of maintaining anonymity in order to limit subjective evaluation and comparison of hubs' social media presences, this could not be accomplished with this project.

Facebook

Similarly to Twitter, the two earliest adopters of Facebook created accounts in 2009. Eight of the 10 hubs with Facebook accounts created pages before 2013, once again indicating that many hubs had a social media presence before contributing collections to the DPLA. The latest Facebook page was created in July 2017. This date is an outlier as there were no accounts created between 2013 and 2017. The average creation date for hub facebook pages was June 2011 while the median date was July 2010.

Facebook content may either be in the form of posts or uploads. Posts may be text and may include links or previews. Media uploads are images and video. Unfortunately, counts of all posts do not seem to display publicly and, therefore, media uploads must suffice as the most precise quantitative measurements of the amount of content. The most uploads for any hub's Facebook profile was 1213. This was the highest total by far and the only hub to have over 1000 uploads. The smallest number was only 14. Only two hubs have under 100 uploads. More than half of hubs' pages have about 500.

There are two statistics associated with a Facebook page that help quantify popularity: "likes" and "followers."¹ The institution with the lowest totals had just 100 and about 120,

¹ Users may choose to like a page, which adds the page to the user's liked pages in their profile's 'About' information. Users who like a page automatically follow the page. Following allows the page to show up in a user's news feed. Those who follow without liking a page may wish to receive updates from the page in the news feed but may not necessarily want the page to show up as 'liked' in their About page

respectively. As with the DPLA Hub Twitter account followers, there was a large difference between the average likes and followers (1873 and 1912, respectively) and the mean (1394 and 1408) once again attributable by the wide range of numbers in either category. Three hubs had under 1000 in each statistic and three had over 2000. There are more often more followers than likes among the 10 institution's pages examined. There is sometimes a considerable difference between the likes and people following statistics for a single institution, of up to about 10% more followers than likes.

It is not as easy to quantify update frequency through the readily available statistics for a Facebook page; therefore, it was necessary to examine individual pages and record update frequency, at least across a recent set up updates, from approximately the last six months of the page's updates. The posts ranged from approximately daily, to daily to weekly, to weekly, to weekly to monthly. The median rate of update frequency across the facebook pages was daily to weekly, and seemed to occur slightly less often than Tweets.

As with the Twitter accounts, data suggests that the DPLA Facebook page's popularity is more than just a matter of a page's age. There is not a strong correlation between the age of a service hub's facebook page and its apparent popularity, in terms of likes and followers. Although 7 of the 10 pages are close to the same age, between 8.5 and 10 years old, there is a wide variation of pages likes and followers among them. There is a correlation between higher update frequency and apparent popularity. 5 of the 6 hubs with the most likes and followers update their pages on either an almost daily or a daily to weekly basis. A connection between media uploads and likes and followers is more tenuous. Although the two most liked and followed hubs also have the most media, the page with the third most uploads is only the sixth most popular. Moreover, the third most popular page only has the sixth most uploads.

Tumblr

Tumblr is a microblogging service and social media platform. Typical Tumblr posts tend to be lengthier and more multi-modal than Twitter or Facebook. Three service hubs have maintained Tumblr blogs, although one has not been updated since 2017. The others have been updated as recently as 2019 but content is posted only very occasionally, from monthly to even less often. Without examining individual posts and user interactions, it is difficult to quantify the popularity of these Tumblr blogs, as there are no visible statistics such as numbers of likes or followers. It is clear, however, that the maintenance of at least two of the three blogs has either ceased or waned considerably from regular updates.

Instagram

Three hubs actively maintain Instagram feeds. Instagram allows for posting single photographs along with optional captions with strict character limits. It is known primarily as a

information. Conversely, some users may wish to like the page but not to receive updates from it, and thus like and 'unfollow.' For more information, see Facebook's help documentation:
https://www.facebook.com/help/171378103323792?helpref=faq_content

mobile device application. Created in 2010, it is also much younger than the other social networks discussed above. Given it is difficult to generalize about these hubs Instagrams, the following will summarize the data collected and make some general comments about Instagram as a resource for DPLA service hubs or other digital library services.

All hub's instagram accounts have been created fairly recently. The oldest was created in September 2015 and the latest was not created until November 2018. Follower totals for each hub's feed range from around 40 to just over 900. The number of uploads range from 16 to over 380. The frequency of uploads range from about daily on average, to weekly, to as rarely as weekly-monthly. The oldest account has the most followers and most frequent uploads.

Pinterest

Pinterest is a popular social networking site that allows users to curate content from around the web, known as pins. The creation of a Pinterest board is aided with a social media sharing-enabled digital library.

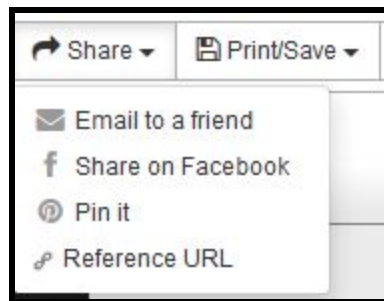


Image 1: Social Media-Enabled CONTENTdm System Interface

Pinterest can increase the visibility of an institution's digital collections by exposing a digital library's resources to an additional group of users through a widely used and highly familiar interface.

Pinterest has seen usage by only two hubs. Generalization about the platforms usage is not possible with such a small sample and therefore, this section will only discuss the data collected from each page. Each page was very different in its amount of content and number of followers. One had about 300 followers, 12 boards, and 150 pins. The other page has over 3000 followers, over 3,500 pins, and what appears to be dozens of boards. Pinterest shows that over 152000 monthly viewers have seen the page. Despite this, this page has not been maintained for about two years.

Flickr

Flickr is one of the oldest online platforms with a social media component. It is primarily an image-sharing platform and is well known for its support of tagging by users. Flickr to some would seem an obvious choice through which a digital library might promote its visual materials to another audience. However, only two hubs are known to maintain Flickr accounts. Being one of the earliest social sharing sites, it is not surprising that each Flickr account is among the

earliest accounts examined in this paper, with one created in May 2007 and another created in June 2010. Each page has some similarities in its statistics, with close numbers of photos (802 to 745), tags (2100 to 1900), geotags (420 to 551), and favorites (17 to 22). The numbers of followers are very different, with 1600 and 116. The number of views between each account is very different as well but both totals are impressive: 6.6 and 1.5 million. Due to the difficulty in determining the dates of the most recent uploads, it is unknown whether these accounts are being actively maintained. It is also not known why accounts with such similar statistics would have such differing results in terms of followers and views.

Primary Content Types and Coordination Across Multiple Social Media Accounts

As discussed above, social media content was divided into six purposes:

- 1) **Marketing/ Promotion** posts or tweets about hub-related events, projects, or programs,
- 2) Posts providing **information** not related to hub marketing,
- 3) **Digital Resource Sharing** which may be sharing based on:
- 4) **Exigent topics** or
- 5) For **entertainment** and finally,
- 6) **Peer-to-Peer Communication**, including comment chains by users and/ or staff.

Depending on such factors as a platform's capabilities and purposes, the standards and protocols that have developed around a content-sharing community, and/ or the standards for interactions enabled and established by a platform, etc., the number of categories of material provided varies significantly across and even within platforms.

Twitter is most often used for marketing and promotional purposes (all 11 accounts), sharing content based on an exigent topic (all 11 accounts) sharing direct links to digital resources (9 of 11 accounts), and sharing content for entertainment (8 accounts). Twitter is less often used purely for informational purposes (by 6 accounts). Peer-to-peer communication is seen very rarely, despite more often than on any other platform, with only one Twitter account showing robust comment feeds (of two or more posts) developing on posted content more often than once a week. Most content across accounts receives several likes and at least 1 to 3 re-tweets.

Facebook's usage is very similar to Twitter. All 10 hubs use Facebook for promotion and marketing, digital resource sharing, and posting content on exigent topics. 8 out of 10 hubs post informative content and material for entertainment. The fact that hubs more often use Facebook to post information rather than Twitter may be a negligible coincidence or it may have to do with the strict character limits on Twitter which make possible more detailed informational posts rather than tweets. Only two Facebook pages were seen to have robust peer-to-peer communications in the form of comment feeds on posted content although there were many pages that often had 10 or more reactions per post and several shares.

All three Tumblr blogs were used for digital resource sharing and posting around exigent topics. They were also often (two of three) used for information sharing, and featured posts

more purely for entertainment. Tumblr was general used as a collection blog among the three hubs that have maintained accounts, and therefore, marketing and promotion of other hub efforts was not a feature. No peer-to-peer interactions such as chains of comments were observed.

All three Instagrams were used for digital resource sharing and sharing around exigent topics. Content was also often posted (on two of three accounts) for entertainment or for marketing and promotion. Only one account shared informational content. Although very few comments were observed across posts, likes and shares were frequent across all Instagram accounts.

As discussed above, Flickr and Pinterest content is exclusively media and media links. Therefore, both Pinterest boards and Flickr accounts are used strictly for 'Digital Resource Sharing,' which may or may not be for the purposes of either entertainment or pertaining to exigent topics. User interactions were not observed on Pinterest but many of the most popular Flickr uploads featured threads of several comments, occasionally in the form of peer to peer interactions.

Among all social media accounts, digital library resource sharing (29) and content based on exigent topics which may or may not be a digital library resource (30) proved to be the most common usages. The next most common usages were for marketing and promotion (23 accounts) and posting content for entertainment (23). Non-promotional information sharing appeared on only 17 accounts and robust peer-to-peer communications occurred regularly on only four accounts.

Coordinating or significantly varying content across platforms across the three most common platforms, Twitter, Facebook, and Instagram was rarely seen. Often, content was re-used and re-posted across platforms. Tweaks are often made either to shorten text to conform to Twitter's character limits or to expand on topics on Facebook or on Instagram that received short shrift on Twitter. Informational content more often appeared exclusively on Facebook rather than Twitter, possibly because of the need for longer posts to get information across which Twitter's character limits do not allow and Facebook has an established community where readers are perhaps more patient and willing to read longer, more text-heavy posts. Proponents of social media best practices, including Young and Rossmann (2015) Harmon and Messina (2013) and Salomon (2013) observe that it is important to tap into the user bases of several platforms while not assuming that content should be the same across platforms nor will users wed themselves to a single platform. Multiple social media feeds with the same content can be efficient for reaching the users of each platform without expending too much effort on content unique to each network but, if seen by the same user, this strategy can send a negative impression. It can be inferred that maintaining multiple social media accounts is already challenging work and it may not be feasible given temporal and monetary resources to vary content.

Note that this survey did not count or seriously examine the amount of content that is shared by hub social media accounts from other accounts on the same networks, such as Facebook shares or Twitter re-tweets. Although this project is more focused on hubs' own social media content, interacting with other social media accounts, such as liking, sharing, re-tweeting, re-blogging, or commenting on their content is an essential component of building a community

of followers and following, and important for the success of a social media campaign, according to Starr (2010) and Schrier (2011).

User Engagement

Users engaging in some way with content, and, even better, staff engaging with users are important for developing and growing a social network community. All social media support some form of interactions from users, ranging from reactions such as 'likes', shares, such as re-tweets or re-blogs, or comments. Although robust peer-to-peer and staff-to-peer engagement was scarce across the different social media accounts, most platforms saw users engaging with specific content in a variety of ways. Note that the interactions discussed here are more particular than interactions with a particular account, such as 'liking' or 'following' a page or subscribing for updates to a Tumblr blog; rather, this activity involves specific content posted by a particular account.

Twitter and Facebook saw the highest rates of interactions among individual posted content. While robust peer-to-peer interactions in the form of comment chains on individual tweets, posts, or media uploads, most Facebook and Twitter pages featured content with 10 or more and occasionally, dozens of interactions, usually in the form of reactions on Facebook or likes on Twitter. This is not surprising considering that Facebook and Twitter remain the two most widely used social media platforms at the time of this writing and pages on these platforms seem to attract the largest and most loyal followings.

User engagement statistics for Instagram, Tumblr, Pinterest, and Flickr are more sparse and will be summarized here. The two main forms of interactions seen on Tumblr blogs are "likes" and "re-blogs," a form of sharing. These are rare across the three hub blogs, with no interactions at all observed on one and only 0-4 total interactions, generally 0-2 each of likes or re-blogs on the two other blogs. Instagram accounts see very few comments but content across the three accounts average between 5 and 10 likes. Comments are rare on Pinterest but re-pinning, a form of sharing, is very common. Pins on either Pinterest account often have dozens of re-pins. There are several ways to interact with Flickr uploads, including by favoriting images and by commenting. The two Flickr pages have dramatically different statistics due to a large difference in their visibility as evinced in the difference in the number of views. Recall that one page has only a little over 100 followers and the other has about 1600; one has over 1.5 million views and the other has 6.6 million, or more than four times that of the other. The page with fewer views and followers also has fewer favorites, with only one image having more than 10 though many images have several thousand views. Comments are almost non-existent. The page with more followers and subscribers unsurprisingly has uploads with many more favorites and comments. Many photos have dozens of favorites and several have over 100. Many photos have multiple comments and several have 10 or more.

Conclusions

Social media adoption is widespread among DPLA hubs. Most hubs (20 of 27) have adopted social media and the use of social media appears to be an element of outreach and marketing efforts for each adopting organization. This can be seen by the fact that, each of the 11 Twitter accounts and 10 Facebook pages and 23 of 31 total accounts across platforms examined in detail feature outreach and promotional material for hub initiatives, projects, events, or other resources.

Twitter (19 accounts) and Facebook (15 pages) were the most widely utilized platforms among hubs, used even more widely than older technologies like blogs (13 sites) and RSS feeds. Twitter and Facebook also saw the most varied content and, besides certain very popular uploads on Flickr, content on Twitter and Facebook were more likely to inspire comments and, albeit very rarely, more complex peer-to-peer or user-to-staff interactions. Twitter accounts and Facebook pages are the oldest social media presences by most hubs with the exception of Flickr and have the most content. This correlates with Twitter and Facebook accounts having the most followers of any social media platform.

Tumblr has seen usage by only three hubs. It is not clear why Tumblr is not more widely adopted by hubs and why the updates from hubs have ceased or fallen off; however, it is also worth noting that many hubs have blogs with platforms such as WordPress or Blogger. It may be that hubs choose these platforms instead of Tumblr; however, the discussion of blogs and blog platforms outside of Tumblr is beyond the scope of this paper. While two blogs used Tumblr to post longform content, including the lengthiest in terms of word counts across all other social media platforms, one other hub used Tumblr in a manner more similar to a secondary digital library or like the platforms, Instagram, Pinterest, or Flickr, posting images from the hub's collections along with a robust set of tags for each post. Despite these different strategies, the Tumblr blogs show the least interactions by users in terms of views, likes/ favorites, and shares (re-blogs) of any platform.

Instagram has not seen wide adoption among DPLA service hubs. This may be due to the relative newness of the platform; many hubs were established long before and began to develop a social media presence before the Instagram was widely available and long before it became available with a website interface for non-mobile devices in 2012. Some (CITE) tout it as a way for digital libraries to users who are not likely to go to a digital library website. Instagram may also appeal to younger audiences. However, the platform has some limitations for digital libraries, such as only allowing for the posting of one image at a time and not allowing for active links in a post, making it difficult to link back to DPLA or local catalogs. Perhaps due to different usage norms among Instagram users, content posted by hubs on Instagram generally receives more likes and views than likes or reactions on Twitter or Facebook, respectively. It is also worth noting that these Instagram accounts have far fewer followers than Facebook or Twitter pages maintained by the same organizations, as few as half. However, there are even fewer comments on Instagram content than on Facebook and Twitter.

While sharing digital library materials seemed to be the most common usage of social media by DPLA hubs, the usage of platforms exclusively for uploading and posting media, namely Pinterest and Flickr, was very low, with only two Pinterest and Flickr accounts each associated with hubs. Though this may be coincidental, it is clear that hubs more often opt for a more versatile platform such as Facebook or Twitter for sharing other types of content that may be important to a hub and its mission, rather than platforms that are more exclusively for media sharing like Pinterest, Flickr, or Instagram, above. Moreover, the lack of adoption of Pinterest and possibly Flickr and Instagram have been similar to reasons outlined in case studies of Pinterest usage by digital library staff.² Curating content in services that operate like additional digital libraries may feel to some like double work, requiring many of the same steps as curating a digital library, such as linking or uploading material and creating metadata for individual items, collections, and other aggregations.

Encouraging user engagement, in the form of posting interesting content, starting or perpetuating conversation, is described by library social media experts as an essential factor in maintaining and growing a social media presence, and more importantly, a community of engaged followers as noted by Shrier (2011) and Young and Rossman (2015). However, Lamont and Nielsen (2015) have shown that it can be difficult to meaningfully engage in conversation with users as many users may lose interest if their comment does not soon result in a reply or if another comment does not soon follow. Unfortunately, most digital libraries do not devote staff exclusively to social media management and replying to comments even only during business hours can be time consuming and distracting from other responsibilities. Therefore, it is not surprising that few comments are seen by hub account administrators across all platforms, with a few rare exceptions. Some attempts to spark conversation, such as posting thought provoking questions along with a media link or upload, have been observed across several accounts, mainly on Twitter and Facebook. It is not clear how successful this strategy is when compared to simply posting interesting media content.

In regards to popular content, certain content shared from digital library collections consistently saw the most interactions. The most popular photographs on one Instagram account shared a few common features. They were all very exigent, such as a post relevant 'on this day in history,' a particular very recent local, national, or international news event, and/or a national or international holiday. The most popular posts also made use of one or more 'hashtags' or '@ mentions.' The most popular images in terms of views, favorites, and comments on Flickr were female nudes and women in bathing suits which were often accompanied by lewd comments. More research needs to be conducted into this but images that may generate a sexist or even pornographic interest and response from certain users should be handled and uploaded with care.

This introduces another element of user engagement somewhat beyond the scope of this paper: comment moderation. Despite the staff time required, especially among popular pages, moderation of comments is important, especially for insuring the highest level of safety on a social media page for people in more vulnerable populations, along with preventing or, at

² For critiques of Pinterest usage by digital libraries, see especially Baggett and Gibbs (2014) and Lamont and Nielsen (2015), also Reilly and Thompson (2017) and Thornton (2012).

least, reducing trolling. More on this topic warrants another paper; suffice it to say that unmoderated comments can, at best, reflect poorly on an organization's reputation and at worst, cause pain and harm to other social media users. Comment moderation: it is a thing and must be done.

Bibliography

- Ayu, A. R. R., & Abrizah, A. (2011). Do you Facebook? Usage and applications of Facebook page among academic libraries in Malaysia. *International Information & Library Review*, 43(4), 239–249. <https://doi.org/10.1080/10572317.2011.10762906>
- Baggett, M., & Gibbs, R. (2014). Historypin and Pinterest for Digital Collections: Measuring the Impact of Image-Based Social Tools on Discovery and Access. *Journal of Library Administration*, 54(1), 11–22. <https://doi.org/10.1080/01930826.2014.893111>
- Bosire-Ogechi, E. (2018). Social Media, Social Networking, Copyright, and Digital Libraries. In T. Kwanya & A. Tella (Eds.), *Handbook of Research on Managing Intellectual Property in Digital Libraries* (pp. 37–50). IGI Global. Retrieved from <https://www.igi-global.com/gateway/chapter/188542>
- Chen, D. Y. T., Chu, S. K. W., & Xu, S. Q. (2012). How do libraries use social networking sites to interact with users. *Proceedings of the American Society for Information Science and Technology*, 49(1), 1–10. <https://doi.org/10.1002/meet.14504901085>
- Cho, A. (2013). YouTube and Academic Libraries: Building a Digital Collection. *Journal of Electronic Resources Librarianship*, 25(1), 39–50. <https://doi.org/10.1080/1941126X.2013.761521>
- Garcia-Milian, R., Norton, H. F., & Tennant, M. R. (2012). The Presence of Academic Health Sciences Libraries on Facebook: The Relationship Between Content and Library Popularity. *Medical Reference Services Quarterly*, 31(2), 171–187. <https://doi.org/10.1080/02763869.2012.670588>
- Gu, F., & Widén-Wulff, G. (2011). Scholarly communication and possible changes in the context of social media A Finnish case study. *ELECTRONIC LIBRARY*, 29(6), 762–776. <https://doi.org/10.1108/02640471111187999>
- Harmon, C., & Messina, M. (2013). *Using Social Media in Libraries: Best Practices*. Lanham, MD, UNITED STATES: Scarecrow Press. Retrieved from <http://ebookcentral.proquest.com/lib/uiuc/detail.action?docID=1126493>

- Khan, S. A., & Bhatti, R. (2012). Application of social media in marketing of library and information services: A case study from Pakistan. *Webology*, 9(1), 1–13.
- Lamont, L., & Nielsen, J. (2015). Calculating value: a digital library's social media campaign. *The Bottom Line*, 28(4), 106–111. <https://doi.org/10.1108/BL-07-2015-0010>
- McDonnell, M., & Shiri, A. (2011). Social search: A taxonomy of, and a user-centred approach to, social web search. *Program*, 45(1), 6–28. <https://doi.org/10.1108/00330331111107376>
- Michel, J. P., & Tzoc, E. (2010). Automated Bulk Uploading of Images and Metadata to Flickr. *Journal of Web Librarianship*, 4(4), 435–448. <https://doi.org/10.1080/19322909.2010.526397>
- Paul, K. (2014). SOCIAL NETWORKING: A POWERFUL TOOL FOR THE LIS PROFESSIONALS IN DIGITAL ERA. *ASIAN JOURNAL OF MULTIDISCIPLINARY STUDIES*, 2(6). Retrieved from <http://www.ajms.co.in/sites/ajms2015/index.php/ajms/article/view/366>
- Pierce, D. (2016). Uploading Photos to Flickr Is No Longer Free, So Bye Flickr | WIRED. Retrieved July 6, 2019, from WIRED website: <https://www.wired.com/2016/03/time-give-flickr-everybody/>
- Reilly, M., & Thompson, S. (2017). Reverse Image Lookup: Assessing Digital Library Users and Reuses. *Journal of Web Librarianship*, 11(1), 56–68. <https://doi.org/10.1080/19322909.2016.1223573>
- Salomon, D. (2013). Moving on from Facebook: Using Instagram to connect with undergraduates and engage in teaching and learning. *College and Research Libraries News*, 74(8), 408–412. <https://doi.org/10.5860/crln.74.8.8991>
- Schrier, R. A. (2011). Digital Librarianship @ Social Media: the Digital Library as Conversation Facilitator. *D-Lib Magazine*, 17(7/8). <https://doi.org/10.1045/july2011-schrier>
- Starr, J. (2010). California Digital Library in twitter-Land. *Computers in Libraries*, 30(7), 23–27.
- Taranto, B. (2009). It's Not Just about Curators Anymore: Special Collections in the Digital Age. *RBM: A Journal of Rare Book, Manuscripts, and Cultural History*, 10(1), 30–36.
- Thornton, E. (2012). Is Your Academic Library Pinning? *Academic Libraries and Pinterest*. *Journal of Web Librarianship*, 6(3), 164–175. <https://doi.org/10.1080/19322909.2012.702006>
- Trautman, L. J., & Ormerod, P. C. (2017). Corporate Directors' and Officers' Cybersecurity Standard of Care: The Yahoo Data Breach. *American University Law Review*, 66(5), 1231.

Vega, L., & Green, J. (2014). Social media advocacy: Pinterest as a marketing tool for special collections libraries [Text]. Retrieved December 11, 2018, from <https://www.ingentaconnect.com/content/hsp/jdmm/2014/00000003/00000002/art00010>

Vucovich, L. A., Gordon, V. S., Mitchell, N., & Ennis, L. A. (2013). Is the Time and Effort Worth It? One Library's Evaluation of Using Social Networking Tools for Outreach. *Medical Reference Services Quarterly*, 32(1), 12–25.

Wan, G. (2011). How Academic Libraries Reach Users on Facebook. *College & Undergraduate Libraries*, 18(4), 307–318. <https://doi.org/10.1080/10691316.2011.624944>

Xie, I., & Stevenson, J. (2014). Social media application in digital libraries. *Online Information Review*, 38(4), 502–523. <https://doi.org/10.1108/OIR-11-2013-0261>

Young, S., & Rossmann, D. (2015). Building library community through social media. *Information Technology and Libraries*, 34(1), 20–37. <https://doi.org/10.6017/ital.v34i1.5625>

Appendix: Some total statistics

The following data was gathered from late-February to mid-March 2019

Among 11 Twitter accounts analyzed

Join Date

Earliest: March 2009

Latest: July 2017

Average: March 2012

Median: April 2012

Photos and Videos

Most: 1245

Least: 16

Average: 340

Median: 212

Tweets

Most: 3425

Least: 95

Average: 1311

Median: 777

Followers

Most: 2437

Least 95

Average: 1200

Median: 989

Likes

Most: 5476

Least: 17

Average: 805

Median: 215

Frequency of Tweets

Most frequent: Hourly to Daily

Least frequent: Monthly to weekly

Median: Daily to weekly

Among 10 Facebook pages analyzed

Launch Date

Earliest: 1/22/2009

Latest: 7/3/2017

Average: June 2011

Median: July 2010

People who like this

Most: 5635

Least: 107

Average: 1873

Median: 1394

People who follow this

Most: 5941

Least: 119

Average: 1912

Median: 1408

Frequency of Posts

Most frequent: Daily

Least frequent: Weekly to monthly

Median: Daily to weekly

Among 3 Tumblr blogs analyzed

Date of first post

Earliest: 4/23/2012

Latest: 2/23/2017

Average: 6/13/2014

Median: 11/21/2013

Date of latest post (as of March 14, 2019)

Earliest: 4/7/2017 [blog is likely no longer in use]

Latest: 3/6/2019

Average: 7/9/2018

Median: 2/14/2019

Frequency of Posts

Most frequent: Daily/ Weekly

Least frequent: Sporadic (less often than monthly)

Median: Monthly to sporadic

Among 3 Instagram profiles analyzed

Date of first post

Earliest: 7/19/2015

Latest: 11/20/2018

Average: 3/16/2017

Median: 3/9/2017

Date of latest post (as of March 20, 2019)

Earliest: 2/25/2019

Latest: 3/19/2018

Average: 3/11/2019

Median: 3/18/2019

Frequency of Posts

Most frequent: Daily

Least frequent: Weekly/ Monthly

Median: Weekly

Posts

Most: 381

Least: 16

Average: 147

Median: 43

Followers

Most: 911

Least: 39

Average: 366

Median: 148

Following

Most: 420

Least: 1

Average: 171

Median: 92

Between 2 Pinterest profiles analyzed

Monthly viewers

(not enough data)

Followers

Most: 3000

Least: 334

Average/ Median: 1667

Pins

Most: 3568

Least: 150

Average/ Median: 1859

Between 2 Flickr accounts analyzed

Join Date

Earliest: May 2007

Latest: June 2010

Median: November 2008

Photos

Most: 802

Least: 745

Average/ Median: 774

Views

Most: 6,600,000

Least: 1,500,000

Average/ Median: 4,050,000

Tags

Most: 2100

Least: 1900

Average/ Median: 2000

Followers

Most: 1600

Least: 116

Average/ Median: 858