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Influential Players in Twitter Networks of Libraries at Primarily Undergraduate Institutions

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ABSTRACT

This study presents an analysis of Twitter networks from academic libraries housed in medium-sized, primarily undergraduate universities. Previous investigations on this topic have used networks of followers, *i.e.* attention, to show that accounts associated with a library's home institution are the prime influencers in library Twitter networks. That is, they are in key positions to disseminate library-related information. The library itself was found to be positioned to contribute to the institution-wide conversation as well. Networks of followers, however, are susceptible to unwanted influence from inactive users. The present study utilizes networks constructed from tweeting behavior to identify influencers. These networks are, thus, insensitive to inactive followers. The results are compared to those of the previously published follower networks. The behavior networks are significantly smaller and contain far fewer interactions than the follower networks; however, institutional accounts are found to be the principal influencers in these networks as well. Additionally, the social network analysis allows for the quantification of relationship strengths. The closest relationships are between library/institutional and library/student accounts. The former demonstrates that the libraries are active participants in the university-wide exchanges on Twitter and the institutional accounts often include the libraries in their messages.

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INTRODUCTION

Academic librarians have turned to social media in an effort to connect with and provide service to patrons. Such activities are becoming important as users increasingly require assistance while outside of the library (Yeh & Walter, 2016). Twitter, in addition to Facebook, has been almost universally adopted, and there is evidence to suggest that libraries are increasing their tweet volume and gaining more followers (Al-Daihani & Abrahams, 2016; Vaughan & Gao, 2016). Librarians have been quick to investigate their usage of Twitter and evaluate its effectiveness, resulting in a large body of literature. Much of the early research involved case studies of individual libraries or how libraries, in general, use Twitter (Emery & Schifeling, 2015; Vassilakaki & Garoufallou, 2015; Young & Rossmann, 2015). Scholars have now established a continuously evolving set of best practices and a solid characterization of Twitter use by both libraries and patrons. The field is now primed to begin investigating ways to maximize the impact and reach of libraries' Twitter programs; such activities will require data. Indeed, there has been a call for more quantitative research on the social media activities in academic libraries (Boxen, 2008; Dickson

& Holley, 2010; Glazer, 2012; Palmer, 2014) to address difficulties assessing their effectiveness (Cuddy, Graham, & Morton-Owens, 2010). This is an important issue; Mannheimer, Young, and Rossmann (2016) note that such research has the potential to advance the field, improve services, and understand users in an unprecedented manner. Fortunately, the electronic nature of social media often allows for the collection of vast amounts of data, permitting scholars to capture a panoramic view of libraries' social media activities.

In response to such opportunities, scholars have begun using sophisticated data analysis techniques to investigate many Twitter topics, *e.g.* tweet content (Al-Daihani & Abrahams, 2016; Al-Daihani & AlAwadhi, 2015; Stvilia & Gibradze, 2014), characteristics of effective tweets (Stvilia & Gibradze, 2014), and extending the reach of library Twitter campaigns (Shulman, Yep, & Tomé, 2015; Yep & Shulman, 2014). This work concentrates on the latter topic; it builds upon that of Shulman et al. (2015) which identified influential accounts in the networks of Twitter followers for libraries housed in primarily undergraduate institutions. Such follower/followee (F/F) Twitter networks form when accounts follow and are followed by a particular account, *e.g.* the library's. Some of these accounts will follow one another and, additionally, other accounts not directly connected to the library. The result is an often dense web of connections that embodies attention Twitter accounts pay to each other. This knowledge can be used by librarians for

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information dissemination purposes. They can partner with prominent accounts identified via social network analysis to spread their message beyond that of their direct followers (Yep & Shulman, 2014).

The F/F network can provide great insight into a library's Twitter community. There is, however, a limitation associated with identifying influential accounts using such a network. Following on Twitter is a rather passive action. One needs to only click the *Follow* button one time. Once accomplished, their position within the F/F network is determined by who follows whom, regardless of how active they are on Twitter or how much actual interest they maintain in the account to which they connected. Identification of influential accounts using the F/F network does not consider such things. Thus, some accounts, particularly those with low activity, could be identified as important while not being so in practice.

This study aims to sidestep the matter of inactive followers by analyzing a different type of Twitter network, one created using replies and mentions (R/M). In such a network, a relationship is assumed between two accounts when one replies to or mentions another. Either the author has something to say to the other account (replies) or feels that their audience will benefit from a tweet about the other account (mentions).¹ It requires energy to compose a tweet, and the act suggests that the author cares enough to invest the time to do so. For this reason, R/M imply a stronger relationship between accounts compared to the passive action of following (Hansen, Shneiderman, & Smith, 2010). Furthermore, the "strength" of these relationships can be approximated by counting the number of R/M exchanged between two accounts.

Here, we report the analysis of the R/M networks for four academic libraries and identify the influential accounts within them. The home institutions of the libraries are California State University San Marcos (CSUSM), Stockton University² (SU), Coastal Carolina University (CCU), and the University of West Georgia (UWG). These medium-sized, primarily undergraduate institutions were chosen so that the properties of the R/M networks can be compared to those of F/F networks presented in Shulman et al. (2015), which also featured CSUSM and SU. F/F networks map the potential for information flow since they describe attention accounts pay to one another. R/M networks portray actual information flow. They are constructed out of the tweets that are delivering the information. This makes them ideal for studying information dissemination. We find that the most influential accounts, using four definitions of importance, in the R/M networks of these libraries are typically accounts associated with the home institution. Interestingly, these results parallel those reported in Shulman et al. (2015) for the F/F networks of CSUSM and SU. Furthermore, our analysis of R/M networks allows us to identify the account types with the strongest connections. These are library-institutional accounts and student-library.

LITERATURE REVIEW

Twitter is one of the more popular social media platforms. It is used by 36% of online adults aged 18–29, and it is also more prominent among educated individuals (Greenwood, Perrin, & Duggan, 2016). Men and women tend to use Twitter equally (Greenwood et al., 2016; Kim, Sin, & Tsai, 2014); however, some differences arise in academic settings. For example, evidence suggests that more undergraduates follow Twitter accounts of academic libraries than graduate students (Sewell, 2013).

¹ A reply is a tweet directed towards another account. It begins with the Twitter handle of the account one wants to address. Example: @LibraryObiWan are you going to the Star Wars convention? The author is talking to @LibraryObiWan.

A mention contains a Twitter handle somewhere other than the beginning. Example: I heard @LibraryObiWan is going to the convention. The author is talking about @LibraryObiWan. Retweets are considered mentions.

² The Richard Stockton College of New Jersey, described in Shulman et al. (2015), changed its name to Stockton University.

Patrons often use web-based resources outside of libraries (Yeh & Walter, 2016), and librarians are working to deliver services remotely. In terms of social media outreach, Facebook and Twitter are the most popular platforms adopted by academic libraries (Harrison, Burress, Velasquez, & Schreiner, 2017). Kim and Sin (2016) found that students generally use microblogs, such as Twitter, to follow popular trends and obtain news. In a pair of studies aimed at identifying student preferences for library tweets, Stvilia and Gibradze (2014, 2017), established that tweets involving student support and community building are identified as *favorites* most often. Additionally, survey data indicates that operation updates, study support, and event posts are the mostly highly valued categories of tweets by students (Stvilia & Gibradze, 2017).

The use of social media, Twitter in particular, by academic libraries has been well documented. There have been many studies describing Twitter use by libraries, patrons, etc. which outline the brief, yet significant history of the subject. Vassilakaki and Garoufallou (2015) provide a review of the literature, from 2007 through 2013. Del Bosque, Leif, and Skarl (2012) discuss Twitter use by academic libraries and also present a comprehensive review of the early scholarly investigations.

Several studies have adopted a network-based approach to the study of Twitter use by academic libraries (Emery & Schifeling, 2015; Ewbank, 2015; Palmer, 2014; Shulman et al., 2015; Yep & Shulman, 2014; Zhang, Sheu, & Zhang, 2017). Palmer (2014) reported a network of Twitter mentions for a library at an Australian university. His results suggest that increased activity from the library on Twitter is associated with an increase in the number of mentions by users. Furthermore, the investigation determined that institutional accounts were strongly connected to the library account.

In an effort to examine ways in which academic libraries could improve their use of Twitter, Emery and Schifeling (2015) looked towards gourmet food trucks, which have successfully harnessed Twitter to promote their businesses and industry. Food trucks are more active than libraries on Twitter; they post twice as many tweets per year. They are also twice as likely to mention or reply to other users. Food trucks use more hashtags and images, while libraries are much more likely to incorporate URLs into their tweets. The study also found that academic libraries do not generally communicate with one another. They mention other institutional accounts most often. Furthermore, it appears that libraries are beginning to adopt some of the successful techniques utilized by food trucks and are increasing their interactions and community-building efforts on Twitter, though it is certainly not suggested that libraries are learning from the food truck industry. They are simply starting to incorporate effective practices already in use by the trucks.

As described above, Shulman et al. (2015) presented the results of an analysis on F/F networks from two medium-sized, primarily undergraduate institutions. They measured the influence of each account in the networks, allowing them to rank the accounts by importance and identify the types of accounts that possess the most influence in the F/F networks. Three metrics, each associated with a unique definition of importance, were used in the study. The results were unanimous; each metric identified accounts associated with the parent institution as the most influential in the networks, e.g. accounts from a department, program, and office at the universities. Interestingly, these accounts were not the most active or those with the most followers. Similar results found from the two libraries suggest that these results are general.

Yep and Shulman (2014) demonstrated that these influential accounts can be harnessed by libraries for information dissemination purposes. By forming partnerships with the accounts and agreeing to share information, the library can significantly increase exposure beyond their direct followers. Furthermore, the library, as an institutional account itself, will help the broader community of its college or university by passing relevant information from its sister accounts, thereby increasing the value of its account to its followers.

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