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Analysis of Academic Libraries' Facebook Posts: Text and Data Analytics

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ABSTRACT

This research analyzed a dataset of academic libraries' posts on Facebook. It applied a text and data analytics approach to a dataset collected from the Facebook posts of academic libraries at the top 100 English-speaking universities, as listed by the 2014 Shanghai World University Rankings. The dataset is from a two-year posting history of 18,333 unique posts, 113,621 likes, and 3401 comments. Less than a quarter of the libraries had more than 2000 post-related likes, and only seven received more than 100 comments on their postings. Content analysis identified the most prevalent single word (unigrams), bigrams (two-word sequences), and trigrams (three-word sequences) in high and low engagement content. Semantic analysis identified the semantic categories for posts with high and low engagement. The findings can assist academic libraries in their social media strategies for engagement, marketing, and visibility.

Introduction

Facebook has attracted the interest of academic libraries, which see the potential for engagement and interaction with their users (Witte, 2014). Facebook provides libraries with the opportunity for social interaction and sharing. Phillips (2011) noted that Facebook helps libraries to engage with students. Facebook allow libraries to build relationships and engage with their users (Tan, Hedren, Kiat, & Somasundram, 2012). To measure usage and interaction, Facebook provides data for examining user behavior and the ways in which content affects user engagement (Luarn, Lin, & Chiu, 2015). Academic libraries could benefit from the social data that is available through their Facebook pages.

Chen, Chu, and Xu (2012) claimed that, despite the increasing adoption of social media by libraries, user engagement remains low. Aharony (2012) found that academic libraries do not use Facebook as a discussion platform with their users; rather, they use it to deliver information, suggesting a lack of engagement and interaction. Academic libraries are being pushed to use effective initiatives to engage their users with their resources and services (Tan et al., 2012). Indeed, Facebook is an effective platform for doing so (Houk & Thornhill, 2013). According to Stone (2014), social media can help to increase interaction and improve engagement.

According to Houk and Thornhill (2013), an analysis of comments and the number of likes on posts (to assess engagement and interaction) provides a clear mechanism for measuring and analyzing Facebook usage. Therefore, this study employed text and data analytics to analyze

academic libraries' posts and measure their engagement and interaction. The methodology and research findings will contribute to literature on data and text mining and the development of best practices for Facebook posting by academic libraries.

Related literature

Facebook use in academic libraries

Facebook is one of the essential social media platforms used by academic libraries. Library and information science researchers have been studying academic libraries' use of Facebook since its emergence. For example, Aharony (2012) conducted an exploratory analysis of Facebook use in academic libraries that investigated the use of different sections of Facebook and the content of posts. Aharony recommended that academic librarians use various Facebook applications effectively to attract more users. Wan (2011) claimed that Facebook has great potential for library outreach, which makes it a useful tool for academic libraries to employ to reach more potential library users. Since that time, an increasing number of libraries have adopted Facebook.

The level of engagement of users with academic libraries' Facebook posts is an indicator of good or bad practices. Engagement can be measured by a simple count of comments and likes. Glazer (2012) noted that number of comments or likes on Facebook posts of academic libraries is a major indication of engagement. Gerolimos (2011) found that, of the 3513 posts from 20 academic libraries in his study, 2228 received no feedback at all and 3191 received no comments. This

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suggests that public engagement with the content of Facebook posts in academic libraries is very low. As [Glazer \(2012\)](#) noted, likes on a Facebook page can be used to measure interaction, as they express user engagement with the original post. Furthermore, [Gerolimos \(2011\)](#) stated that content with photographs attracted more likes and comments. One of the recommended engagement mechanisms is to post promotional updates about library resources and services ([Parvin, 2017](#)).

[Tan et al. \(2012\)](#) conducted a study of 82 academic libraries' Facebook pages across 52 Asia-Pacific universities. The study investigated the content and popularity of the Facebook pages. The results showed that 83% of the interactions were likes of posts, where the remaining interactions were comments. [Ayu and Abrizah \(2011\)](#) studied Malaysian academic libraries' Facebook pages to identify best practices for use and concluded that these libraries are using their Facebook pages for marketing and creating awareness of library services to their users.

[Houk and Thornhill \(2013\)](#) used data collected from the Facebook page of a health sciences library to determine best practices for posts. The study explored user engagement with the library posts. Increased posting frequency was correlated with more page likes and more user engagement. The type of post content also considerably increased user engagement with the library's Facebook page, with multimedia posts drawing the most interest from users. The study highlighted how Facebook Insights data can be used to capture statistics about user trends and as a basis for best practice posting guidelines for greater user engagement. [Winn, Rivosecchi, Bjerke, et al. \(2017\)](#) investigated user engagement at four academic libraries in Montreal, Canada. The level of user engagement was measured by likes and shares over a specific period divided by the number of posts. This study demonstrated the potential of social media data for assessing library users' engagement with libraries.

Text and data mining in academic libraries

Data mining is the process of knowledge discovery of patterns from data ([Han, Kamber, & Pei, 2012](#)) and the identification of unknown or hidden information ([Siguenza-Guzman, Saquicela, Avila-Ordóñez, et al., 2015](#)). Text mining, on the other hand, is a collection of methods to uncover relationships in a large collection of unstructured text and to extract information and discover new knowledge ([Zhang & Gu, 2011](#)). Text and data mining has been used in library and information science for bibliometric studies ([Delen & Crossland, 2008](#)) and to improve collection development in academic libraries and enhance research support of faculty ([Gao & Wallace, 2017](#)). [Nagarkar and Kumbhar \(2015\)](#) found that the literature on text mining in library and information sciences is rapidly increasing and doubles every five years, indicating its importance in the field.

The importance of text and data mining for academic libraries, in particular, was highlighted in a review by [Siguenza-Guzman et al. \(2015\)](#) of the range of studies that employ this technique. Their review highlights the usefulness of these techniques for academic libraries in understanding the patterns of behavior of library users and staff, and patterns of information and resource usage. Text and data analytics provides academic libraries with insight into real data compared to surveys and feedback forms. [Renaud, Britton, Wang, and Ogihara \(2015\)](#) noted that data reveals patterns of use and correlations between library activities and users' achievements, as well as measuring their contribution to their academic institution's goals. [Okerson \(2013\)](#) demonstrated how libraries can respond to new challenges in this field and understand data to create new knowledge. This will help them to strengthen their collections and information for decision-making processes and enhance their resources and services ([Lone & Khan, 2014](#)). Finally, these techniques “help a library in the collection, analysis, and dissemination of knowledge and information” ([Singh, 2016:160](#)).

Social media are data sources that text and data analytics can investigate in depth. [Olajide and Alao \(2016\)](#) believe that the social

media use of academic libraries can provide a measure of library users' level of engagement by extracting data about posts' likes, shares, and comments. [Al-Daihani and Abrahams \(2016\)](#) demonstrated the power of these analytic techniques using a dataset downloaded from a sample of academic libraries' Twitter accounts to extract data patterns and information in order to understand their use and practice.

However, there is a lack of literature that employs text and data analytics to investigate academic libraries' Facebook posts. We expect that this study, by reporting the patterns of their use, will contribute to establishing best practices for the engagement of academic libraries on social media generally and Facebook in particular.

Study aim and research questions

This study used a text and data analytics approach to investigate academic library posts on their Facebook pages. The research questions were as follows:

1. What extracted data describes the libraries' patterns of Facebook use?
2. Which library content has the highest and lowest engagement?
3. What are the semantic categorizations of the content of posts?

Methods

Dataset collection

This study examined the engagement of users with academic libraries' Facebook posts. The sample was 100 academic libraries in four English-speaking countries (Canada, the United Kingdom, Australia, and the United States), selected from the highest-ranking universities according to the 2014 Shanghai World University Rankings ([Shanghai, 2014](#)). It is assumed that the academic libraries from these top universities will have substantial resources and library users. The sample is sufficiently large to provide enough data for the analysis, and spread across the globe to capture diverse data.

The dataset for analysis comprised 18,333 posts from 100 academic libraries, covering the two-year period from January 2013 through December 2014 inclusively, downloaded on March 25, 2015. There were a total of 113,621 likes and 3401 comments on these posts. [Figs. 1 and 2](#) show a Facebook page and post features.

Dataset processing and analysis

The researchers gathered the Facebook post data using a Microsoft Excel Visual Basic for Applications (VBA) macro to query the Facebook Graph Application Programming Interface (API) version 2.2. In order to gather the needed data, two temporary access tokens were obtained from Facebook ([developer.facebook.com](#)), which provided temporary privileges to download data. The Facebook ID of each library was manually determined and recorded in a spreadsheet to retrieve the correct posts for each library. This process involved finding each library's page manually using Facebook search, manually verifying that the correct library was found, and then recording the relevant library ID in a lookup table in a spreadsheet. The Facebook Graph API returned data in JavaScript Object Notation (JSON) format. Microsoft Excel PowerQuery was then used to flatten the JSON data into tabular format in a Microsoft Excel Workbook. Aggregate statistics were computed using Microsoft Excel Data Analysis Toolpak, Microsoft Excel PivotTables and PivotCharts, and SAS JMP v13. The dataset was downloaded over a 10-day period including the time taken to write the Microsoft Excel VBA code.

Three analyses were conducted—term prevalence (ngram), semantic, and sentiment analysis—as described in the following sections.

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