Selective openness, branding, broadcasting, and promotion: Twitter use in Canada's public universities

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Abstract

Higher education institutions have embraced social media platforms. Yet, little research has examined the characteristics of institutional social media accounts and the narratives their posts construct for faculty and student life. By investigating these topics, researchers can better understand the actual and potential roles of these tools in contemporary universities. This study focused on understanding how Canada's public universities use Twitter, reporting descriptive, inferential, and qualitative analyses of large-scale Twitter data. Findings show extensive variability in participation patterns among institutions. Although rhetoric surrounding Twitter suggests an interactive platform, institutions mostly use it to broadcast information and construct overwhelmingly positive representations of institutional life. While the identified representations are partly authentic, they are also incomplete and misleading. Such representations suggest difficulty for students and faculty seeking to use social media to accurately anticipate campus life or to interact online in these spaces.

Introduction

Digital technologies are increasingly infused into institutions of higher education and envisioned as integral components of the day-to-day operations of the contemporary university (e.g., University of Alberta, 2016; University of British Columbia, 2014; University of Calgary, 2014). Technologies serve many institutional purposes, but perhaps none are as pervasive and flexible as social media. These technologies (e.g., Twitter, Facebook, Instagram, YouTube) allow institutions, faculty, and students to access, create, and share content in a variety of formats (Kaplan & Haenlein, 2010). Twitter in particular has been described in the literature as offering opportunities for participatory engagement enabling new dimensions to learning, collaborative activities, and an informal route for immediate and sustained interaction and communication (Gao, Luo, & Zhang, 2012). As might be expected with these possibilities, Twitter has been widely adopted by higher education institutions and professionals for a variety of purposes including general communications, marketing, teaching, learning, and research (e.g., Dakin, 2015; Gao et al., 2012; Junco, Elavsky, & Heiberger, 2013; Linvill, McGee, & Hicks, 2012; Snelgrove, 2010; Verishagen & Hank, 2014).

While some exploratory research has examined Canadian universities' use of social media in general and Twitter in particular, the literature lacks (1) large-scale investigations characterizing ways Canadian universities use social media, (2) examination of the type of posts receiving the greatest attention, and (3) investigation of the narratives social media posts construct for university life. Addressing these gaps in the literature is important because it allows researchers to under- stand the landscape of Twitter usage in higher education, the areas upon which institutions exert influence and attract attention, and the ways that institutional

actors choose to represent the institution online. This study employed a mixed methods approach, including data mining, descriptive and inferential statistics, and thematic analysis, to address these gaps in the literature.

Review of relevant literature

Contemporary universities are complex organizations impacted both predictably and unpredictably by technology (Lewis, Marginson, & Snyder, 2005). While institutions might develop significant technological innovations – such as launching supercomputing systems that allow geographically dispersed scholars to access and use the same datasets – they may use other technologies in simplistic ways. For example, faculty may use powerful technologies in ways consistent with familiar instructional practices rather than in ways that augment their courses (Veletsianos, Kimmons, & French, 2013). In broader terms, while technology may be interpreted in overly optimistic or overly pessimistic terms, universities integrate it in complicated ways. Conscious of the "messy realities" of technology use in education (Selwyn, 2010), below we explore institutional use of social media, particularly Twitter.

Recent research has examined use of a variety of social media. The term social media refers to digital platforms on which users can create, share, and consume content. Many social media platforms center on profiles around which a user can build a network of contacts. For this reason, social media are often also referred to as social networks or social networking sites. Different platforms encourage different kinds of sharing (e.g., some focus on video, some are anonymous, some allow participation based on a user's current location). Researchers have investigated the use of social media for instructional and learning purposes (e.g., Dunlap & Lowenthal, 2009; Ebner, Lienhardt, Rohs, & Meyer, 2010; Greenhow, Robelia, & Hughes, 2009; Jacquemin, Smelser, & Bernot, 2014; Tay & Allen, 2011), and other uses which include regulating student athlete use (Epstein, 2012), coordinating recruitment and admissions (Uversity, 2013), raising funds (Council for Advancement & Support of Education, 2014), supporting learners' adjustment to university (Ruud, 2013), and maintaining general communications and marketing (Constantinides & Zinck Stagno, 2011; Nyangau & Bado, 2012). Scholar's use of social media has attracted extensive media attention (e.g., Grusin, 2015; Guarino, 2014; Herzog, 2015; Jaschik, 2015), and researchers have investigated this topic as well, suggesting positive contributions to worthwhile forms of scholarship (Greenhow & Gleason, 2014) and identifying the challenges and conundrums that scholars face when they use social media (Veletsianos & Kimmons, 2013).

However, less is known about the general patterns of use of central and official institutional Twitter accounts. Twitter is a platform of interest because it is used widely at institutions of higher education. For example, one study noted that over 84% of institutions of higher education have at least one Twitter account, mak- ing the platform one of the most popular social media tools used by universities (Barnes & Lescault, 2013). Our review of the literature suggests that institutions' use of social media seems fairly limited, typically focused on institutional branding and recruitment. Studying 106 Canadian universities, Bélanger, Bali, and Longden (2014) collected data from both Twitter and Facebook over six months to explore how universities use social media to manage and promote institutional brands and

identities. They found that the majority of institutions employed a "campus news feed" strategy for Twitter, broadcasting information concerning campus news and events while demonstrating keen awareness of conveying the institution's brand. Universities focused on academic excellence often tweeted about faculty and student research and accomplishments; those seeking to attract attention to the campus experience more frequently tweeted about student life and events. Using Twitter to promote and market an institutional brand seems nearly universal for higher education institutions. In a research brief aimed at using social media for student recruitment and retention, Qing and Geraci (2012) advocated incorporating Twitter as part of a broader digital strategy. Bélanger et al. (2014) noted that "just like any other marketing campaign, the baseline goal for social media marketing remains the same – to build a positive brand that attracts a larger number of cus- tomers, students in this case" (p. 25). Studies examining Twitter use in other countries reported similar results (Kimmons, Veletsianos, & Woodward, 2017; Palmer, 2013; Yolcu, 2013). This perspective considers social media as marketing and recruitment tools, not the collaborative, expansive learning tools proposed by enthusiasts.

Despite the fact that social media allow users to interact and communicate, the literature suggests that universities use Twitter primarily as a broadcast medium. One study found that the majority of tweets sent by institutions (75%) were meant as one-way communications to broadcast information to stakeholders (Bélanger et al., 2014). Another study showed that 113 US colleges and universities gener- ally used their official Twitter accounts as a type of news feed to broadcast to a generic audience (Linvill et al., 2012). Similar studies suggested the same is true for Australian and Turkish institutions (Palmer, 2013; Yolcu, 2013).

The authors of these studies have noted that using Twitter primarily to broadcast information means that universities are not using the interactive affordances of social media. In addition to tweet responses, Twitter provides interactivity through sharing links, retweeting a post, including hashtags (#), and using the @ symbol to cite or signal specific users – all shown by prior research to be rarely used by universities. Despite the potential for universities to initiate conversation on Twitter, a study of 155 US universities' institutional tweets posted over a two-week period ($n = 1550$) found that the majority of institutions neglected to build relationships or genuine dialog with the public (Beverly, 2013). Similarly, another study found that only 28% of Canadian universities used Twitter to interact with students (Bélanger et al., 2014). Thus, the potential of interactive relationships to attract and retain students (Qing & Geraci, 2012) has remained largely unrealized.

This paper addresses a number of weaknesses in the current literature. First, the reports in the literature describing Twitter being used as a marketing-oriented tool become more significant when contextualized in terms of the ways stu- dents use online information to make decisions regarding university attendance. Importantly, one study found that international postgraduate students commonly used social media to investigate student life at prospective institutions, making application and enrollment decisions based on such information (Galan, Lawley, & Clements, 2015). If students use social media to learn about university life, we wonder how university life is structured and narrated by universities' official social media accounts and whether this narrative is accurate. Furthermore, although current research investigates social media uses and types of shared posts, we were not able to locate studies identifying which posts received the most user atten- tion. We

also could not find studies identifying determinants of impact metrics or providing data for reach and interest of university accounts.

This study was thus undertaken to understand these issues on a larger scale, by asking and answering the following research questions:

RQ1: What are the general patterns of institutional Twitter adoption and use among universities in Canada?

RQ2: What are the general characteristics of tweets, and how are these characteristics related?

RQ3: What factors influence university impact metrics?

RQ4: What narratives do institutional Twitter accounts construct for university life and faculty?

RQ5: What types of Twitter posts receive the most attention?

Theoretical framework

Two theoretical perspectives guide this research. First, we postulate that institutional use of Twitter is influenced by social factors. These factors encourage, restrict,

and shape both the ways that Twitter is used and the information that is posted on the social network. For instance, institutional policies and users' literacies may dictate and influence what is and is not posted on Twitter. This perspective aligns with the social construction of technology theory (Pinch & Bijker, 1984), which suggests that people's actions shape the ways that a particular technology is used. Thus, Twitter does not necessarily lead higher education staff, administrators, or researchers to post particular information, but individuals decide what information to post on Twitter and how to employ it in their day-to-day work. Thus, whether the information emanating from an institutional account centers on student issues, university rankings, research findings, or community news is the result of choices made by actors at a particular institution.

The second theoretical perspective we use to understand institutional uses of Twitter centers around the theory of Acceptable Identity Fragments (Kimmons & Veletsianos, 2014). This perspective theorizes that individuals (a) shape their par- ticipation online in ways that they believe are "acceptable" to their audiences (e.g., peers, employers, family), (b) view their participation to be a direct expression of their identity, and (c) feel this expression to only represent a small "fragment" of their larger sense of self. In the context of institutional Twitter accounts, this the- ory may suggest that the individuals managing the accounts may be strategically revealing facets of institutional identity, but might not be revealing all there is to reveal about the institution. Thus, institutional accounts can be said to structure their online participation in particular ways so as to shape the ways that others view them.

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This study used a series of web extraction and data mining methods to collect user and tweet data from Canadian public universities and employed descriptive and inferential statistical analyses, as well as in-depth qualitative analysis, to yield findings. This methodology consisted of six main steps, which will be explained in more detail below:

  (1) Website identification and homepage extraction.
  (2) Social media account identification.
  (3) Tweet extraction.
  (4) Data cleaning, restructuring, and exporting.
  (5) Quantitative analysis.
  (6) Qualitative analysis.

Website identification and homepage extraction

Using available lists of public universities in Canada (Government of Canada, 2015; Universities Canada, 2015), the research team compiled a spreadsheet listing all

Canadian public universities, with the URL for each university's website home-page. Each university was assigned a unique numeric identifier, and the list was imported into a database for data management and relational queries. Operating from this list, we used a series of web scripts to download the content of each university's homepage: opening the homepage and saving the website's HTML to temporary local file storage for later analysis and retrieval. To avoid unduly bur-dening university servers with unnecessary page loads or retrieving information that institutions consider private or confidential, we limited our data collection to institutions' homepages.

Social media account identification

Once homepages for all Canadian public universities were downloaded, we con-structed another series of scripts to programmatically open each homepage's con- tent and search for information signaling the presence of a social media account. Such information was then parsed to extract any social media account names. The Twitter API (n.d.), a set of tools allowing developers and researchers to pro-grammatically access public data, was then queried to extract user information for each Twitter screen name that had been identified in this way, and these data were stored in the database.

Once we had generated a full list of user accounts from university websites, the research team manually examined each account, coding each as either the primary official institutional account of the university, as a secondary official account, or as an unofficial account. Secondary official accounts included those representing officials or departments within a university (e.g., president, reg-istrar, alumni relations), and unofficial accounts included personal accounts of alumni or news agencies (e.g., *New York Times*). Only primary official accounts were included in this analysis in order to maintain uniformity in university comparisons.

Tweet extraction

Once primary institutional accounts were identified, we used the Twitter API to download available tweet histories for each account. The Twitter API is limited by making only the most recent 3500 tweets for each user available for extraction. Thus, full user histories may be collected for infrequent tweeters, but less time coverage is available for more active accounts. For this study, reliable timeframes of user histories were influenced by the tweet frequency. Only public non-deleted tweets were available for extraction; thus a deleted tweet could not be retrieved but would count against the 3500 limit, so some accounts returned tweet counts lower than this limit. For each tweet, we retrieved all information associated with it, including creation date and language used.

Data cleaning, restructuring, and exporting

Once we had collected and cleaned the data, we calculated summary statistics for each tweet and user (e.g., average tweet per user). To calculate account lifespans, we subtracted the account's creation date from the analysis date. These summary data were also entered into the database. Finally, all data were exported from the database as comma-separated value files for import and analysis in Microsoft Excel, Google Sheets, nVivo, and SPSS.

Quantitative analysis

This study utilized a census approach for data collection, which included data from all Canadian public universities. Descriptive and inferential analysis varied with each research question. Descriptive results were generated directly from the data- base (e.g., queries, string searches), in SPSS (e.g., frequency tables), or in Microsoft Excel (e.g., line charts). Inferential analyses were conducted in SPSS. Further details for these analyses, are provided in the results for each research question.

Qualitative analysis

For Research Questions 5 and 6, we drew on methods of thematic, narrative, and visual analysis to qualitatively examine the media (images and video) in and con- tent of tweets receiving high levels of attention. From the database we extracted tweets that included media and created a spreadsheet containing the university name, unique indicator, content of the tweet, link to the media, and descriptor of the type of media (image, video, or set/album of images). Similarly, we exported tweets identified as receiving a high level of attention out of the database into a spreadsheet. For both spreadsheets we performed initial data coding to identify emerging themes, compared these initial themes against the data, and generated a list of codes to be used. We then imported the data into qualitative analysis research software (nVivo), and, using both manual processes and analysis func- tions of the software, we coded and explored the data to identify categories and clusters of themes relevant to the research questions. We took multiple steps to reduce the incidence of bias and to establish validity in this study, as suggested by Creswell and Miller (2000), including conducting independent analysis by multiple researchers and reporting findings in thick and detailed descriptions.

Limitations and delimitations

As with any study methods, those employed in this study have had a few notable limitations and necessary delimitations. First, URL analysis did not consider the use of URL shorteners, such as *bit.ly* or *ow.ly*. Therefore, the media used in RQ4 did not include all media posted by institutions since messages using a shortener were not

included in the analysis. However, since the results presented below are uniform, we do not anticipate that additional media would reveal additional patterns not identified in this investigation. Second, universities may use multiple institutional accounts that may serve different purposes (e.g., the president's account vs. a registrar account), which means that some institutional activities on Twitter were not fully captured in this analysis of primary accounts. In future research, this limitation can be addressed by comparing multiple accounts for the same institution. Third, the Twitter API restriction allowed only the 3500 most recent tweets for each account to be examined. So even though this sample collected was the largest to date in terms of Canadian institutions, the complete Twitter histories were not available for analysis. Finally, this study focuses only on Twitter, and researchers and practitioners should avoid generalizing the results to other institutional social media platforms (e.g., Facebook) without further research, as the patterns identified here may not be transferrable to other platforms.

Results

The process described above lead us to identify 77 primary institutional Twitter accounts for analysis. Tweet extraction on these accounts returned 145,822 original tweets and 70,792 retweets. For all but a handful of universities, posted tweets spanned at least a full year; for institutions posting more than the Twitter API limit of 3500 tweets in the last year, tweets spanned at least nine months.

General patterns of institutional twitter adoption and use (RQ1)

Many of the identified accounts have been active for several years (max = 8 years), while others were relatively new (min = 2.5 years). On average, the accounts had been in operation for 6 years, beginning in fall 2009. We expected public university Twitter accounts to list English or French as the account's language, with individual tweets written in either. The data supported these expectations, with the majority of accounts listing English (84.4%) and the rest French (15.6%) as their language. Similarly, the majority of tweets were in English (82.4%) and most others in French (16.6%); other languages cumulatively comprised less than .5% of all tweets. Among English accounts, 93.5% of tweets were English, and 5.4% were French. Among French accounts, 95.7% of tweets were French, and 3.4% were English.

On average, universities tweeted 7189 times in their lifespan (min = 617, max = 30,470, SD = 6103.7) at a rate of 1.3 tweets per day or 483 tweets per year (min = 138.4, max = 1067.3, SD = 163.8). This revealed significant use, with high variability between institutions. The most prolific universities are shown in Table 1. With retweets excluded, University of Toronto, Mount Saint Vincent University, University of Regina, and Université de Saint-Boniface were the most prolific, each posting more than 600 original tweets per year.

Table 1. top 10 prolific universities.

#	University Name	Tweets per year	Original tweets per year	Retweet as % of all tweets
1	university of toronto	1067.3	739.7	30.7
2	St. thomas university	1029.5	459.1	55.4
3	Mount Saint Vincent university	821.4	664.6	19.1
4	university of ottawa	774.9	400.4	48.3
5	nova Scotia college of art & design	719.7	492	31.6
6	university of Victoria	709.1	426.2	40
7	university of regina	704.5	611.6	13.2
8	université de Saint-Boniface	695.6	605.4	13
9	institut national de la recherche Scientifique	694	303.1	56.3
10	university of Windsor	614.1	534.5	13

note: Figures and percentages are based on archived tweets.

For interactive tweets (replying to a particular user), University of Toronto was also the most prolific, followed by York University (Table 2). However, though the University of Toronto posted many more replies, the percentage of tweets that were replies was much lower than that of York University (36.9 vs. 62.1%), revealing that the former utilized Twitter primarily for broadcasting while the latter used the platform more often for interacting with users. Both of these levels of interactivity were much higher than the average for all universities (M = 13.6%, SD = 13.6%), suggesting that universities generally use Twitter mostly for broadcasting information rather than for interacting with users.

Interactivity in tweets can also be examined via an institution's hashtags (*#keyword* to classify, tag, or categorize). We consider hashtagged tweets interactive, since hashtags bring tweets to the attention of individuals following particular topics/issues without necessarily following the Twitter account posting the original tweet. A descriptive analysis of hashtags revealed that interactivity also seemed minimal in this context, as the most used hashtags tended to be self-referen- tial (e.g., tweets by a university utilizing the university's own unique hashtag). Although represented in many tweets, self-referential hashtags were not used often between institutions. For example, #mytru, a self-referential hashtag for Thompson Rivers University's community portal, was the most used hashtag in

Table 2. top 10 interactive universities.

#	University	Replies per year	Replies as % of all tweets
1	York university	266.6	62.1
2	Brock university	239	50.7
3	Western university	229.3	46.6
4	university of Prince Edward island	212.5	44.9
5	nipissing university	205.7	41.1
6	Saint Paul university ottawa	141.6	39.4
7	university of toronto	393.6	36.9
8	university of ontario institute of technology	214.2	35.9
9	Queen's university	173.7	35.7
10	lakehead university	89.4	34.8

tweets overall (n = 2085), yet only two other universities used this hashtag in any tweet. Thus, as self-references are the most widely used hashtags, using overall hashtag counts to explore whether conversations are occurring across universities may be misleading.

General tweet characteristics and their relationships (RQ2)

The typical university tweet mentions another Twitter user (M = 63.1%, SD = 21.3%), includes a link (M = 55.2%, SD = 16.8%), and includes at least one hashtag (M = 49%, SD = 18.1%). To examine the relations of these three charac- teristics for original tweets, we performed a series of chi-square tests of inde- pendence. The relationships found for these variables were significant as follows: hashtagging vs mentioning, χ^2 (1, N = 145,822) = 270.3, p < .001; hashtagging vs. linking, χ^2 (1, N = 145,822) = 1416.33, p < .001; and mentioning vs. linking, χ^2 (1, N = 145,822) = 5711.79, p < .001. Thus, tweets that mention other users were less likely to be hashtagged or linked, while tweets with a link were more likely to be hashtagged (Table 3). As universities mention other users in their tweets, they include fewer links and hashtags than otherwise. Conversely, hashtags and links tend to be used together.

A second series of chi-square tests of independence was performed to examine the relation between interaction and each the three above tweet characteristics for original tweets. The relationships for these variables were sig- nificant as follows: hashtagging, χ^2 (1, N = 145,822) = 8647.29, p < .001; linking, χ^2 (1, N = 145,822) = 23,656.53, p < .001; and mentioning, χ^2 (1, N = 145,822) = 32,814.96, p < .001. Thus, interactive tweets were more likely to mention a user but less likely to include a link or hashtag than non-interactive tweets (Table 3).

Factors influencing university impact metrics (RQ3)

Impact metrics consider the reach and interest of a university's tweets. We consid- ered three metrics: followers, favorites, and listed counts. *Followers* refer to the num- ber of users who follow an account, theoretically representing the number of people interested in a university's tweets. This is not a perfect metric of impact because (1) Twitter hosts many bots and fake accounts that follow other users indiscriminately, and (2) following does not mean that the tweets are read or valued. Therefore, we included two additional metrics that represent more specific user evaluations of tweets and accounts. *Favorites* refers to the number of times a university's tweets

Table 3. chi-square likelihood of tweets having shared characteristics.

	Linked (%)	Hashtagged (%)	Mentioned (%)
linked	–	64	48.9
Hashtagged	64	–	47.6
Mentioned	48.9	47.6	–
interactive	20.3	22.4	95.9

were favored or liked, and *listed* refers to the number of times the university's account was placed in a categorization list by another user (for future retrieval).

Because these raw values and their potential predictors exhibited power law (rather than linear) relationships, raw values were converted to logarithmic values. This conversion allowed us to conduct a series of linear regression analyses on the factors without violating the assumption of linearity.

The results of the first stepwise linear regression for *followers* indicated that a model of three predictors explained 80% of the variance in $lg(followers)$ ($R^2 = .8$, F [3,73] = 95.66, $p < .001$). We found that $lg(enrollment)$ ($B = .48$, $p < .001$), $lg(tweets)$ ($B = .61$, $p < .001$) and *hashtag percent* ($B = -0.3$, $p < .05$) significantly predicted $lg(followers)$. Thus, larger universities that tweeted more and used hashtags less frequently in their tweets had a higher follower count.

The results of the second stepwise linear regression for *favorites* indicated that a model of five predictors explained 76% of the variance in $lg(favorites)$ ($R^2 = .76$, F [5,71] = 44.05, $p < .001$). We found that $lg(followers)$ ($B = .77$, $p < .001$), $lg(tweets)$ ($B = .59$, $p < .001$), *url percent* ($B = -0.69$, $p < .01$), $lg(lifespan)$ ($B = -0.87$, $p < .05$), and $lg(following)$ ($B = -0.15$, $p < .05$) significantly predicted $lg(favorites)$. Thus, uni- versity accounts that had many followers, tweeted often, included fewer URLs, had existed longer, and followed many other users would have higher numbers of their tweets favorited.

The results of the third stepwise linear regression for *listed* indicated that a model of four predictors explained 94% of the variance in $lg(listed)$ ($R^2 = .94$, F [4,72] = 259.63, $p < .001$). We found that $lg(followers)$ ($B = .8$, $p < .001$), $lg(lifespan)$ ($B = .81$, $p < .001$), *url percent* ($B = .31$, $p < .001$), and $lg(enrollment)$ ($B = -0.12$, $p < .01$) significantly predicted $lg(listed)$. Thus, university accounts that had many follow- ers, had existed longer, included more URLs, and had slightly smaller enrollments would have been included in Twitter lists more often.

Narratives constructed by institutional twitter accounts (RQ4)

To examine the positioning of students, faculty, and university life, we wrote a script to identify all tweets that included links to visual media (e.g., *gif, jpg, youtube*). This query produced a set of 274 tweets that included images or video. Drawing on the framework used by Mendelson and Papacharissi (2010) in their work around images shared on Facebook, two researchers examined each image and its cap- tion (tweet) on five dimensions: participants (those in the image, those behind the camera, the intended audience), content (subject, event, or activity captured), setting (time and place), message (purpose and content), and code (style and com- position of the image). During the initial data coding we removed tweets that (1) included links to deleted media (2) included links to general collections of images without indicating specific images or video to be shared, or (3) duplicated media in previous tweets. Of the remaining 197 tweets, 35 contained individual images,
41 pointed to collections of images on Flickr (an image sharing website), and 121

pointed to short videos. We were able to identify images and videos being posted by 38 different institutions.

Participants/content/setting

The majority of media contained images of people: primarily students or faculty, with some images of others connected to the university in some way (alumni, community members with university personnel, dignitaries at university events). While students most often appeared grouped with other students or with faculty members, faculty members often appeared alone. This difference was particularly noticeable in images of campus events such as graduation, where faculty mem- bers would be pictured standing alone at a lectern, while students were generally pictured with peers or with faculty members.

Most images depicted some type of university event, the most common by far being graduation ceremonies. Images of other structured campus events were also included: for example, new facility dedication, homecoming weekend, sporting events, and student presentations. Very few visuals depicted the daily business of the university: teaching, learning, and researching. The few images and vid- eos that depicted students and faculty in classrooms or showed students stud- ying were primarily from special events (e.g., a "design jam") or appeared staged (e.g., a tweet showing students using a new "study space"). A number of images shared work being done on campus: either student work (albums and images of fine arts projects) or faculty research (videos of faculty members presenting or being interviewed about their work). These images rarely showed faculty and students together, one exception being videos of faculty sharing their research with students seen working in the background. In images portraying a specific subject or discipline, the sciences and medicine were disproportionately repre- sented, appearing nearly three times more frequently than arts, humanities, or social sciences.

A diverse group of students appeared in the images: nearly equal numbers of males and females, as well as students of a variety of ethnic backgrounds. Diversity was particularly noticeable in convocation albums (both individual students and diverse groups) and in videos with a pair of presenters who were nearly always of different genders and different ethnicities. However, the students in these images were uniformly young; older non-traditional students were not represented.

Faculty members appearing in images and video were much less diverse than the students. Males appeared almost twice as often as females, particularly in sin- gle-subject images (a convocation speaker, a research presenter). Very few faculty members appeared to be of a non-white ethnic background. Though other forms of diversity were not overtly presented in these images, universities included media from events celebrating diversity, such as an album with images of the Pride Parade and videos from a university promoting the Toronto 2015 ParaPan-Am Games (an international event for athletes with disabilities).

The university campus was also a prominent subject in the media. Images or albums of buildings and facilities were common, particularly those that were new or had been recently improved. Also popular were images of nature on campus: The 3000 photos in one university's Flickr stream nearly all depicted the flowers, forests, and outdoor spaces of the campus.

Message/code

The images and videos shared were designed to promote the university and to convey an overwhelmingly positive image of university life. Three themes emerged around this idea: campus attractiveness, positive experiences, and successes.

The buildings, facilities, and natural beauty of the campus were commonly featured. Most of these images, professionally photographed, exhibited a boastful display of facilities or improvements (e.g., a new recreation facility, new turf in a stadium). Even if the campus was not the main subject, it was carefully represented as modern and attractive. In a series of videos from one university in Vancouver, the sun was always shining as students and faculty moved through a variety of campus buildings and spaces. Rain was only shown once in this series, although rain is part of daily life in the area.

The images all represented positive experiences of campus life. Except when posed to look studious, students are all smiling, and their informal activities were enjoyable and positive (e.g., homecoming, an "arts social"). Students were most often depicted in groups, showing positive peer relationships or interacting positively with faculty (e.g., being handed a diploma, working together in a field school). Faculty members were nearly always depicted in professional settings (giving speeches, working in a lab) or in carefully arranged informal settings (e.g., being interviewed while walking and carrying coffee, playing the guitar at a student event).

Examples and success moments dominated these images. Albums and pic- tures from convocation ceremonies were by far the most prevalent. Other popular images and videos revealed successes in sports, dedications of new buildings, or groundbreaking work by faculty members. These images were obviously selected to provide a uniformly positive impression of university life. With one exception, a poster advertising a visit of therapy dogs to combat stress, no references were found to struggles faced by students or faculty. Students were smiling as they spent most of their time, not in classrooms, but enjoying the activities and facilities around the beautiful campus, while faculty members were conducting research or congratulating students on their successes.

Types of posts receiving the most attention (RQ5)

To examine this question, we first operationalized "most attention" to refer to tweets that were retweeted (shared) more times than average. While this analysis could have been conducted using the tweets that were favorited most often,

favorites and retweets exhibited a Pearson Correlation of .66 ($p < .01$), indicating that tweets used for this analysis would be largely the same if favorites instead of retweets were used. We gathered all retweeted tweets from the sample (1156). The highest number of retweets for a single tweet was 1048; on average, tweets were retweeted 34.4 times (SD = 63.8). The 317 tweets that had been retweeted more than the average (35 times) were used for this analysis. Two researchers examined each tweet to identify categories describing them. Four categories were identified: information on changes in the normal operations of the university, tweets related to routine events on campus, tweets promoting the university, and tweets that expressed support for individuals or groups.

Tweets highlighting changes in the normal operations of the university received the most attention (42%). Such tweets included announcements pertaining to campus closures for extreme weather, lockdowns and other responses to danger, or cancellations from strike activities. Informational tweets of this type may have received high levels of attention as they affected the majority of the university community, but we must consider that they related primarily to unusual situations.

The second most popular category of tweets related to routine events on cam- pus (28%), including the start and end dates of terms and exams or the scores of sporting events. This category also included tweets related to extraordinary, often tragic, occurrences at the university, typically gatherings of support for those affected by such events or news releases from the university: for example, "University of NameWithheld in mourning. There will be a communal gathering today at 3 pm at Name Hall."

Tweets promoting the university in some way (22%) also received a high level of attention. Such tweets included celebrations of high-level placements in univer- sity rankings and successes of sports teams. Other popular posts included images that captured the beauty of the campus, tweets that shared awards received and research accomplished by faculty members or (less frequently) students, and tweets that celebrated donations made to the university.

The final category included tweets that expressed support for causes or for indi- viduals (17%). While some of these supportive tweets were directed toward specific individuals or events (e.g., condolences to the families and friends of university students killed at a party), most tweets in this category related to campaigns calling for support of well-known causes. The most numerous were tweets containing the #BellLetsTalk hashtag, for which each retweet earned funds to support mental health initiatives. Most retweets in this category (9% of the 317 tweets analyzed overall) explicitly asked for retweets.

Discussion

We found that the majority of Canadian public universities listed at least one official Twitter account on their institutional homepage, indicating that higher education institutions recognize the need to be present online. Yet in examining

tweets from these accounts, we found institutions using Twitter in limited ways. As previous studies have noted (e.g., Linvill et al., 2012), institutional use of Twitter centers around the broadcasting of information. However, the degree to which Twitter was thus limited varied among universities. In examining the percentages of tweets replying to other users, we found that although many universities primar- ily engaged in what Bélanger et al. (2014) called a "campus news feed" strategy of broadcasting information, other institutions interacted with users more frequently.

In contrast to previous studies (e.g., Yolcu, 2013), tweets from Canadian universities frequently shared links, mentioned individuals, and included hashtags in tweets (cf. RQ2). Yet while these characteristics may suggest interactivity, we found that the majority of hashtags were self-referential, suggesting hashtags were not used for wider conversations. Further, we noted that as universities engaged with individuals through Twitter mentions, their posts included fewer links and hashtags, showing that conversations were focused on the individual and not the community or an Internet resource. Further, we found that university enrollment was the greatest predictor of follower counts, and follower count was the greatest predictor of favorites and listed counts – larger universities have greater impact on Twitter due to their size (cf. RQ3). However, delving deeper into the narratives that institutions constructed for their university life and community, we discovered more qualitative similarities than differences among institutions.

Overall, institutional Twitter accounts seemed to portray an overwhelmingly positive picture of university life. These activities may reflect institutional strategies to manage the narratives that surround them, using Twitter as a tool to highlight and control an institutional identity for the public. As Bélanger et al. (2014) noted, the tweets of these institutions seem to suggest a desire to convey a positive brand to market the university to potential students and other stakeholders. While using Twitter to convey the institution's brand may make sense from a business and marketing perspective, the scholarly and educative implications of this activity are troubling.

Even though the institutional brand that universities craft on Twitter may authentically represent various aspects of the university (e.g., buildings that are beautiful and students who are happy to graduate), such presentation is incom- plete and potentially misleading. Such a tightly controlled representation gives an inaccurate picture of the operations, disciplines, and people of the university. These narratives included no mention of students' challenges (e.g., courses or finances), sessional faculty members' working conditions, or other sociopolitical and economic challenges prevalent in contemporary universities. This distortion becomes especially troubling when contextualized in terms of prior research indicating ways students draw on social media to anticipate student life at institutions they consider attending. Whether deliberate or not, the misconstruction of univer- sity life is concerning and should lead higher education administrators and other stakeholders to pause and consider the ways that this activity may impact students.

Study results showed that institutional Twitter accounts were used predominantly for branding and marketing. As researchers of education, we are compelled to ask: Is this how Twitter *should* be used? Are there uses that would be more productive? If there are more productive uses for institutional social media accounts, which university office should manage them? Should lifelong learning programs and continuing education departments, with a mandate to support public learning, manage social media accounts? Should social media accounts, with their already large audiences, be used in the service of public scholarship to improve Canadian society? Or, rather than aiming to change practice, is this an area that we should examine closer to better understand institutional efforts at branding and marketing? While our results help problematize the use of social media at Canadian institutions, our research does not provide answers to these question. This however, is a rich area for future research. Even if one were to accept Twitter as predominantly a marketing tool, its use primarily for broadcasting is not consistent with the opportunities that the medium provides for interaction and communication. Our results support the findings reported by Waters, Canfield, Foster, and Hardy (2011). We urge the managers of institutional Twitter accounts to reconsider the ways that they use Twitter. Given their large (and potentially diverse) following, institutional accounts have the potential to engage meaningfully with stakeholders and to engender opportunities for valuable two-way interactions, thereby breaking down some of the traditional "ivory tower" dichotomies of university and public life. Beyond its role in branding and recruitment, Twitter could serve educative purposes and facilitate two-way interactions between the institution and members of the public.

Scholars sometimes have difficulty when using Twitter to engage in critical discourse, as some have attempted, and this may be due to the fact that institutions position this platform as a branding and marketing tool. Scholars who use Twitter as a one-way communication tool to promote their research are unlikely to find themselves in trouble. However, scholars who use Twitter to speak out in ways that are not aligned with institutional attitudes may be judged as using this tool subversively. Accordingly, this misalignment might be an impetus for the social media troubles that have faced academics as recently reported in mass media (e.g., Grusin, 2015; Guarino, 2014; Herzog, 2015; Jaschik, 2015).

Finally, it is worth noting that this is a fertile ground for future research. Further exploration in this area could reveal insights into the policies that govern academ- ics' use of social media (e.g., Lough & Samek, 2014) and the ways that social media technologies are expected to impact the education sector as contrasted to the ways that they are used "on the ground." Furthermore, future research could exam- ine the ways that content consumers (e.g., potential students) view institutional social media posts. How are the positive and self-congratulatory messages posted by institutions perceived? Are they having the expected impact? Future research could also seek to generate a better understanding of the factors that produce the most engaging interactions on social media. Such research could help some institutions better leverage social media for branding and, ideally, other purposes.

Conclusion

This research reported on a large-scale investigation characterizing the ways Canadian universities are using Twitter. It also investigated the types of Twitter posts that receive the greatest attention and sought to understand the narratives that Twitter posts construct for university life. Even though Canadian institutions appear to embrace Twitter as an institutional tool, the platform is used as a mecha- nism to broadcast messages. Analysis of the media posted by the institution reveal an attempt to manage the institutional brand and reflect an overwhelmingly pos- itive picture of institutional life. While tweets that promote the university receive some attention, messages that receive the greatest attention are those that report a change in the normal daily operations of the university.

Future research can examine these results in additional contexts. In the mean- time, we urge institutional leaders and offices managing social media accounts to reflect on how and why they use these technologies. The large following garnered by social media accounts can assist institutions in performing knowledge-shar- ing, knowledge-building, and educative functions. At present, such activities are constrained by limiting the use of these technologies to broadcasting, promoting, and branding the institution.

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References

Barnes, N. G., & Lescault, A. M. (2013). *College presidents out-blog and out-tweet corporate CEO's*. Retrieved from http://www.umassd.edu/cmr/socialmediaresearch/collegepresidentsoutblog/

Bélanger, C. H., Bali, S., & Longden, B. (2014). How Canadian universities use social media to brand themselves. *Tertiary Education and Management, 20*, 14–29.

Beverly, J. A. (2013). Public relations models and dialogic communication in the Twitterverse: An analysis of how colleges and universities are engaging their publics through Twitter. Dissertations. 159. Retrieved on April 12, 2017, from http://aquila.usm.edu/dissertations/159

Constantinides, E., & Zinck Stagno, M. C. (2011). Potential of the social media as instruments of higher education marketing: A segmentation study. *Journal of Marketing for Higher Education, 21*, 7–24. Council for Advancement and Support of Education. (2014). *Best practices in social media: Summary of findings from the fifth comprehensive study of social media use by schools, colleges, and universities*. Retrieved from http://www.case.org/Samples_Research_and_Tools/Benchmarking_and_Research/Surveys_and_Studies/Social_Media_Survey.html

Creswell, J. W., & Miller, D. L. (2000). Determining validity in qualitative inquiry. *Theory Into Practice,39*, 124–130.

Dakin, D. (2015, July 31). Brock's Twitter account ranked no. 1 in Canada. *The Brock News*. Retrieved from http://www.brocku.ca/brock-news/2015/07/brock%E2%80%99s-twitter-account-ranked-no-1-in-canada/

Dunlap, J. C., & Lowenthal, P. R. (2009). Tweeting the night away: Using Twitter to enhance social presence. *Journal of Information Systems Education, 20*, 129–135.

Ebner, M., Lienhardt, C., Rohs, M., & Meyer, I. (2010). Microblogs in higher education—A chance to facilitate informal and process-oriented learning? *Computers & Education, 55*, 92–100. Epstein, T. L. (2012). Regulation of student athletes' social media use: A guide to avoiding NCAA sanctions and related litigation. *Mississippi Sports Law Review, 1*(1), 1–36.

Galan, M., Lawley, M., & Clements, M. (2015). Social media's use in postgraduate students' decision-making journey: An exploratory study. *Journal of Marketing for Higher Education, 25*, 287–312.

Gao, F., Luo, T., & Zhang, K. (2012). Tweeting for learning: A critical analysis of research on microblogging in education published in 2008–2011. *British Journal of Educational Technology, 43*, 783–801.

Government of Canada. (2015). *Designated learning institutions list*. Retrieved from October 2, 2015, from http://www.cic.gc.ca/english/study/study-institutions-list.asp

Greenhow, C., & Gleason, B. (2014). Social scholarship: Reconsidering scholarly practices in the age of social media. *British Journal of Educational Technology, 45*, 392–402.

Greenhow, C., Robelia, B., & Hughes, J. E. (2009). Learning, teaching, and scholarship in a digital age: Web 2.0 and classroom research: What path should we take now? *Educational Researcher, 38*, 246–259.

Grusin, R. (2015, June 2). First Amendment intimidation by UW-Milwaukee administration. *Ragman's Circles*. [Web log]. Retrieved from https://ragmanscircles.wordpress.com/2015/06/02/first-amendment-intimidation-by-uw-milwaukee-administration/

Guarino, M. (2014, September 9). Professor fired for Israel criticism urges University of Illinois to reinstate him. *The Guardian*. Retrieved October 30, 2015, from http://www.theguardian.com/education/2014/sep/09/professor-israel-criticism-twitter-university-illinois

Herzog, K. (2015, July 16). UW professor under fire for tweeting at incoming freshmen. *Journal Sentinel*. Retrieved from http://www.jsonline.com/news/education/uw-professor-under-fire-for-tweeting-at-incoming-freshmen-b99538936z1-315784681.html

Jacquemin, S. J., Smelser, L. K., & Bernot, M. J. (2014). Twitter in the higher education classroom: A student and faculty assessment of use and perception. *Journal of College Science Teaching, 43*, 22–27.

Jaschik, S. (2015, May 18). Duke professor's comments on black students anger many. *Inside Higher Ed*. Retrieved from https://www.insidehighered.com/news/2015/05/18/duke-professors-comments-black-students-anger-many

Junco, R., Elavsky, C. M., & Heiberger, G. (2013). Putting twitter to the test: Assessing outcomes for student collaboration, engagement and success. *British Journal of Educational Technology, 44*, 273–287.

Kaplan, A. M., & Haenlein, M. (2010). Users of the world, unite! The challenges and opportunities of social media. *Business Horizons, 53*, 59–68.

Kimmons, R., & Veletsianos, G. (2014). The fragmented educator 2.0: Social networking sites, acceptable identity fragments, and the identity constellation. *Computers & Education, 72*, 292–301.

Kimmons, R., Veletsianos, G., & Woodward, S. (2017). Institutional uses of Twitter in U.S. higher education. *Innovative Higher Education, 42*, 97–111.

Lewis, T., Marginson, S., & Snyder, I. (2005). The network university? Technology, culture and organisational complexity in contemporary higher education. *Higher Education Quarterly, 59*, 56–75.

Linvill, D. L., McGee, S. E., & Hicks, L. K. (2012). Colleges' and universities' use of Twitter: A content analysis. *Public Relations Review, 38*, 636–638.

Lough, T., & Samek, T. (2014). Canadian University social software guidelines and academic freedom: An alarming labour trend. *The Digital Future of Education, 21*, 45–56.

Mendelson, A. L., & Papacharissi, Z. (2010). Look at us: Collective narcissism in college student Facebook photo galleries. In Z. Papacharissi (Ed.), *The networked self: Identity, community and culture on social network sites* (pp. 251–273). London: Routledge.

Nyangau, J., & Bado, N. (2012). Social media and marketing of higher education: A review of the literature. *Journal of the Research Center for Educational Technology, 8*, 38–51.

Palmer, S. (2013). Characterisation of the use of Twitter by Australian Universities. *Journal of Higher Education Policy and Management, 35*, 333–344.

Pinch, T. J., & Bijker, W. E. (1984). The social construction of facts and artefacts: Or how the sociology of science and the sociology of technology might benefit each other. *Social Studies of Science, 14*, 399–441.

Qing, L., & Geraci, L. (2012). Building a comprehensive social media strategy for student recruitment. *Research Brief*. Retrieved from http://www.baylor.edu/content/services/document.php/188267.pdf

Ruud, C. M. (2013). *College student social networking and its relationship to perceived social support* (Unpublished doctoral dissertation). University of Illinois at Urbana-Champaign.

Selwyn, N. (2010). Looking beyond learning: Notes towards the critical study of educational technology. *Journal of Computer-Assisted Learning, 26*, 65–73.

Snelgrove, R. (2010). Using Twitter in the classroom for student engagement and exchange at University of Windsor. *Teach Online*. Retrieved from http://teachonline.ca/pockets-innovation/using-twitter-classroom-student-engagement-and-exchange-university-windsor

Tay, E., & Allen, M. (2011). Designing social media into university learning: Technology of collaboration or collaboration for technology? *Educational Media International, 48*, 151–163. Twitter API. (n.d.). API overview. *Twitter developers*. Retrieved from https://dev.twitter.com/overview/api

Universities Canada. (2015) *Member universities*. Retrieved on October 2, 2015, from http://www.univcan.ca/universities/member-universities/

University of Alberta. (2016). *Institutional strategic plan: For the social good*. Retrieved from April 2, 2016, from https://uofa.ualberta.ca/strategic-plan/-/media/isp/institutional-strategic-plan- first-draft-march-11-2016-1.pdf

University of British Columbia. (2014). *Flexible learning—Charting a strategic vision for UBC*. Retrieved from April 13, 2016, from http://flexible-learning2015.sites.olt.ubc.ca/files/2015/04/fl_strategy_september_2014.pdf

University of Calgary. (2014). *Strategic framework for learning technologies*. Retrieved from February 26, 2016, from http://www.ucalgary.ca/provost/files/provost/final_lttf_report_gfc_june_2014.pdf

Uversity. (2013). *The social admissions report*. Retrieved from http://www.uversity.com/downloads/research/social-admissions-report.pdf

Veletsianos, G. & Kimmons, R. (2013). Scholars and faculty members lived experiences in online social networks. *The Internet and Higher Education, 16*, 43–50.

Veletsianos, G., Kimmons, R., & French, K. (2013). Instructor experiences with a social networking site in a higher education setting: Expectations, Frustrations, Appropriation, and Compartmentalization. *Educational Technology, Research and Development, 61*, 255–278.

Verishagen, N., & Hank, C. (2014). Are there birds in the library? The extent of Twitter adoption and use by Canadian academic libraries. *First Monday, 19*(11).

Waters, R. D., Canfield, R. R., Foster, J. M., & Hardy, E. E. (2011). Applying the dialogic theory to social networking sites. *Journal of Social Marketing, 1*, 211–227.

Yolcu, Ö. (2013). Twitter usage of universities in Turkey. *Turkish Online Journal of Educational Technology, 12*, 360–371.