Assessing e-Recruiting on Social Media: FBI Case Study

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Abstract

With the rise in popularity of social media, these platforms present a new opportunity to reach potential job candidates for employment opportunities. The current literature lacks sufficient research on methods and best practices to design and assess the efficacy of recruit and hire campaigns delivered on social media. We present a case study of a government e-recruiting effort discovered on Twitter. We collected almost 20 thousand tweets using the hashtag #FBIJobs, this included both Tweets and Retweets. Applications of descriptive statistics, topic modeling, sentiment analysis, and graph analytics identify where the campaign may miss potentially interested job candidates. We also find evidence of "popularity transfer" where co-mentions appear to increase the visibility of an accounts content in public feeds, without transferring the sentiment surrounding the more popular account. The research and findings were based on a publicly available e-recruiting campaign found online, without any inside knowledge or influence on campaign design or execution. Recommendations to better focus e-recruiting campaigns are provided.

Introduction

Social media is potentially a useful platform for recruiting, especially for recruiting educated people that are comfortable with technology (Sills, 2014). Social media use among U.S. adults remains unchanged between 2018 and 2019 with 22% of Americans using Twitter, making it the 7th most popular platform (Perrin and Anderson, 2019). Even though social networking platforms have existed for more than a decade, empirical research surrounding the effectiveness of these sites for recruit and hire is insufficient. This paper explores Twitter as a recruit and hire strategy for the U.S. Federal Bureau of Investigation (FBI) as a case study of e-recruiting. This study highlights the efficacy of Twitter as an e-recruiting platform and identifies opportunities for improved strategy.

This paper is organized as follows. Section two presents recent research related to e-recruiting and methods used in this case study. Section three presents the methodology used to assess the @FBIJobs recruit and hire campaign. Section four presents results for this specific campaign and section five provides recommendations for more effective e-recruiting via social media.

Background

Social media is potentially a useful platform for recruiting. There are a number of ways in which employers may use social media to locate, screen, support interviews, and communicate hiring actions. Girard et al (2014) conducted a mixed-method qualitative/quantitative study, interviewing 34 experts to identify current best practices for the use of social media in support of recruiting. These practices ranged from advertising jobs, identifying candidate pools, screening employee background, communication with candidates, and announcements of recent hires. Most e-recruitment uses LinkedIn (Girard et al, 2014; Melanthiou et al, 2015), however, there can be legal implications of screening prospective employees thru social media. These issues largely surround privacy concerns and non-representative population samples on social media. The use of social media, however, has resulted in a faster time-to-hire, improved candidate quality, and wider candidate pool (Girard et al, 2014; Madia, 2011; Sills, 2014). Social media is especially effective at reaching young and more technical talent (Sills, 2014).

Another aspect of e-recruiting is the ability to market a company or job opportunity to prospective candidates, thereby increasing their likelihood to apply and accept an offer. Social media exposure and user engagement creates positive affinity toward the recruiting company, and increases job applications (Carpentier et al, 2017; Selden and Orenstein, 2011; Sharma, 2014). Stone et al (2019) found that LinkedIn and Facebook engagement had significant influence on candidate attitudes, while Twitter did not demonstrate a significant effect. Selden and Orenstein (2011) argue that companies with more engaging, useable websites

get more applications, while those with better content have reduced employee turnover. Perhaps the effectiveness of e-recruiting on social media is also more influenced by how engaging the platform and content are. Thus, Twitter shortcomings in Stone et al (2019) can be overcome with more engaging tweets containing co-hashtags, media links, among other tactics. Sharma (2014) recommends a strategy of frequent and interesting posts to build up a network on Twitter to increase exposure, engagement, and effectiveness.

This paper focuses analysis on two social media platforms, Twitter and Instagram. Twitter is a social media platform where users interact, follow, and post messages called "tweets" that are restricted to 280 characters. As of 2017, Twitter had more than 321 million active monthly users. Instagram is a social media platform where users share images, video, and interact. As of 2018, Instagram was reaching a reported 500 million users daily.

According to a recent Pew survey (Perrin and Anderson, 2019), U.S adult use of "online platforms or messaging apps" are YouTube 73%, Facebook 69%, **Instagram 37%**, Pinterest 28%, LinkedIn 27%, Snapchat 24%, **Twitter 22%**, WhatsApp 20%, and Reddit 11%. Snapchat and Instagram are more popular among 18-24 year old users at 73% and 75% respectively (Perrin and Anderson, 2019). Twitter use is highest among this age group at 44%.

The U.S. Federal Bureau of Investigation (FBI) maintains an official Twitter account, @FBI, and an account specifically used for recruit and hire, @FBIJobs. They use a specific hashtag #FBIJobs to tag recruiting messages and content. The FBI also maintains an official account on Instagram, @FBI. There is no @FBIJobs on Instagram, and the @FBI account seldom posts with #FBIJobs, suggesting that Instagram is not used as an e-recruiting platform by the FBI. The FBI is a well-known government agency within the American culture, and the CBS television network broadcasts a popular crime drama and maintains a Twitter account @fbicbs which competes with other crime dramas such as NBC's *Law and Order Special Victims Unit* with Twitter account @nbcsvu.

FBI e-recruiting presents an interesting case study in the use of social media for recruit and hire. There is an active campaign on a major social media platform that can be compared to no campaign on a more popular platform. There are popular broadcast dramas with Twitter accounts that draw audiences and social media attention that can be compared to recruit and hire efforts. There are multiple regional FBI office Twitter accounts that can support and amplify recruiting efforts. This contributes to understanding the value of social media as an e-recruiting tool.

Method

This case study will focus on the FBI e-recruiting effort detected in publicly available data found in Twitter and Instagram. All data was collected in accordance with Twitter and Instagram terms of service. This work does not use any inside knowledge of the FBI, their campaign, and was not sanctioned, approved, or conducted on behalf of the FBI. The @FBIJobs and #FBIJobs campaign presents an interesting use-case for e-recruiting via social media.

Public data was collected using the Twitter application program interface (API) and Instagram API using search terms #FBIJobs, @FBIJobs, and @FBI during the dates 1/1/2018 through 1/1/2020. Public data was separately collected using the Twitter API with search terms @fbicbs and @nbcsvu.

Descriptive statistics include identifying peaks in tweet volume over time and searching for qualitative potential explanations of peak tweet activity. We measure top mentions and co-occurring hashtags to gain greater qualitative insight into the nature of the #FBIJobs discourse and related topics. Rates of content engagement by official FBI and unofficial accounts provide insight into the reach and amplification of targeted messages across the platform.

Topic modeling was conducted by first creating *N*-grams and then applying Term Frequency – Inverse Document Frequency (TF-IDF). Topics are then qualitatively analyzed to understand the nature of discourse surrounding the e-recruiting campaign on the platform. The volume and percentage of tweets within each topic are also measured. Sentiment analysis is conducted using the Sentiment and Polarity functions of the TextBlob package in Python. The Tweets and Retweets were first lemmatized utilizing the lemmatize function within the same package. The sentiment of tweets provides insight into whether discourse is likely to increase positive affect toward the employer's brand and increase applications and offer acceptance or harm recruiting efforts.

We construct a re-tweet network, where nodes represent personas in the social media platform and a directed link represents one node retweeting the other. Network centrality measures (Freeeman, 1978; McCulloh et al, 2013) are used to identify key nodes that broker e-recruiting messaging and who amplify the reach of content. Community detection is used to identify and characterize different online population segments that may hold differing views toward the campaign.

Supervised learning is used to estimate the gender and age of tweet personas to determine if the e-recruiting messages are reaching the target age group. Both gender and age estimators use a combination of features from user metadata and data including but not limited to linguistic features, tweet / retweet rates, following / follower information. Note that FBI Special Agent job applicants generally need to be between the ages of 23-36 and have a college degree, while

other career paths have more lenient requirements. We may infer that #FBIJobs is targeting educated young adults between ages 18-34.

Results

There were 19,875 tweets that mention #FBIJobs in 2018 and 2019. The volume of tweets over time is shown in Figure 1. Spikes were identified over the two-year time frame. A simple Boolean search was entered into Google using the search terms "FBI" and the month and year of the spike to identify any potential news stories that may correlate with the spike in social media activity. There was a consistent pattern, where activity surrounding #FBIJobs was correlated with news headlines related to the FBI investigation of president Donald Trump. Identified spikes and summary of the search results are in Table 1. It appears that high exposure broadcast media coverage involving the FBI is correlated with increased Twitter activity related to #FBIJobs.

Table 1. Qualitative Assessment of Tweet Spikes over Time

Spike Date	Summary of Search Results
APR 2018	FBI raid on Trump lawyer Michael Cohen.
SEP 2018	Declassification and release of all text messages tied to Russia investigation.
FEB 2019	Release of U.S. House memo accusing FBI of bias in Trump investigation.
JUL 2019	Announcement of new female special agent in charge of St. Louis FBI office. FBI arrests of white supremists.
OCT 2019	FBI crime drama premiere 24 SEP 2019.
NOV 2019	FBI agent under investigation for altering documents to implicate Trump.

In contrast to @FBIJobs, Twitter engagement with @nbcsvu was 151,809 tweets and with @fbicbs was 38,875 tweets. This indicates that crime dramas and entertainment likely have far greater reach over social media than the FBI's e-recruiting efforts. The majority of these interactions can be geo-referenced to New York (15.5%) and at least 17% originate outside of the U.S. It is unclear if this is due to both shows taking place in New York, particular interest in the crime drama genre, or whether New York may represent a more fertile recruiting ground for FBI offline recruit and hire efforts.

The TD-IDF topic model generated 15 clusters that all appeared to be related to e-recruiting issues and are displayed in Table 2. Of note, three clusters were related to diversity, making up a combined 10% of the discourse, suggesting an FBI effort to improve gender equity among hiring and possibly tied to the announcement of a female special agent in charge of the St. Louis office.
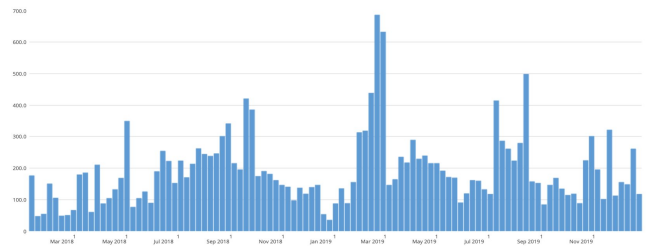

Figure 1. #FBIJobs Tweet Volume 2018-2019.

Table 2. Topic Modeling of #FBIJobs

Topic	Total	Pct
Career at the FBI	3491	18%
Agents at the FBI	3342	17%
FBI Special Agent	2675	13%
Skills to the FBI	1424	7%
Diversity Agent Recruitment	1048	5%
Work for the FBI	1024	5%
FBIJobs is it Time	941	5%
Dedication to the FBI	702	4%
Diversity Agent Recruitment Event	670	3%
Becoming a Special Agent	669	3%
Place at the FBI	634	3%
Expertise to the FBI	589	3%
Becoming an FBI Special Agent	540	3%
Future Special Agents	428	2%
Women Special Agents	388	2%

Top mentions and hashtags are displayed in Figure 2 and include other government sites and topics to include those of the president. Note that #MAGA and #TrumpTrain support the U.S. president, suggesting that pro-Trump content is more prolific in the FBI Jobs discourse, which is surprising given the correlation between media coverage of the FBI Trump investigation with spikes in #FBIJobs tweet volume during this timeframe. There is no evidence of any anti-FBI or anti-Trump hashtags or mentions among any of the major topic clusters or engagements. The majority (12,645) of retweets by both official and non-official FBI accounts have neutral sentiment, and a majority (1,609) of original tweets also have neutral sentiment.

The retweet network consists of 5,956 unique personas. Of these, 64 (1% of social network) are official FBI Twitter accounts including @FBI, @FBIJobs, and 62 accounts for regional offices such as @fbitampa or @fbilosangeles. The #FBIJobs campaign is reaching an audience 100 times the size of the accounts promoting recruit and hire content. The @FBIJobs node is connected to 3,649 (61.3%) accounts in the retweet network, and the @FBI node is connected to 1,503 (25.2%) accounts. The official accounts directly reach the vast majority of those engaging with the content. The diameter of the main component in the retweet network is 8, meaning that the network can amplify its message several
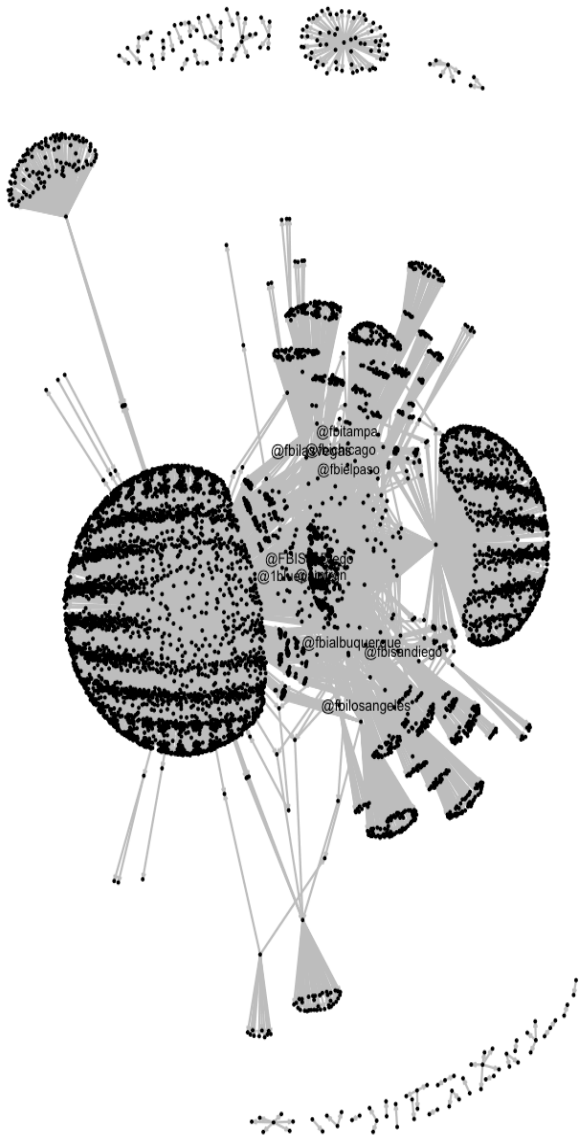
Figure 2. Retweet Network Surrounding #FBIJobs

steps beyond the @FBIJobs account. The majority of smaller clusters in the network, however, are accounts that follow or engage with the 62 regional office Twitter accounts. A visualization of the retweet social network is displayed in Figure 2.

Table 3. Descriptive Statistics of (Re)Tweet Origin

Tweet	Total	Pct.
Original FBI account tweets	1,510	8.54%
Original non-FBI account tweets	475	2.69%
Retweets by FBI accounts	1,931	10.92%
Retweets by non-FBI accounts	13, 687	77.41%

Most of the original tweets were posted by @FBIJobs or @FBI (76.1%) and the vast majority of retweets (87.6%) were posted by non-FBI accounts as shown in Table 3.

Supervised learning was used to classify gender and age of personas engaging with #FBIJobs. Only 44% of posts have identifiable gender, of which 66% are male. Only 16% of posts have identifiable age, of which the vast majority are 35 and above, a category which begins near the maximum age allowed to join the FBI as a special agent. This suggests that the current #FBIJobs campaign may fail to reach the intended candidates in terms of age eligibility or diversity goals.

The accounts engaging @nbcsvu or @fbicbs by contrast have higher rate of identifiable gender (58% and 65% respectively) and higher proportion of women (76% and 55% respectively). They also better reach the target age group with 66% and 38% of personas under the age of 35.

At the time of writing, the Instagram search identifies 748 posts with #FBIJobs but only 371 of them are retrievable due to API and terms of use restrictions. There are only 304 comments for these posts. Only two verified accounts posted with #FBIJobs: @FBI and @PoliceNationale. The @PoliceNationale profile is the official French Interior Dept.'s law enforcement account. It is unclear why @PoliceNationale would be promoting FBI tags and posts. A representative post is https://www.instagram.com/p/B3ClO62CiQF/. There is no @FBIJobs on Instagram indicating that the FBI may not be using Instagram as an e-recruiting platform.

Of the 371 retrievable posts, 146 belong to @FBI. The posts have an average of 29,285 likes. There are no comments because @FBI does not allow comments on the thumbnails.

Discussion

The FBI's social media e-recruiting campaign is likely a wise investment of taxpayer dollars. While we do not have insight into the costs associated with this effort, original tweets by official FBI accounts are amplified by more than a factor of 10 and reach 100 times more users than the official accounts promoting and sharing the content. Normal marketing costs for a recruit and hire campaign could be reinvested in efforts to assess and refine campaigns to be more effective using methods outlined in this paper.

There is evidence suggesting mention and hashtag co-occurrence may transfer the Twitter frontpage visibility/popularity of one account to another. A social media frontpage or feed does not present random content to users. They typically employ algorithms that optimize content using recommender systems to increase user engagement with the platform. These algorithms are not public. It does appear, however, that content is more likely to appear in a user's feed

when it involves content and personas engaged by the user. It is notable that engagement with #FBIJobs is correlated with major media coverage involving both the FBI and U.S. President Donald Trump. While the media coverage was negative toward President Trump, and arguably the FBI, the discourse involving #FBIJobs was neutral. Moreover, pro-Trump accounts were more engaged with #FBIJobs and there was no notable anti-Trump sentiment or discourse in the data. Given that at the time of writing this paper, @realDonaldTrump was the 10th most followed account on Twitter, it is likely that President Trump's Twitter popularity may have been transferred to @FBI and by relation @FBIJobs, increasing visibility and engagement with the e-recruiting campaign.

There is more engagement surrounding crime dramas related to the FBI than there is to official FBI e-recruiting efforts. The users engaging FBI-related crime dramas tend to include more women and more users in the target age group eligible for FBI employment than those engaging with #FBIJobs. This supports Sharma's (2011) findings that frequent and interesting posts are more effective at building a network of users that can promote and amplify content. The FBI may not need to invest in building a network with interesting content as much as engaging with key personas and content in the networks of popular crime dramas. In addition to lowering the cost of maintaining a user network, the FBI could take advantage of and transfer popularity from crime dramas to e-recruiting efforts. This could be done with co-mentions of hashtags and official accounts.

Another interesting feature of the #FBIJobs campaign is the number of regional official FBI accounts that appear as prominent and central actors in the re-tweet network. The 64 official accounts that follow, friend, favorite, retweet, and mention each other's content may also amplify their visibility on social media feeds. They effectively create their own network eco-system to increase popularity and visibility. It is unclear if this is deliberate on the part of the FBI, but it is something that more organizations should do to improve their message reach and visibility.

Successful marketing campaigns delivered on social media can be more effective if the understand and leverage features of platform recommender systems to amplify visibility and reach. The FBI has conducted a deliberate e-recruiting campaign on Twitter but does not appear to have used Instagram or other popular social media platforms to support their recruit and hire goals. Instagram is a more popular social media platform with 1.7 times greater adoption by those eligible to apply for an FBI Special Agent career. The fact that there are 26 times the number of posts related to #FBIJobs on Twitter, a platform with almost half the popularity of Instagram is evidence of the success of a deliberate campaign.

Understanding the social media landscape may improve the effectiveness of any messaging campaign to include e-

recruiting. Given the greater popularity of Instagram and Snapchat over Twitter, the FBI should consider extending their e-recruiting efforts to those platforms. While YouTube has become the dominant platform, content development is far more costly. It is important to weigh the costs of delivery against potential return on investment. It is important, however, to consider what demographic is engaging with your content on social media when selecting a platform and shaping content and engagements.

A combination of network and sentiment analysis provides a structural and holistic view of the discourse surrounding a given topic such as #FBIJobs. Once a meaningful social network is constructed based on retweet or mention, community detection may reveal different clusters of conversation. While this case study had only two clusters surrounding @FBI and @FBIJobs, it is possible that online conversations may have different social foci that contribute to clustering to include echo chambers. Sentiment monitoring of the Tweet and Retweet contents from users within the clusters allows for wholistic insight into perception and concurrent reactions by users to posted content on official accounts. In order to conduct sentiment analysis on platforms where content is image or video based, comments by users would be required. For this study, it is interesting that the discourse remains neutral, despite the correlation in tweet activity and negative media coverage of the FBI investigation of President Trump. This can reassure the FBI that their #FBIJobs hashtag is being used as intended and has not been hijacked or misused.

Conclusion

This case study identified a U.S. Government e-recruiting campaign on Twitter, collected empirical data from two different social media platforms, assessed the effectiveness of the campaign and we identify several best-practices to inform future campaigns and further empirical research. This observational study advances our understanding of social media marketing campaign design.

We identify five key findings from this case study that inform best practices for e-recruiting or other social media marketing campaigns.

1. Organizations that use social media to broadcast marketing-type messages can reach many people in a targeted population at relatively low cost.
2. Co-mentioning content with popular users and hashtags can increase message visibility and reach, transferring popularity to your content. The transfer of popularity does not necessarily transfer the affect or sentiment toward the popular node.
3. Frequent, entertaining, and interesting content increases engagement with users. Campaigns should either use entertaining content, which can be

expensive, or co-mention content and users that share engaging content (e.g. FBI crime dramas) which may be more cost effective.

4. Investing in an eco-system of related accounts that actively follow, friend, favorite, share and mention each other's posts may amplify messaging more than a similar investment in message quality/content.

5. Campaign designers should consider platform usage among target populations and the relative cost of delivering content when selecting which platforms to use.

This study has several limitations. It was based on an e-recruiting campaign found online, without any inside knowledge or influence on campaign design or execution. These findings and results could be better validated with deliberate manipulation of the campaign in a designed experiment over time to create more rigorous findings. The FBI is a unique organization within American culture. Additional e-recruiting campaigns evaluated with this methodology may further validate findings. Data was restricted to only two social media platforms and the more popular platform showed less user engagement with the campaign. Investigating campaigns over multiple platforms may reveal platform-specific differences.

The #FBIJobs e-recruiting campaign presents an interesting and unique case that highlights and supports some important insights to inform social media campaign design. We have illustrated a methodology to assess a social media e-recruiting campaign and we offer several recommendations to improve the effectiveness of the FBI campaign. This advances our understanding of recruiting via social media and offers directions for future research.

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