UPMC
LIFE CHANGING MEDICINE

SOCIAL MEDIA ANALYSIS REPORT
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UPMC'S STRATEGIC COMMUNICATIONS OFFICE

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Business Understanding

UPMC's mission is to reach a network through serving their community. They strive to provide outstanding patient care and to shape the future's health care system through clinical and technological innovation, research, and education. UPMC's vision is to redefine healthcare through putting their members, employees, and community first. They want to ensure that their patients are taken care of in the best way possible. They hold their stakeholders to the same high standard and expect excellence and state of the art care. Their partnership with the University of Pittsburgh allows them to advance their education through understanding disease, its prevention, treatment and cure. They also aim to support the development of new businesses that are consistent with UPMC's mission which serves as an ongoing catalyst of economic development. Therefore, we can expect everything that UPMC says and does on their social media platforms will reflect their overall mission and vision.

Data Understanding

The structural characteristics that I will be taking a look at are the nodes, edges, and paths that are shown in the following graph-based representations. These structural characteristics will allow us to understand how UPMC is interacting with people whether this is through clicks, subgroups, or isolates. I will also be taking a look at behavioral characteristics. Behavioral characteristics will help us determine events and individuals that may stimulate engagement among the target audience. I expect to find useful insights through investigating homophily, selection/social influence, and affiliation behavioral characteristics. Through these characteristics I plan to find who UPMC interacts with on social media and what relationships are valuable to UPMC, indicate who the social influencers are within UPMC's social network, and find what topics and ways different network members are connecting. The purpose of analyzing structural and behavioral characteristics is to see what network structures UPMC has in order to achieve their mission statement.

Data Preparation

In order to gather and analyze the data for this canalysis, I utilized a social media data collector called NodeXL Pro. Using NodeXL Pro, I collected information through connecting with UPMC's Twitter Search Network. I pulled and interpreted data throughout the entire spring 2021semester.
When I pulled the data using NodeXL Pro, I utilized the NodeXL Gallery to pull an appropriate recipe that performed several analyses for the business objectives. Through this process, I had to find the best recipe that best analyzed the top 10 domains, most popular word pairs and positive words in the data. I ensured that the data collected was in English in order to perform an accurate sentiment analysis. In gathering the data, I was able to limit the results to focus on a condensed number of 5,000 tweets. In addition, I filtered tweets in order to visually comprehend the nature

of connections between various nodes or user profiles and whether they appeared strong or weak ties regarding the data. Throughout this process, I utilized features of Node XL Pro to analyze the data in terms of triadic closure, clustering coefficients, edge weight, clique and connector motifs, links, spreading agents, and centrality measures. The results of my analysis are interpreted in the following sections.

Modeling

First I performed a tie strength analysis in order to interpret strong and weak ties within the network. Strong ties show users that are close friends and interact often. While weak ties are associated with users who are acquaintances or friends of friends. In order to measure these ties I used clustering coefficients. The clustering coefficient of a node is defined as the probability that two random users are friends with another ranging from 0 to 1; Zero being no friends, and one being friends. In UPMC's data, users such as astephman, lplung, apolonetsup, aldomr10, bennettauron, codedevdave, davevillasal, galeantv, bigedbarr71, and jayson_hatton All share a clustering coefficient of 1 meaning that someone in UPMC's network is extremely likely to be friends with them. While users such as lns_abshokoya, obamalik, baldwin__hockey, intuitivesurg, maryguan8, siyanu2, lillies_requiem, dinadoll720, butterfly5069, olgasixta, and drrayms share a clustering coefficient of .5 meaning that someone in UPMC's network is somewhat likely to be friends and that someone can be potentially connected to them in the future. And users such as 3k_james jabizofficial, tmj_pa_anesth, ireland_us, amberowens18, c3kenneth, misssssssglenn, john_ruffini, tom8610, edsnyderpgh, and reneethompsonrn share a coefficient on 0 meaning that someone in UPMC's network is not likely to be friends.

Taking it one step further, I analyzed the connection between users to determine strong and weak ties. I did this by utilizing the edge weight filter. Edge weight ranged from 1 to 20; one being a weak tie and 20 being a strong tie. The weakest ties include connections between lamarcalinda and upmc,lamarcalinda and upmcnews, papysam and upmc. While somewhat strong connections occurred between 4medlen and steelers, 4medlen and upmc, mjfsteeler and upmc, tmj_vaw_other and itself, and upmc_pinnacle   and itself. The strongest connection exist between UPMC and itself, husseinhkhachfe and upmcsurgonc, husseinhkhachfe and pittsurgery, husseinhkhachfe and upmc, husseinhkhachfe and pitttweet, upmcnews and itself, and the strongest connection being between tmj_md_nursing and itself. This is important information because it shows who potential ambassadors could be for UPMC. These accounts are getting the word out about UPMC and talking about UPMC quite frequently. This data driven approach allows us to find potential influencers within UPMC's social network.

Another way I investigated UPMC's social network is by looking for people that are similar or the tendency for homophily. Looking for people who are similar is important so that UPMC can target their users more efficiently. I collected this information by finding motifs or gatherings or

people within the network. One popular motifs that I found was a 10 connector motif that connects 19doug64 with justintrudeau, upmc, cityofcincy,northdakotadot, water_steve, naomiwong1984, michaelpsenger, katewand, naomirwolf, and brianosheaspi. The context of their conversation involves Canadian Politics. 19doug64 is an influencer in this small network because he effctivley got the word out to all of these accounts. The tweet includes Justin Trudaeu , the prime minister of Canada, wanting to pass bill C 10. Another popular motif connected annlyn85501308 with rideruniversity, moraviancollege, njdeptofhealth, pahealthdept, padeptofed, scrowder, ewoodhouse7, emily_burns_v, kristenmeghan, templehealth, virtuahealth, slipperyrocku, lasalleuniv, villanovau, and many more. The context of their gathering involves a conversation with Dr. Byram Bridle, an associate Professor of Viral Immunology, at the University of Guelph discussing COVID-19, developing immunity, and isolations detrimental effect on children's immune systems. Annlyn85501308 is another social influencer in this small network because she got the word out to all of these universities.

Another topic that I analyzed is viral marketing.Viral marketing is a strategy that is exponentially scattered across the Internet because unique content is valuable, shared, and liked. Knowing this gives a competitive advantage because it attracts more users and interactions
I specifically took a look at one tweet in particular that states:"New @ScienceMagazine is a succinct and excellent review of the major #SARSCoV2 variants, how they emerged, and their impact, by @JohnMellors3 and colleagues @UPMC w/ @ScienceVisuals." In this specific case, the idea is non entirely viral worthy because it is not very catchy. I feel like this tweet gained a lot of attention through how many followers this account has. The spreading agent is a checkmarked (famous) account named Eric Topol. Eric topol is a well known physician scientist, author, and editor. Eric Topol is a sneezer because he gets attention through being well known. Also, tweets from blue check marked accounts might be ranked higher in Twitter's algorithm. However, the contents of the tweet are interesting. The many variants of COVID-19 are relevant and important to know.The KPI of interest is engagement because Eric Topol is trying to gain awareness about the many variants of COVID-19.The target audience is anyone following Eric Topol who is most likely people trying to stay informed with current events and check out real life statistics. The target audience is anyone following Eric Topol who is most likely people trying to stay informed with current events and check out real life statistics.

The last topic that I performed an analysis on was centrality. Centrality identifies the most important users within a network. The first measure is called Degree centrality, which counts how many neighbors a user has within the network. Degree centrality can be split into two different categories, In-Degree and Out-Degree. In-Degree being the more important measure because it shows if other users are reaching out and connecting with them. In UPMC's network, the users with the most degrees are the most important because the links are generated by nodes in the network and people are seeking this person in the network. The top ten indegree users are: upmc, magsg, upmcnews, penguins, kdka, martygriffinkd, mcipriani_wtae, and seangentille.

The top ten users with the most out degree are: amberjohnsonmd, upmc, upmc_pmr, brianosheaspi, katietraylordo, telehealthbot, drmrox151, pittgilivernutr, drmrox151,pittgillivernutr, upmcnews, and jelevenson. Another measure of centrality that helps indicate which users are influential is Betweenness centrality. This measure helps to detect which users have the highest influence over the flow of information within a network. The top ten users with the most betweenness centrality are: upmc, magsg, upmcnews, martygriffinkd, kdka, mcipriani_wtae, cammill39745910, etnreisenweber, seangentille, and pittpsychiatrThe top ten users with the most closeness centrality are: colleenpjackson, cepattersonjr, barryskyler, dakota_ginger, justsimplyryan, gardenvole, vynga_, pri_vgd, nselvaggio1, and seando40. The top ten user regarding page rank are: upmc, magsp, upmcnews, martygriffinkd,mcipriani_wtae, penguins, kdka, seangentile, getpghvaxxed, and neurodev_lab. The top ten user regarding clustering coefficient are: etnkirik, rkolash18, marietk28, luko, regeiceman32, keribear101, jmattocks55, mazoellen, debbie_albin, and jececi. These centrality measures can help determine which users to target to increase exposure on social media and get more user traffic.

Evaluation

Top Domains: twitter.com (1), upmc.com (2), radian6.com (3), ctvnews.ca (4), publicsource.org (5), triblive.com (6), theglobeandmail.com (7), cbslocal.com (8), careerarc.com (9), and goodmorningamerica.com (10).

Top Hashtags: nfldraft (1), steelers (2), covid19 (3), cumberland (4),steelersdraft (5), donatelifemonth (6), upmc (7), nursing (8), herewego (9), and openingnight (10).

Top Influencers: upmc (1), gaineyformayor(2), summerforpa(3), darwinleuba(4) upmc_pmr(5), upmc_pinnacle (6), upmcnews (7), upmc_ctsurgery (8), wassman98 (9), and annlyn85501308 (10).

Top Tweeters: Tayesosmooth (1), _evangelo(2), rudedogreyes(3), reuters (4), madrynha2012 (5), rudyglove27(6), dubvnow (7), steelersdepot (8), c3kenneth (9), and moritzbhg (10).

Top Replied to: brianosheaspi (1), chidiahanotu (2), husseinhkhachfe (3), steelers(4), nflobjectors (5), sheilladingus (6), theneurotimes (7), finucan_tim (8), penguins (9), Cpotterpgh (10).

Top Mentioned: upmc (1) michaelpsenger (2), naomirwolf (3),northdakotadot (4), cityofcincy (5), water_steve (6), naomiwong1984 (7), katewand (8), pitttweet (9), and steelers (10).

Top Words In Tweets: upmc (1), pittsburgh (2), more(3), taxes (4), thank (5), michaelpsenger (6), naomirwolf (7), northdakotadot (8), cityofcincy (9), peduto (10).

Top Word Pairs: northdakotadot,cityofcincy (1), cityofcincy,upmc (2), water_steve,northdakotadot (3), michaelpsenger,naomirwolf (4), naomiwong1984,water_steve (5), naomirwolf,naomiwong1984 (6), covid,19 (7), fair,share (8) intelligence,agencies (9), and canada,intelligence (10).

The figure below shows 53 communities observed in the data collected for UPMC's social media network in May 2021. In order to be more concise, I will only be discussing the top ten groups in UPMC's Network.
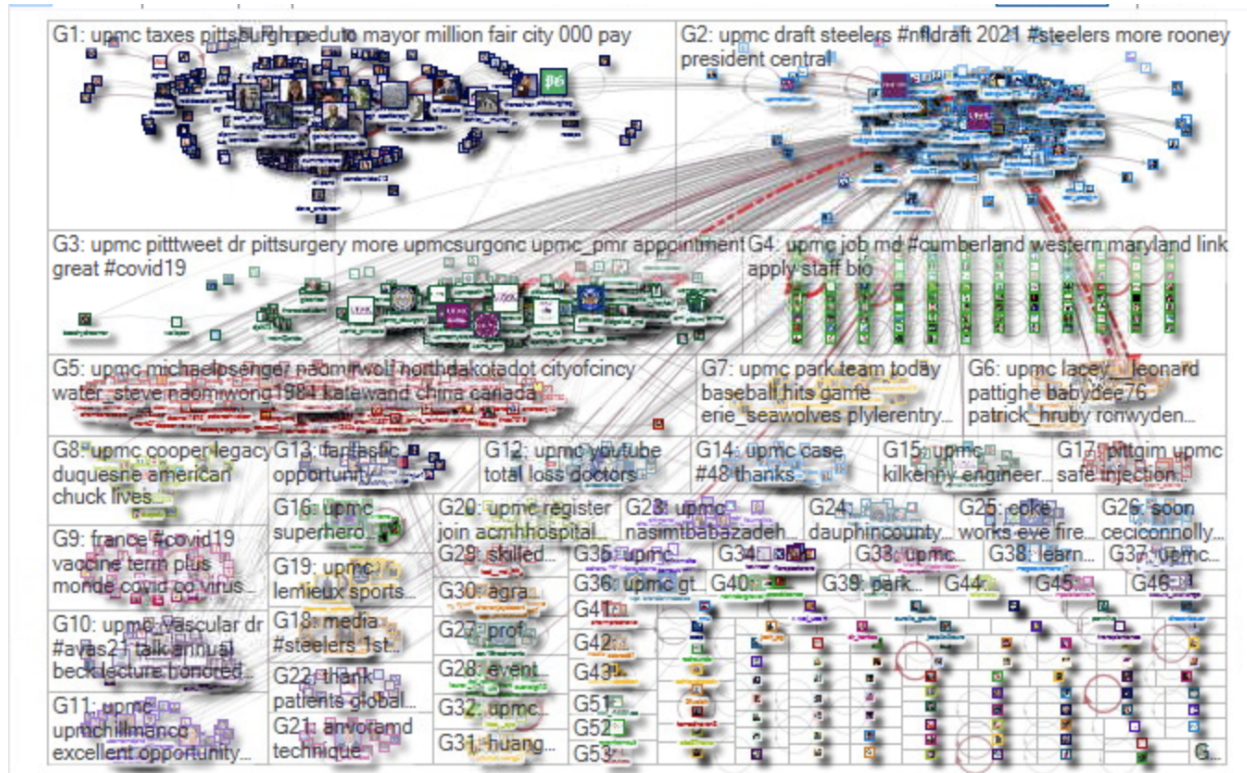
Recommendations

The top domains: radian6.com is a customer relationship management (CRM) website that is ranked third in top domains. This affiliation is through UPMC Health Plan using Salesforce for health insurance sales, as well as marketing campaigns.

Hashtags: Sport related hashtags are common in UPMC's network. Nfl Draft and Steelers being the top two hashtags. In order to reach their network, I recommend involving sports most specifically football and Pittsburgh teams such as the Pittsburgh Steelers or Pirates. Based on covid19 being the second top hashtag we can assume that people also seem to be interested in information about COVID-19. Therefore, any update on the current pandemic is likely to spread across the network.

Top Influencers: Gaineyformayor, the PA State Rep Ed Gainey who is running for Mayor of Pittsburgh, is the second top influence after UPMC itself. I suggest helping his campaign because he has a lot of influence in UPMC's network. Summerfopa is ranked third and is also a PA State Representative. Supporting her would be great for UPMC because she is influential in the network.

Top Tweeters: The top tweeters are Tayesosmooth, _evangelo, rudedogreyes, reuters, madrynha2012, rudyglove27, dubvnow, steelersdepot, c3kenneth, and moritzbhg meaning that these accounts are relative to UPMC's Twitter account. It also means that they have the greatest volume of tweets meaning that they can quickly spread information and successfully influence user decisions.

Top mentioned:
- Michaelpsenger is an attorney and researcher based in Atlanta, Georgia. This account provides information about COVID-19 and controversial beliefs about lockdown policies.
- Naomirwolf is an American author and journalist. Since around 2014, she has been considered a conspiracy theorist by multiple media sources who explores violations of personal freedoms.
- Northdakotadot is the Twitter account for the North Dakota Department of Transportation. This account provides information about roadways in North Dakota.
- Cityofcincy is the official Twitter account of the City of Cincinnati. This account provides updates about current events in Cincinnati.
- Water_steve is a cyber News Analyst and Speaker in Montreal Quebec Canada.
- Naomiwong1984 is a user who posts about Covid-19, politics, and data.
- Katewand is an artist & creative filmmaker from Venezuela.
  Pitttweet is the official Twitter account of the University of Pittsburgh. This account gives updates about what is happening in Pittsburg and at the university.
- Steelers is the official Twitter account of the Pittsburgh Steelers Football team.

Deployment

1. Strategic Communications Office

STAKEHOLDERS AND HOW TO CONNECT WITH THEM

TARGET LOCALS

Pittsburg locals want to be involved in their community, especially keep in touch with local universities and sport teams.

KEEP PEOPLE INFORMED ABOUT COVID-19

Covid-19 is hot topic in UPMC's network. Keep giving updates about the pandemic in order to inform the public and increase brand awareness.

2. Marketing Team

RECOMMENDATIONS FOR MARKETING TEAM

Group 1: Mayor Donation

Group 2: Steelers

Group 3: Pitttweets

Group 4: Cumberland

Group 5: CityofCincy

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Group 6: Research Recap

Group 7: Baseball

Group 8: Post Covid-19

Group 9: Covid- 19

Group 10: UPMC Vascular

TOP TWEETERS IN THE NETWORK

1. Tayesosmooth
2. _evangelo
3. rudedogreyes
4. reuters
5. madrynha2012
6. rudyglove27
7. dubvnow
8. steelersdepot
9. c3kenneth
10. moritzbhg

KEEP YOUR TWEETS ALIVE WITH THESE HASHTAGS (TOP HASHTAGS)

1. #nfldraft
2. # steelers
3. #covid19
4. #cumberland
5. #steelersdraft
6. #donatelifemonth
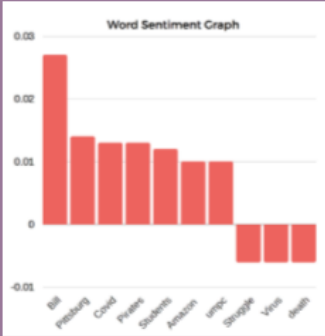7. #upmc
8. #nursing
9. #herewego
10. #openingnight

POTENTIAL STRATEGIC ALLIANCE WITH:

PNC Park, NFL, Steelers, Covid-19 Research, Mayors running in the Pittsburg area.

3. Top Management Team

UPMC'S WELLBEING METRICS

COMMON WORD ANALYSIS

POSITIVE AND NEGATIVE SENTIMENT PER NETWORK GROUP

POSITIVE VS. NEGATIVE SENTIMENT
POSITIVE= 1, NEGATIVE= 2