Semantic Analysis on Twitter of Two Religious' Leaders: @Pontifex and @DalaiLama

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Abstract. Social media stands out as the main setting of interaction within the digital ecosystem permeating the communication of religious leaders. Admitting such a premise, the following research establishes a descriptive analysis of the interaction carried out by Pope Francis and Dalai Lama in their respective Twitter accounts determining variables such as frequency of publication, use of hashtags and culminating in the revision of the lexicon used in tweets through text mining software tools. The main results denote greater activity by the Pope on Twitter in terms of the frequency and quantity of messages; on the other hand, as far as the use of hashtags is concerned, the Pope's account highlights events related to the religious doctrine he leads, while the Dalai Lama focuses on its application to current situations in the global situation. In the third objective, the lexicon incorporated by both in their messages differs. While the Pope focuses on promoting institutional identity, the Dalai Lama builds his tweets on general human values. In short, it can be concluded that the following research manages to deepen the paradigmatic axis by combining it with the dissemination in digital networks.

Keywords: Twitter · Lexicon · Hashtags · Social media · Semantic · Leaders

1 Introduction

On October 8th, 2011, the Dalai Lama participated in Google+ with Archbishop Desmond Tutu to celebrate his 80th birthday [1]. It happened because the Dalai Lama was denied a visa to visit South Africa [2]. The Dalai Lama participated in the live hangout open to the public. Later a user posted images of the hangout on YouTube. The public praised the two Nobel Peace Prize winners for their decision to meet virtually despite government restrictions [3].

On January 23, 2014, Pope Francis described the Internet and its immense possibilities for meeting and solidarity as a gift from God [4]. It is necessary to study religion in social networks due to the growing dominance of religion in the media. Religion is a central component of human culture, identity, and social relations [5].

Prior to 2010, no international religious leader had posted content on Twitter. This all changed after one person supplanted the Dalai Lama on Twitter. After this incident, the real Dalai Lama joined Twitter in February of that year and other international religious leaders did the same.

Religious organizations aim to serve their followers. Communication is crucial to this. Many religions require the consumption of multimedia materials through books, music and so on [6]. The greatest leaps in education and communication were with the invention of the printing press that inspired a global increase in literacy. Religious organizations are pioneers in terms of communication [7]. The emergence of the Internet and social networks is now important for faith-based organizations [8] meaning that in many parts of the world, major religions represent the primary focus of communication at local, national and global levels.

Surveying religious leaders, it was found the use of Internet as an educational resource and that most spiritual leaders go online to promote their congregational worship [9]. Regarding the relationship between religion and social networks, 20% of Americans posted content about their religion on social networks. Internet users seek religious information and communication through the Internet [10].

While there are social network accounts for temples, synagogues, churches and monasteries, they are few and far between. Religious leaders are accepted as personified representations of religious organizations. Catholicism and Buddhism were specifically chosen for several reasons, (a) they are actively practiced internationally; (b) they have living religious leaders who are active in social networks; (c) they have a rich history of communication both outside and within the Internet; and (d) they have a senior religious leader [10].

His Holiness the 14th Dalai Lama, a Buddhist monk and spiritual leader from Tibet, was recognized within two years as the reincarnated. The Dalai Lama assumed all political and spiritual power in Tibet at age 15 and is known for his non-violent approach and the lifelong struggle for Tibet's liberation from Chinese rule. The Dalai Lama is now 80 years old and has traveled the world encouraging peace initiatives. The Dalai Lama's Twitter username is @DalaiLama and his first tweet was on February 22, 2010 [10].

Pope Francis is the first American Pope and was elected Pope at age 76 on March 13, 2013. Pope Francis is known for his humble approach to the papacy, his modern style towards the papacy, and his compassion for the poor. Pope Francis was considered the "Pope of the people" and is the second Pope to have a Twitter account. Pope Francis' Twitter username is @Pontifex, which is Latin for "bridge builder. Pope Francis has nine Twitter accounts. His first tweet occurred on March 17, 2013, five days after he was elected Supreme Pontiff [10].

Religious leaders are perceived as building trust and relationships with their followers by speaking to them "personally", without having a conversation with them through the traditional model of symmetrical communication. It is through communication on Twitter and personal references on Twitter that the Pope and the Dalai Lama are perceived positively and that helps to maintain a positive relationship between the religious leader and his followers, thus inspiring and encouraging commitment to their religion [11].

The presence of religious leaders in social media can serve not only religious teaching messages but also interreligious and ecumenical dialogue. An episode from late May 2013 demonstrates this. The official headquarters of the Church of England, Lambeth Palace, reiterated Pope Francis' idea of prayer in his account @lambethpalace.

1.1 Quantitative Analysis of Content on Twitter

Twitter is a tool for measuring public opinion [12]. All tweets are public unless the account holder specifies, explaining that Twitter is an accurate and reliable snapshot of global sentiment [13].

Twitter is a web-based social networking site that was publicly launched in 2006. This social network allows its users to post photos, text, audio, video and information across the web. Twitter allows its users to include website URLs, hashtags (#), other accounts (@), photos, and videos of the published content. Twitter differs from other social networks by its 140 characters limit per tweet. Twitter is also considered a website or microblogging tool [10].

Twitter is a free resource that encourages users to produce and consume information. Twitter is available anywhere in the world with Internet access or a cell phone data plan. Twitter is available in 33 languages with 288 million active users per month. Every time a user tweets, or publishes content, the tweet can be seen by the public or only by approved "followers", people who have been granted access by the account holder. Users post an average of 500 million tweets per day.

The growth of active users on Twitter is exponential. The number of users increased by 28% between 2013 and 2014. A large part of the steady growth is attributed to the ease of use of the social networking site, which allows users from all walks of life to learn the jargon easily, regardless of their social status, educational level or geographic location [14]. Twitter is an excellent tool for academic research. Researchers can easily measure opinion, relevance, and attribution through content analysis of public tweets [15].

2 Methodology

This article presents a perspective focused on a descriptive view of the interaction from religious leader and its influence through Twitter accounts to know the main contents of interest at a communicational level in each religious doctrine. For this purpose, the social network Twitter has been selected as the main source of the content exposed by 2 media leaders such as the Dalai Lama and Pope Francis, thus configuring 3 specific objectives:

– Determining the frequency of publications of both spiritual leaders on Twitter.
– Identifying the most repeated hashtags of their publications on Twitter
– Applying a sentiment analysis referring to the lexicon presented in the tweets of both leaders.

The design used in this research contains a deductive-quantitative approach with a descriptive scope ordered by the application of content analysis, defined by Bardin (1996) as the set of techniques for the analysis of communications willing to obtain quantitative indicators by systematic and objective procedures of description of the messages allowing the inference of knowledge related to the conditions of production/reception within the social context of these messages. Specifically, the nature of social networks provides a significant construction of units of analysis that facilitate the coverage of the

messages through computational processes and algorithms that allow the collection of patterns arranged by the fluctuations categorized in Twitter [16].

For this purpose, two religious authorities have been selected, Pope Francis and Dalai Lama excluding leaders of other religions because both have important similarities: both act as examples for Catholicism and Buddhism respectively, both act as promoters of human values, and of course both use social networks to communicate their message.

In this case, we have selected the official English accounts of Pope Francis @Pontifex, created in February 2012 which contains more than 18 million followers and the account of the Dalai Lama @DalaiLama created in February 2009 which maintains today more than 19 million followers. It should also be noted that the Pope has 8 more accounts in different languages, Latin, German, Spanish, Portuguese, Polish, Italian, French and Arabic which in total would imply more than 30 million followers. However, recognizing that the Dalai Lama only has one account in English, this study was oriented only to tweets written in that language. Although the Twitter accounts of the Pope and Dalai Lama, specializes in the rhetoric of the community, while the following study seeks to deepen the quantitative method from computer tools obtaining complementary and equally significant data on the sequential use of social networks and lexicography in religious doctrines [17].

The tweets analyzed are dated between January 2019 and July 2020, basically 19 months of publications made by both religious leaders were considered. The reason that supports such selection is that initially it was going to be reviewed only for one year, January 2019 until January 2020, however, the escalation produced by the global pandemic has been a phenomenon that was also intended to be explored during the analysis of content.

For the collection of tweets, first, performed the authentication of Twitter to access the application programming interface (API) through the Software R version 4.02, then established a script in that software, which allowed modularizing the extraction of tweets referred to the objectives that contained the following components:
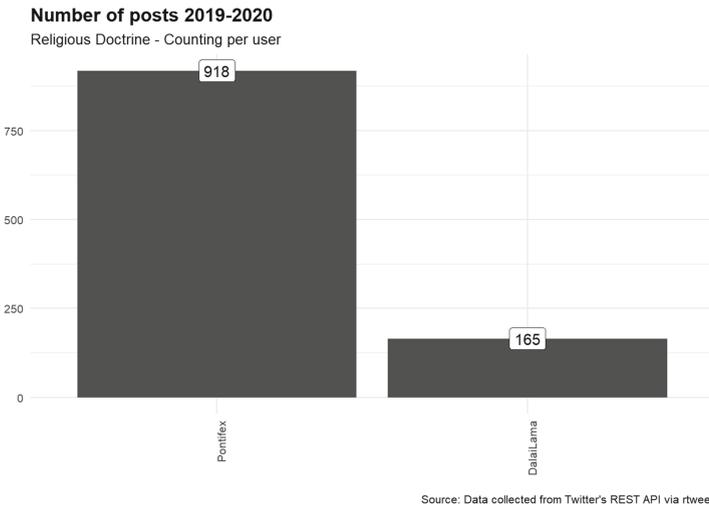
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Stringr
ROAuth
RCurl
ggplot2
tm
RJSONIO
wordcloud
gridExtra
plyr
score_sentiment.R
func_on_tweet.R
graphs.R
```

The Script codes exposed respond in computer language translated to the information obtained about the units of analysis: frequency of publication, distribution of tweets, labels and lexicon, being systematized from a sample estimated in tweets (n = 1,803) that reflects the terminological configuration of the publications issued by both religious

leaders. Likewise, it should be expressed that the function of this study is not to make a subjective comparison between Pope Francis and the Dalai Lama nor to demonstrate direct traits of their personalities, but to demonstrate, in short, the interaction of their doctrine through a lexicological review of their respective tweets.
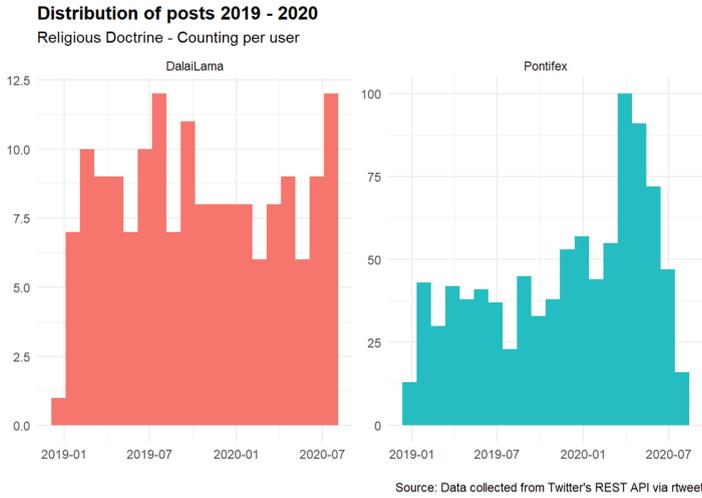
3   Results

As for the preliminary results, the first figure shows the number of tweets made by both religious leaders during 19 months, in the case of Pope Francis' account, @Pontifex, published 753 more than the Dalai Lama, @DalaiLama, generating a percentage difference of 556% more, meaning that, Pope Francis generated 5 times more publications than Dalai Lama (Fig. 1).

Number of posts 2019-2020
Religious Doctrine - Counting per user

Source: Data collected from Twitter's REST API via rtweet

**Fig. 1.** Number of tweets from @Pontifex and @DalaiLama.

Likewise, concerning the distribution of tweets, an average of 8 tweets per month is denoted in @DalaiLama, while @Pontifex contains an average of 48 tweets per month. However, in the case of the second religious leader, an exponential increase is displayed (+416 tweets) since the beginning of the year 2020 when + 45% of tweets were published for 7 months. On average, during the year 2019, 42 tweets/month were published, while in 2020 it was 59 tweets/month. In short, it is noted that @DalaiLama maintains a symmetry in the monthly amount of tweets in both 2019 and 2020, however, @Pontifex in addition to publishing more than @DalaiLama has also progressively increased the number of publications in 2020 (Fig. 2).

Microblogging services such as Twitter are configured to use hashtags (#), this tool facilitates the search and filtering of specific information. During the 19 months reviewed, the predominance of @Pontifex in the use of symbols is clearly shown. In fact, the

Distribution of posts 2019 - 2020
Religious Doctrine - Counting per user

Source: Data collected from Twitter's REST API via rtweet

Fig. 2. Distribution of tweets from @Pontifex and @DalaiLama.

20 most repeated hashtags come from that account (Fig. 3), highlighting Catholic festivities such as #HomilySantaMarta, #Lent, #Angelus, #Easter, as well as events such as #GeneralAudience, #LaudatoSi5 and #PBC2019, while @DalaiLama only incorporates them in one of its sentences, as happens with #InternationalWomensDay; #PeaceDay-Challenge; #JanAndolan; #SwachhBharatMission; #plasticfree, #InfinitePotentialFilm, #DavidBohm; #QuantumPotential.

Source: Data collected from Twitter's REST API via rtweet
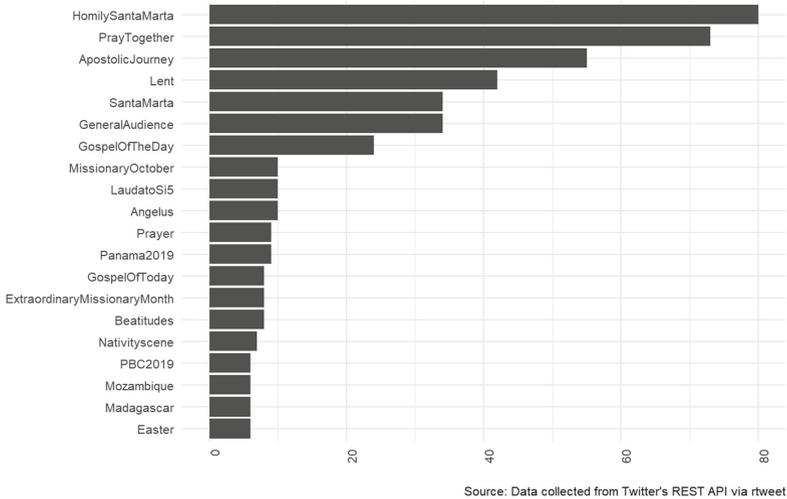
Fig. 3. Most used hashtags 2019–2020

Then, for the sentiment analysis, the modulated compilation of the phrases emitted by both religious leaders leads to demonstrate significant particularities in their messages. In the first instance, @DalaiLama expresses a notion of his doctrine through values such as compassion (52), happiness (43), strength (32), love (31), peace (29), tolerance (26) adding also general concepts such as something (27), others (27), life (24). On the other hand, @Pontifex reverberates the identity with terms properly seated in doctrine: god (31), Christian (30), catholic (29), church (26), Vatican (19), cardinal (17) and jesus (16). Similarly, it expresses actions correlated with its religious vision as charity (29), philanthrophy (25), pray (21), allow (15). Finally, the presence of contextual circumstances is uniquely evident by adding the reiteration of the term COVID (20) (Fig. 4).
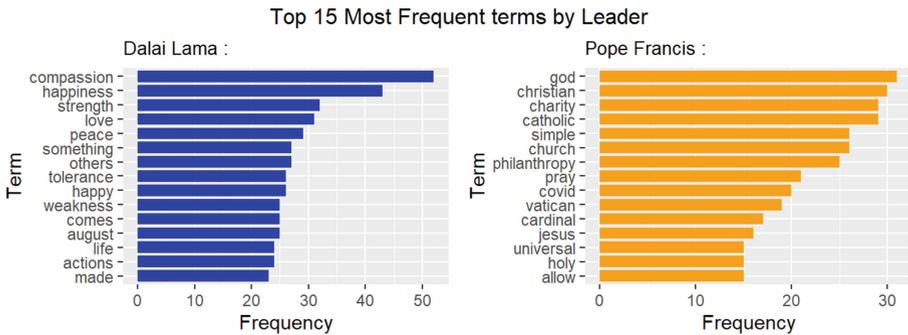

Fig. 4. Top 15 most frequent terms in @DalaiLama and @Pontifex

Both religious leaders have different communicational strategies. A greater terminological heterogeneity of the @DalaiLama is evident, accentuating a nucleus of words related to human values, but at the same time accompanying it with words of lesser frequency that can be inferred towards an orientation of political criticism: Tibetan, Chinese, censored, security. On the other hand, @Pontifex builds its terminological core towards the identity of the religion it professes by linking it with reflections on the global situation echoing terms such as COVID, media, couple, victims. In short, the Dalai Lama and Pope Francis have developed a different lexical repertoire in the messages on their Twitter accounts, maintaining a unique interaction with their followers.

4   Conclusions and Discussions

According to the results obtained, multiple edges are discovered that arise from the interaction exposed by both religious leaders in this microblogging platform, while at the same time new disjunctions are built for future research. The first edge is ordered towards a quantitative variable that responds to the frequency of emission of messages in Twitter, this purely numerical objective allowed observing the concurrent use of Pope Francis in the writing of 280 characters. From a descriptive point of view, curiously none of the religious leaders follow each other, in fact, the Dalai Lama does not follow any other Twitter account, while Pope Francis follows his other accounts presented

in other languages. Similarly, both redirect their accounts to websites and contain a defined location. Regarding @Pontifex, it links to the official Vatican news website (vaticannews.va) and of course is in Vatican City, while @DalaiLama links to its own website (dalailama.com) and is geolocated in Dharamsala, India.

As for the second edge, hashtags play a heterogeneous role in coordinating online communities and search-related issues, so it can be considered as a resource that stands out in both religious leaders to indicate a post that is considered important to interpret opinion and feeling in social network discourses. On the part of Pope Francis, the hashtags emphasize events linked to the doctrine of the Church, while the Dalai Lama directs their use to current issues that are reiterated in the communication spectrum, but of a more general nature.

On the other hand, the third part of the study sought to go deeper into the lexicon constructed in the tweets by means of a computerized text mining tool, managing to extract the most frequent terms, leading to the interpretation of divergent communicative strategies. @DalaiLama uses an inter-religious communicative strategy through concepts that could permeate different doctrines; meanwhile, the strategy of @Pontifex is constructed towards the promotion of institutional identity, combined with the contemporary situation.

Some of the limitations presented in the study were the difficulties in systematizing the tweets and the second, maintaining the impartial scientific correspondence of the information, keeping a discourse that does not alter religious sensitivities. In short, analyzing the communicative presence of both religious leaders has generated significant findings that should be extrapolated to other researches, such as the review of other social networks and the prospective use of other emerging impact platforms such as TikTok. We also invite descriptive comparisons of other religious leaders, as well as in-depth profiles of regional and local leaders. In fact, in support of knowledge mainstreaming, the application programming interface components presented in this document are freely accessible and can be implemented in other studies related to social networks, thus producing new contributions for the academic community.

References

1. Liu, M.: Dalai Lama, Twitter Rock Star: The Virtual Influence of His Holiness. https://bit.ly/3j4yrlH. Accessed 21 Oct 2020
2. Macale, S.: Dalai Lama and Archbishop Desmond Tutu to Hangout on Google+. https://bit.ly/3k4ynDF. Accessed 21 Oct 2020
3. Choney, S.: Big-time 'hangout': Dalai Lama and Desmond Tutu on Google+. https://on.today.com/3403HxN. Accessed 21 Oct 2020
4. Fung, B., Boorstein, M.: Pope Francis calls the Internet 'a gift from God'. The Washington Post. https://wapo.st/3lTpqgW. Accessed 21 Oct 2020
5. Lichterman, P.: Religion and the construction of civic identity. Am. Sociol. Rev. **73**(1), 83–104 (2008)
6. Campbell, H.: Spiritualising the internet: uncovering discourses and narratives of religious internet usage. Online Heidelberg J. Relig. Internet **1**(1), 1–26 (2005)
7. Cannon, D.: Who do you say that I am? A history of how religion communicators have often avoided "public relations." J. Public Relat. Res. **27**(3), 280–296 (2015)

8. Rupp, W., Smith, A.: A study of the interrelationships between the internet and religious organizations: an application of diffusion theory. Serv. Mark. Q. **24**(2), 29–41 (2002)
9. Larsen, E.: Wired Churches, Wired Temples. Pew Research Center. https://pewrsr.ch/2T1 St5y. Accessed 25 Oct 2020
10. Morehouse, J.: Favorite for Jesus, Retweet for Buddha: A Content Analysis of Religious Leaders on Twitter. University of Houston Press (2015)
11. Tilson, D., Chao, Y.: Saintly campaigning: devotional-promotional communication and the U.S. tour of St. Therese's relics. J. Media Relig. **1**(2), 81–104 (2002)
12. Greer, C.F., Ferguson, D.A.: Using Twitter for promotion and branding: a content analysis of local television Twitter sites. J. Broadcast. Electron. Media **55**(2), 198–214 (2011)
13. Aiello, L., Petkos, G., Martin, C., Corney, D., Papadopoulos, S., Skraba, R., Goker, A.: Sensing trending topics in Twitter. IEEE Trans. Multimedia **15**(6), 1268–1282 (2013)
14. Duggan, M., Ellison, N., Lampe, C., Lenhart, A., Madden, M.: Demographics of Key Social Networking Platforms. Pew Internet Research. https://pewrsr.ch/3511QIC. Accessed 26 Oct 2020
15. Vargo, C., Guo, L., McCombs, M., Shaw, L.: Network issue agendas on twitter during the 2012 U.S. presidential election. J. Commun. **64**(2), 296–316 (2014)
16. Kim, H., Jang, M., Kim, S., Anan, W.: Evaluating sampling methods for content analysis of Twitter data. Soc. Media+ Soc. **4**(2), 120–135 (2018)
17. Toth, T., Farkas, J.: The terminologies of two religious leaders rhetoric about communities in pope Francis'and Dalai Lama's tweets. Eur. J. Sci. Theol. **15**(5), 159–178 (2019)