



Topic Modeling on Tweets about Limited Face-to-Face Classes during Covid-19 in the Philippines

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Abstract

In line with the huge disruption caused by the spread of the coronavirus in the academic learning and education of Filipino students, this study aims to conduct a topic modeling examining tweets about limited face-to-face classes during COVID-19 in the Philippines for the purpose of determining what Filipinos on Twitter talk about and what their topmost concerns are with regard to this new educational or learning setup. Using the qualitative research approach, the researcher utilized the topic modeling method in order to obtain and mine data from Twitter and use it as a source and reference in gathering insights from people that will help achieve the maximization of academic learning, in the midst of the massive educational disruption in the country. Topic modeling was used in this study to identify topics and obtain hidden text patterns from a given text corpus. Findings from the topic modeling conducted on Twitter revealed certain predominant topics that Filipino Twitter users are currently discussing or talking about based on their tweets related to limited face-to-face classes during COVID-19. These topics include the limited nature of classes during the pandemic, which limits their knowledge and learning as students and concerns about health and safety. The topics derived from the study's findings put emphasis on people's concerns about the limited nature of classes during this time, which also restricts the students' ability to acquire new knowledge and learn. As their discussions centered mostly on the limitations of classes, it is evidently one of their topmost concerns.

Keywords: Topic Modeling, COVID-19 pandemic, Twitter, limited face-to-face classes.

1. Introduction

One of the biggest adverse impacts of the COVID-19 pandemic worldwide is the massive disruption it has caused to the educational system. As the whole world was put to a complete stop by the quickly spreading coronavirus, the majority of schools in many countries were closed, leaving students without a choice but to quickly shift and adapt to remote or distance learning [1]. Alarmingly, as a result of the pandemic, students from various parts of the world experienced learning struggles at home, perhaps due to the isolation and the frustration of not being able to go out and study in what used to be the 'normal' classroom set-up [2].

In the Philippines, the education of over 27 million students has been severely disrupted due to school closures and a lack of in-person or 'face-to-face' classes since the COVID-19 outbreak in 2020 [3]. Fortunately, the government recently approved the expansion of the

implementation of limited face-to-face classes in the country, in accordance with the health and safety standards set by the Department of Health [4]. Interestingly, however, this triggered polarizing opinions among many Filipino parents and students, with some agreeing and others disagreeing with the progressive expansion of in-person classes in the country. Given the differing views on this important matter, this study intends to acquire the Filipinos' predominant views and thoughts on the implementation of the limited face-to-face classes and determine their topmost concerns as students begin to shift to this new learning and educational set-up.

Currently, there is no data from any other study supporting the majority of Filipinos' opinions about limited face-to-face classes. Thus, this study intends to address this research gap by conducting topic modeling, specifically examining tweets from Twitter users sharing their views about limited face-to-face classes during COVID-19. Twitter, a very popular microblogging social media platform will be used as the 'text corpora' from which the most predominant topics related to the study will be derived [4]. Since Twitter has become a valuable and reliable platform to mine people's opinions and views on many different topics, it is considered useful to utilize this platform as a text corpus in this study.

In line with this, the main purpose and research goal of this study is to determine what Filipinos on Twitter talk about in line with the implementation of the limited face-to-face classes in the Philippines and what their topmost concerns are with regard to this new educational or learning setup. Moreover, this study also intends to determine the data sets that may be collected for topic modeling with regard to tweets related to limited face-to-face classes during COVID-19 and the specific tools and topic modeling techniques that may be used to acquire these data sets.

2. Related Works

COVID-19 and its Impact on Education in the Philippines

The onset of the global health crisis, specifically the COVID-19 pandemic, caused massive disruption to the education and learning of students. As everyone was advised to stay at home, schools and other types of establishments were ordered to temporarily close to restrict the movement of people and protect them from the rapidly spreading virus [5]. Consequently, as people, especially students, were confined to their homes, the different educational institutions in the country were left with no other choice but to implement special work-from-home arrangements for teachers and school administrators and facilitate the shift to online learning among students [6].

Undoubtedly, the COVID-19 pandemic posed an adverse impact on the status of education in the country, as many learners struggled to adjust to online learning and other new educational tools and platforms [7]. Unfortunately, the new distance learning program in the country did not work for many students, as a year since the beginning of the pandemic, it was reported that almost 2 million Filipino students chose not to enroll [8]. Apparently, most of these students opted to be temporarily out of school for various reasons. Some of these reasons include the slow speed of the Internet, which disrupts the students' learning process, the additional costs associated with online learning as a new educational platform, and the many sources of distractions at home, to name a few [8].

The shift to online learning also enabled students to face numerous challenges that were part of the adjustment process for them to continue their education in the midst of the pandemic

restrictions. One of these challenges is the sense of isolation that many students experience while attending online classes. For instance, students who were required to work on their modules alone found it difficult to self-study, as they had no one else to turn to for questions or clarifications. As a result, many students felt that they lacked proper guidance from their teachers, which is essential in maximizing their learning process [9].

Another challenge is the limitations of online learning in many ways. Aside from creating a sense of isolation for students, the giving of feedback is also very limited in online learning, and teachers often fail to monitor the learning hurdles and the actual learning progress of their students because of the distance [10]. Moreover, because of the absence of face-to-face interaction and communication between students and teachers, many learners found it challenging to motivate themselves to study and to focus on the tasks at hand. Students who attend online classes also have to learn to be more disciplined with time and to purposely avoid distractions at home, which can be challenging given the absence of a teacher to guide them [9].

Limited Face-to-Face Classes

The most recent announcement from the Department of Education highlights the approval of more than 10,000 schools (both public and private) in the country to resume the implementation of limited face-to-face classes in the present year [10]. In the midst of this plan, educational institutions emphasized that limited face-to-face classes are not mandatory and students (especially those who are unvaccinated) may opt to not attend the face-to-face classes and simply continue with their chosen alternative learning modes (e.g., modules, online classes, etc.) [11]. In addition, the health and the safe return of students to school remain at the top of the priorities of the government in the implementation of limited face-to-face classes in the country [12]. In fact, schools that were given a go-signal to execute limited face-to-face classes are required to comply with the SSAT (school safety assessment tool) standards, which will serve as a school's safety seal [13].

Interestingly, despite the remaining threats posed by COVID-19 in the midst of the resumption of in-person classes in the country, many Filipino students and parents are optimistic that the implementation of limited face-to-face classes will benefit students academically, as teachers will become more involved in the learning process of their students [14]. Nevertheless, despite many parents' approval of the limited face-to-face classes, there are still some who disagree with it, especially parents whose children are still unvaccinated. They are the ones who remain most worried about their children contracting the virus while attending classes in school [14].

Social Media on the Impact of Covid-19 in Philippine Education

The Philippines has been tagged as the 'social media capital' of the world as it is home to at least 89 million Filipinos who spend an average of 4 hours a day on various social media platforms [15]. At the height of the COVID-19 pandemic and the lockdowns, Filipinos proved to be more active on social media, particularly on Facebook and Twitter, even using specific hashtags to convey their thoughts and opinions about the on-going pandemic [16]. One study also validated the active use of Filipinos on various social media platforms during the course of the pandemic. For instance, those in isolation or in quarantine relied on the use of social media platforms to maintain their communication and social connectedness with others [17].

On top of keeping people socially connected during the pandemic, social media also served as an important source of information about COVID-19 updates. Social media platforms such as Facebook and others provide dedicated sections and pages that link directly to valuable and related information on COVID-19, including educational discoveries, protocols, and guidelines, etc. [18]. Moreover, social media sites were also used by a number of educational institutions as a means of reaching out to students to drive the learning process. In fact, at the height of the pandemic, many schools tapped into the use of various social media platforms to run and broadcast recorded lectures and webinars so as to reach as many audiences as possible [18]. This highlights the valuable role that social media sites play in driving learning and education given the educational disruptions and gaps caused by the pandemic. Furthermore, there was evidence to support the assumption that Filipinos actively talked, discussed, and shared their experiences about the COVID-19 pandemic on various social media platforms [19].

Analyzing Data Through the Topic Modeling Method

Topic modeling is defined as an analytical tool used for data evaluation. More specifically, it is a machine learning method that analyzes various types of text data to automatically determine cluster words for a given set of documents [20]. It may be considered a powerful analytical tool/ technique that is often applied to a large collection of documents or texts. In applying this technique, it is important to note that topics are viewed as recurring patterns composed of words that co-occur. Through the topic modeling tool, different words can be linked together in the same context, and words that have different meanings can also be differentiated [21]. What is beneficial about utilizing the topic modeling technique is that it serves as a means of engaging in the distant reading of specific texts. The topics that are derived through topic modeling aid in highlighting thematic trends as well as patterns that cannot be easily derived within extensive data sets [22].

3. Methodology

Using the qualitative research approach, the researcher utilized the topic modeling method. The topic modeling process adhered to in this study includes data collection, preprocessing of data, and the generation of topic models and topic labels. These are depicted in the fig. 1.:

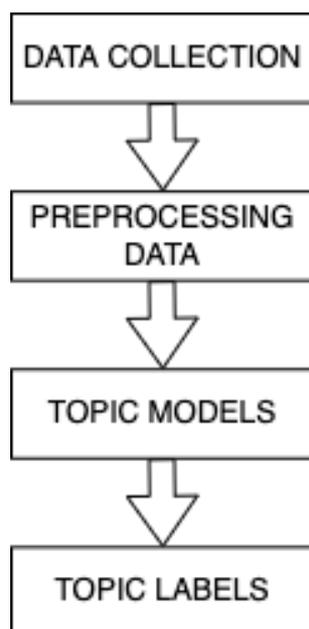


Fig. 1. Topic Modeling Method/Process

Data Collection

Tweets about limited face-to-face classes during COVID-19 in the Philippines were collected using the Twitter library of RStudio. The researchers chose the Twitter platform as the text corpora in this study, primarily because it is designed to produce or generate a huge number of short messages from actual users sharing their personal views and opinions about a topic. Hence, Twitter can be used as a reliable source of data sets which may serve as a basis of people's thoughts on limited face-to-face classes during the COVID-19 pandemic. A total of 7,598 tweets related to limited face-to-face classes during COVID-19 in the Philippines were collected by the researchers.

Preprocessing of Data

The preprocessing of data is a crucial step to making data more amenable to an accurate and reliable analysis of the study's findings. Data processing also increases the accuracy and efficiency of a machine learning model. For this study, the researcher utilized the preprocess text widget of Orange to remove duplicates, URLs, punctuations, hashtags, as well as symbols, and transform all data to lowercase. The tokenization and filtering processes were also applied in this study. After the preprocessing method, a total of 5,487 data sets were retained.

Generating Topic Models

Given the 5,487 data sets obtained, the number of topics was set at ten (10) unique words by the researcher, considering the log perplexity and coherence score. The topic models were generated in Orange using the Latent Dirichlet Allocation, a popular topic modeling algorithm. Based on the Dirichlet parameters, which indicated the weight of each topic, it is evident that the primary/main topic in this study was "limitations of online learning during the pandemic" with 25.5%.

Creating Topic Label

The analysis of each topic model was performed by the researcher based on two criteria: (1) the frequency with which every unique word occurred; and (2) the interconnection of every

word listed and the meaning created when the topic models are grouped together. The manual assignment of the topic labels was based on the personal judgment of the researcher. Moreover, the researchers asked some experts to validate and review all the topic labels assigned per number.

4. discussion of findings

Table 1 presented below (see Table 1) shows all the topic models with their corresponding Dirichlet parameters which indicate the weight of every topic obtained in this study: topic model results

No.	Topic Labels	Weight	Topic Models
1	Internet connection problems/difficulties in online classes	0.03368	student, understand, limited, class, lesson, classes, school, internet, connection, hard
2	Online class during COVID-19 pandemic	0.02804	learning, students, student, online, class, knowledge, covid, pandemic, people, academic
3	Focus on health and safety of students	0.05637	students, classes, school, teachers, learning, ensure, safety, covid, health, concentrate
4	Limited classes for students equate to limited knowledge	0.25396	classes, limited, students, learn, online, covid, learning, class, knowledge, implementation

5	Limited classes equate to limited learning during pandemic	0.115 23	classes, limited, pandemic, students, students, school, virus, learning, covid, agree
6	Students needing help in learning in the midst of limited classes due to COVID-19	0.038 46	classes, limited, normal, students, covid, time, learn, especially, student, help
7	Students' limited classes result to limited learning in school	0.148 78	students, limited, classes, student, learn, school, education, help, understand, implementation
8	Limited online classes result to limited learning	0.127 89	classes, online, covid, students, limited, class, learning, pandemic, school, health
9	Students needing help in learning and health protection in the midst of the COVID-19 pandemic	0.077 55	students, limited, health, classes, covid, school, follow, learn, help, virus
10	Limited learning and classes online	0.086 83	learning, limited, students, class, online, student, school, classes, experience, especially

The results and findings reflected the primary/ main topics in this study, based on the weight indicated on each Dirichlet parameter include “Limited classes for students equate to limited knowledge” (25.396%), “Students’ limited classes result to limited learning in school” (14.878%) and “Limited online classes result to limited learning” (12.789%). These results evidently emphasize the limited nature of classes and the restrictions imposed on learning due to the COVID-19 pandemic. On top of the top three topic labels that resulted from the study, other topic labels that were generated from the study are as follows: “Internet connection problems/ difficulties in online classes” (3.368%), “Online class during COVID-19 pandemic” (2.804%), “Focus on health and safety of friends” (5.637%), “Limited classes equate to limited learning during pandemic” (11.523%), “Students needing help in learning in the midst of limited classes due to COVID-19” (3.846%), “Students needing help in learning and health protection in the midst of the COVID-19 pandemic” (7.755%) and “Limited learning and classes online” (8.683%).

Through a manual and perceptive analysis of these findings, it can be deduced that most of the tweets reflected the Filipino Twitter users’ concerns on the limited nature of classes and the restrictions imposed on learning due to the COVID-19 pandemic, and thus, the significance of students being able to shift to a limited face-to-face learning setup to address the learning gaps and problems that they experienced during the pandemic. The figures below show the weight of the topic keywords with the highest percentage:

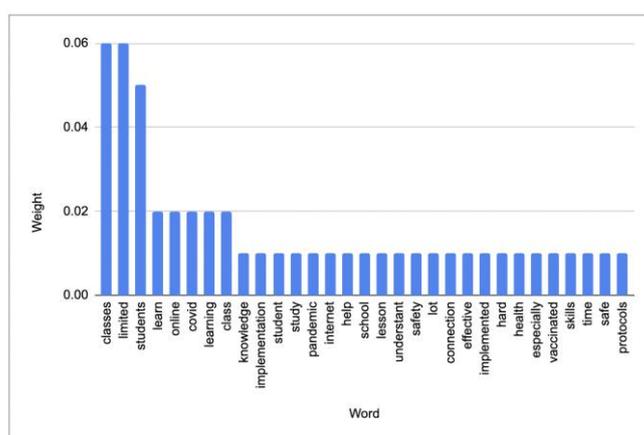


Fig. 2. Topic Label No. 4

“Students’ limited classes result to limited learning in school” (14.878%)

Fig. 2 shows the weight of words for the top topic label No. 4 (25.396%), with “classes”, “limited” and “students” having the highest weight which can be directly interpreted as an emphasis on the limited nature of classes during pandemic, which negatively affects the knowledge and learning of students. This data result confirms the literature findings that indeed, the COVID-19 pandemic, caused massive disruption on the education and learning of students [Simbulan] and that the pandemic posed adverse impacts on the status of education in the country, as many learners struggled to adjust to online learning and other new educational tools and platforms [Joaquin]. Certainly, all of these adverse impacts of the pandemic put students to a disadvantaged position in terms of academic learning progress.

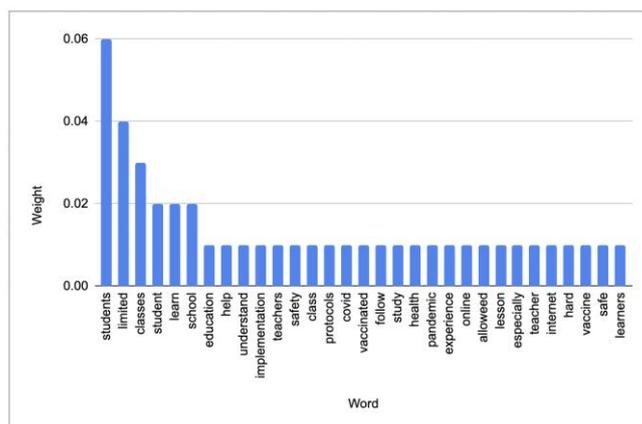


Fig. 3. Topic Label No. 7

“Students’ limited classes result to limited learning in school” (14.878%)

Fig. 3 shows the weight of words for the topic label No. 7 that gathered the second highest rating (14.878%) with “students”, “limited” and “classes” having the highest weight among all the other words. This was interpreted as “Students’ limited classes result to limited learning in school”. Similar to topic label #4, this topic label puts emphasis on the limited nature of classes during pandemic and the limited learning among students. Literatures suggest that these limitations may be attributed to a number of factors, among which include the numerous challenges that students had to face as part of the adjustment process for them to continue their education in the midst of the pandemic restrictions which include: the sense of isolation, the lack of proper guidance from teachers, and the absence/ limitations in feedback which is crucial to learning [Tamm].

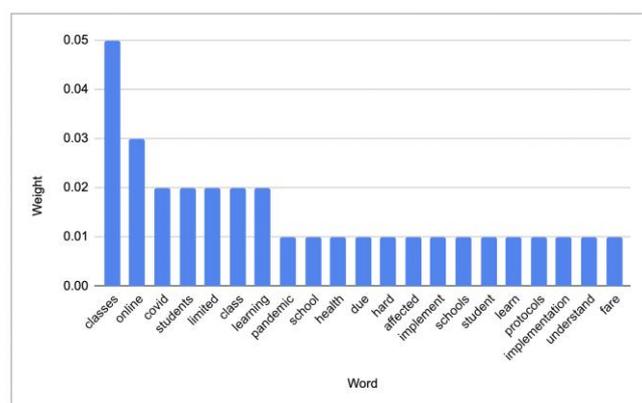


Fig. 4Topic Label No. 8

“Limited online classes result to limited learning” (12.789%)

Fig. 4 shows the weight of words for the topic label No. 8 that gathered the third highest rating (12.789%), with “classes”, “online”, “covid”, “students”, “learning” and “limited” having the highest weight among all the other words. This was interpreted as “Limited online classes result to limited learning”. Similar to topic labels #4 and #7, this topic label also highlights the limitations in online classes and its resulting restrictions on the academic learning and progress of students during the pandemic. This proves and validates that the

limitations and difficulties in learning are based on the students' real pandemic experiences and is evidently one of the topmost concerns among Twitter users, given its disadvantages to the students' academic performance and learning progress.

On the other hand, the bottom two topic labels that gathered the least rating are topic label No. 1 "Internet connection problems/ difficulties in online classes" with 3.368% rating and topic label No. 2 "Online class during COVID-19 pandemic" with only 2.804% rating. Based on these findings, it may be deduced that Internet connection is one of the least concerns of the Filipino students attending online classes in this time of the pandemic. Literatures gathered also did not delve too much on the problem on Internet connectivity although it may be considered as one of the biggest obstacles to learning among some students.

5. Conclusion

The results drawn from the study highlights the limited nature of classes during pandemic and the limited learning among students. All three topic models with the highest rating put emphasis on the limitations in online classes and its resulting restrictions on the academic learning and progress of students during the pandemic. This implies therefore that the implementation of the limited face-to-face classes is an important immediate solution to address the lag and disruption in the students' academic learning since the onset of the pandemic. Apparently, merely encouraging students to attend online classes may prove to be very limited and restrictive in terms of their learning progress. What made this study relevant and important therefore is the fact that it stresses the urgency of implementing limited face-to-face classes the soonest time possible, in order to facilitate the slow but steady shift of students from the temporary pandemic learning setup to a more permanent and effective educational setup within the classroom. Moreover, these results may serve as a guide for the LGUs (local government units) and the various educational institutions to think of other practical ways (on top of the limited face-to-face classes implementation) to further maximize the learning of students, especially in these uncertain times.

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