

PAPER DETAILS

TITLE: Social Media Analysis in Distance Education Period Due to Pandemic: Data Mining
Application on Twitter Data

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PAGES: 66-76

ORIGINAL PDF URL: <https://dergipark.org.tr/tr/download/article-file/1156089>



Social Media Analysis in Distance Education Period Due to Pandemic: Data Mining Application on Twitter Data

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Article Info

ABSTRACT

Article History

Received: 17/06/2020

Accepted: 02/11/2020

Published: 22/12/2020

Keywords:

Pandemic,
Distance Education,
Twitter,
RapidMiner,
Social Media
Analysis

Turkey decided to change to distance education because of the pandemic early 2020. As the result of that decision people express their opinions about that in social media. In this study, what people think about distance education on Twitter, how much use of hashtags, what they talked about most, and who tweeted the most with these hashtags in this period was examined. RapidMiner was used to obtain data in research. As a disadvantage brought by the RapidMiner program, data were obtained between April 5, 2020 and April 13, 2020. RapidMiner program was used to display and interpret the data too. Among the findings of the study, it has been determined that the use of positive hashtags is low, but the use of negative hashtags is high. As a result of data analysis, the current situation and the problems experienced were revealed by analyzing tweets about distance education. In line with the results of the research, various suggestions were made regarding the functional implementation of distance education

Citation: Sinoplu, M. & Yılmaz, R. (2020). Social media analysis in distance education period due to pandemic: data mining application on Twitter data, *Journal of Teacher Education and Lifelong Learning*, 2(2), 66-76.



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INTRODUCTION

At the end of 2019, a new virus called coronavirus, or COVID-19, which can be transmitted to humans and has fatal effects, has been detected (Til, 2020). This virus was first seen in China (Akbaba, Kurt, & Nazlıcan, 2014). This virus then spread to all countries. In Turkey, the first case is described by the Ministry of Health on 10/03/2020. As a result of this announcement, the Ministry of National Education firstly and then the Higher Education Council announced that a transition to distance education will be made (Yükseköğretim Kurulu, 2020).

As an example of studies on distance education, Telli and Altun (2020) gave information about the rise of this system after the transition to distance education due to coronavirus. In their studies, they compared how much countries attach importance to distance education and provided information about the availability of distance education after the crisis. They also expressed the views of students and educators using this system.

As another example of distance education, Yıldız and Seferoğlu (2020) studied the competencies of distance education students against technologies for the cycle. In this study, they aimed to measure and compare the knowledge of students in the associate degree program about distance education technologies.

It can be said that the decisions taken by the Ministry of National Education on distance education are effective in this research. In another study, Özer (2020) gave information about the decisions taken by the Ministry of National Education during the coronavirus period. In the study, he evaluated the decisions of the Ministry of National Education to develop online platforms and transition to distance education to meet the educational needs of students. It also touched upon the efforts to further improve the infrastructure of the Education Information Network (EBA), which has been used previously, through the transition to distance education due to coronavirus.

As another example of distance education, Solak, Ütebey, and Yalçın (2019) focused on comparing the success of distance education students' exams in normal and digital environments. They stated that distance education provides more flexible education in terms of time and place than normal education. They also emphasized the advantages and disadvantages of distance education and normal education.

It can be said that the subject of comparing distance education with normal education is a subject frequently researched before the compulsory distance education period. Şahin and Tekdal (2005) analyzed the effectiveness of distance education against normal education in their research. In this analysis, they gathered 50 different experimental studies and analyzed them with meta-analysis method. As a result, they concluded that distance education is a statistically more effective method of education than normal education.

Regarding distance education, it is possible to say that students' susceptibility to education is as important as students' tendency to this type of education. In the studies of Düzakin and Yalçinkaya (2008) on this subject, they aimed to find the common features of the instructors at Çukurova University related to distance education. They also tried to analyze what instructors use the computer for. As a result, it has been revealed that the instructors who use distance education mostly use the computer to send e-mails, do research and use electronic services. They also concluded that faculty members rarely use the computer for lectures and video chat about distance education.

It can be said that examining the attitudes of the candidates of the education staff towards distance education is a frequently researched subject. In their study, Ateş and Altun (2008) focused on examining the attitudes of prospective computer teachers towards distance education. In this study, they tried to analyze attitudes with variables such as gender, grade level and computer use experience. As a result, the distance education proficiency level does not change according to gender and grade level; they concluded that this level also increased as the experience of using computers increased.

Kutluca and Yalman (2013) focused on examining the approaches of mathematics teachers about the distance education system, as another example for examining the attitudes of candidates for education in distance education. They used different variables to determine students' approaches. As a result of the research, they concluded that the gender of the students, the way the lesson is taught, and the learning program are not related to distance education.

After switching to compulsory distance education due to the pandemic experienced in the beginning of 2020, people expressed their opinions, suggestions and questions on this subject through social media. Twitter, which is a social media platform used by state institutions and universities, was preferred more.

Many problems and uncertainties have occurred due to the rapid transition to distance education. People shared these problems and uncertainties, especially on Twitter, under hashtags. In this research, tweets containing hashtags related to distance education from the tweets sent during the distance education period on Twitter were examined. The daily usage numbers of these hashtags are determined by the Rapidminer program, who uses the most and which hashtags are used most in distance education. In line with this information, the research is seeking answers to the following problems:

- 1- What are the most discussed topics in Twitter users' tweets about distance education?
- 2- On which subjects did Twitter users feel dissatisfied with the tweets about distance education?
- 3- Which of the hashtags on distance education have been tweeted the most on Twitter?
- 4- Does the number of tweets posted daily with hashtags on distance education change on Twitter?
- 5- Which users tweeted the most with Twitter hashtags on distance education?

METHOD

This section focuses on the structure and number of data included in the method of the study, data collection and cleaning stages, and the analysis of the data in the last step.

Data Set

RapidMiner program was used in the research to collect, filter and display Twitter data. RapidMiner program was used for data analysis. The "Visualization" pane in the "Results" section of the RapidMiner program was used to display the results on the graph. The chart type "Bar (Column)" under the "Plot type" option was used as the chart type.

Data Analysis

In the research, RapidMiner program was used to collect Twitter data. The data consists of data between April 5, 2020 and April 13, 2020. The operators used in the RapidMiner program are as follows:

1. **Search Twitter:** It is used to search and collect Twitter data with RapidMiner. You must first link your Twitter account in the "Connections" section. The "Query" section under the operator is used for the word you want to search. The "Result type" section is used to select results by popularity or by recent tweets. The "Limit" section is used to determine the maximum number of data collected.
2. **Select Attributes:** It is used to select the data obtained according to its characteristics. In the "Attribute filter type" section, the type of the filter is selected. In the research, this section was chosen as a "single". In the "Attribute" section, you can determine which data type you want to choose according to the filter you choose.
3. **Nominal to Text:** It takes the duty to convert the data entered in different types to "text" type. In the "Attribute filter type" section, the type of the filter is selected.
4. **Process Documents from Data:** It is used to create word vectors from sentences. It includes different

operators.

5. **Token:** It is used to divide the sentences in the data into words.
6. **Transform Cases:** It is used to make all the letters in the text uppercase or lowercase.
7. **Filter Stopwords:** It is used to filter the pause words obtained after using your token.
8. **Date to Nominal:** It is used to convert the date information on the raw data to the desired format.
9. **Aggregate:** It is used to group the data with functions and count their numbers.
10. **Rename:** It is used to change the name of the desired feature.
11. **Sort:** It is used to sort the desired features in the desired order.
12. **Filter Example Range:** It is used to filter the data at desired intervals.
13. **Append:** It is used to combine the same kind of data from different sources.

These are the RapidMiner operators used in the research. RapidMiner operations for each research question are given below.

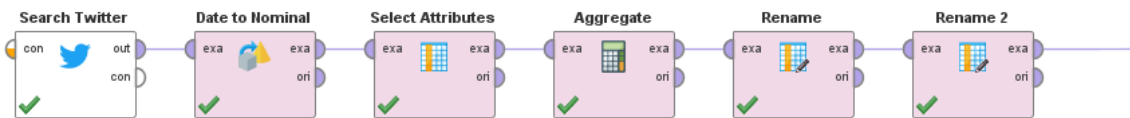


Figure 1. Calculation of the number of tweets per day for the hashtag

In the figure above, how many tweets are made per day with a specified hashtag is calculated.

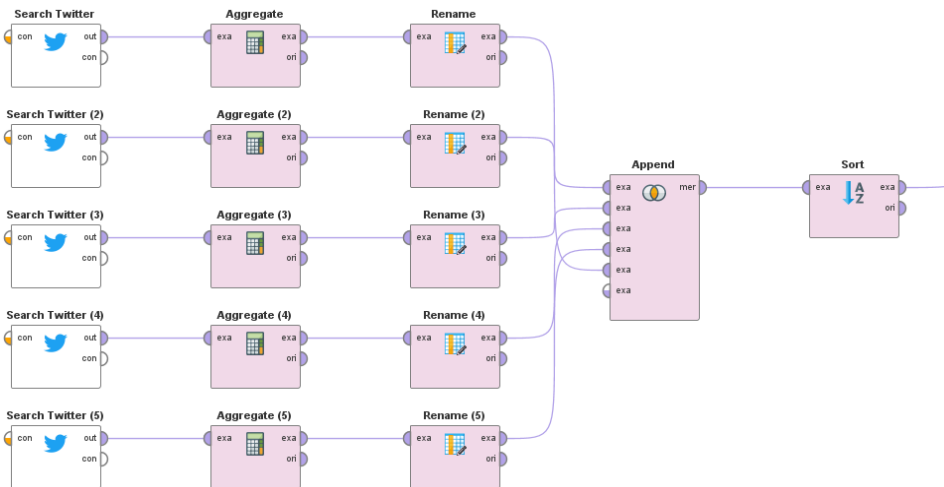


Figure 2. The process of finding weekly tweets for the determined hashtags

In the figure above, how many tweets are made per week regarding the determined hashtags are calculated.

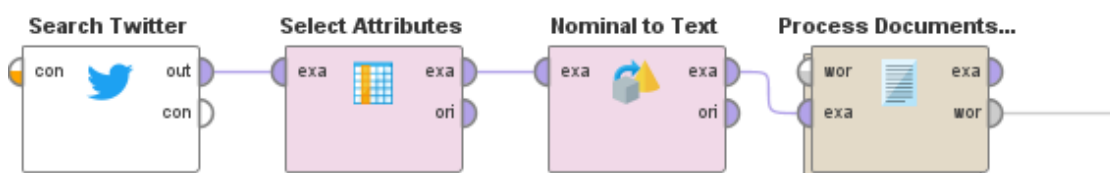


Figure 3. The process of determining the frequency of the number of words in the specified hashtag

In the figure above, the frequency analysis of the word numbers in the tweets sent with the desired hashtag was performed.

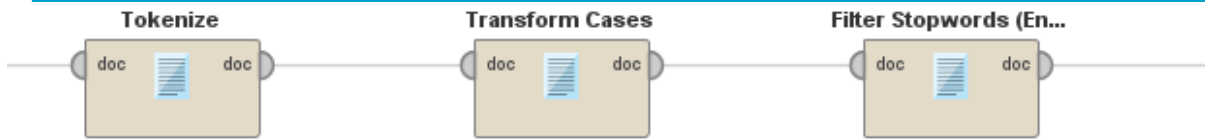


Figure 4. The operations inside the “Process Documents from Data” operator given in Figure 3.

In the figure above, other operators in the “Process Documents from Data” operator given in Figure-3 are given.

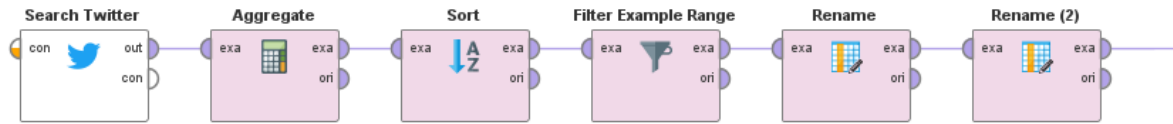


Figure 5. The process of determining which user tweeted the most with the specified hashtag.

The figure above shows which user tweeted the most with the specified hashtag.

FINDINGS

1. The most discussed topics in Twitter users’ tweets about distance education

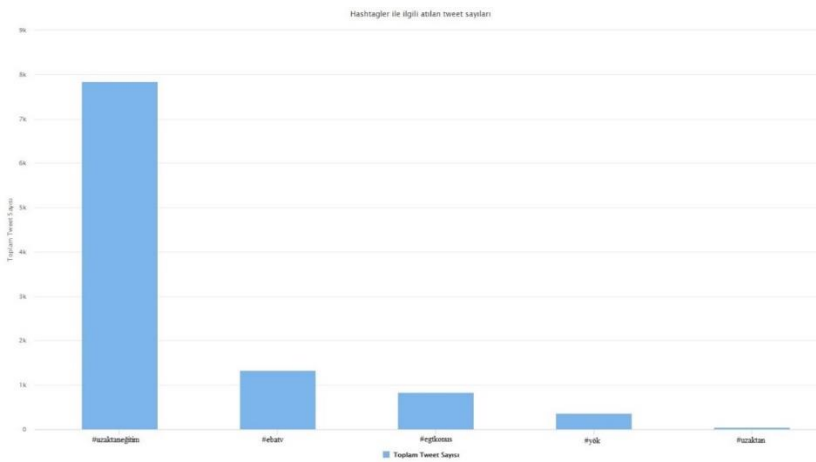


Figure 6. Weekly tweet counts of hashtags

In the figure above, weekly tweet counts with hashtags are given. It has been determined that the hashtag “#uzaktaneğitim” is by far the most used hashtag for distance education.

2. The number of daily tweets exchanged with hashtags on distance education on Twitter and the most tweeted users

2.1. Daily tweet counts with the hashtag #ebatv

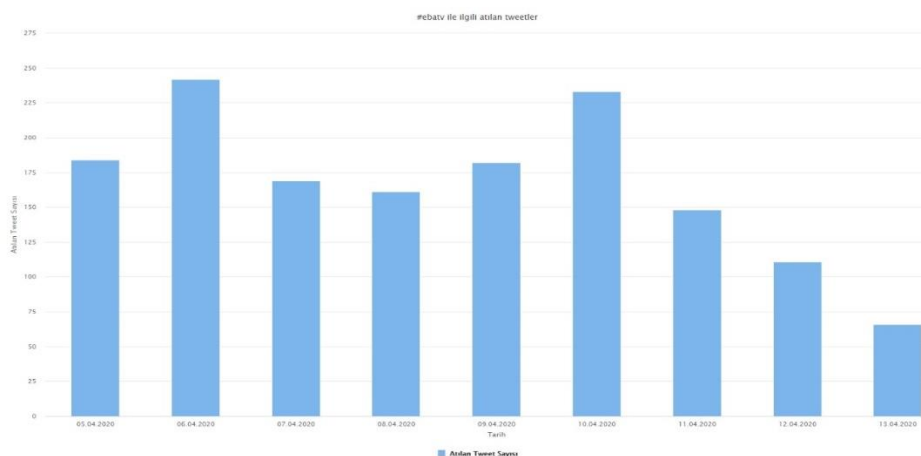


Figure 7. Daily tweet counts with the hashtag #ebatv

In the figure above, the daily tweet counts with the hashtag “#ebatv” are given. It was determined that more tweets were posted on April 6 and April 10, since it was the first and last day of the week the lessons were taught.

2.2. Daily tweet counts with the hashtag #ebatv

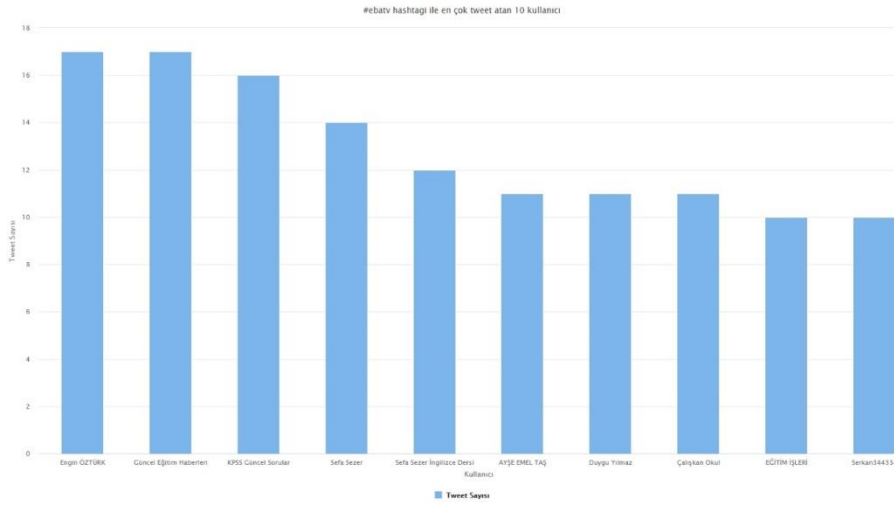


Figure 8. Users who tweeted the most with the hashtag #ebatv

In the figure above, it was determined which users tweeted with this hashtag from the tweets that were made using the hashtag “#ebatv”. It was determined that the user who tweeted the most in the period when the data was obtained was “Engin ÖZTÜRK”. In the research, it was found that he was the Diyarbakır Kayapınarı District Director of National Education. The second user who tweeted the most was the Twitter news page titled “Güncel Eğitim Haberleri”.

2.3. Daily tweet counts with the hashtag #uzaktaneğitim

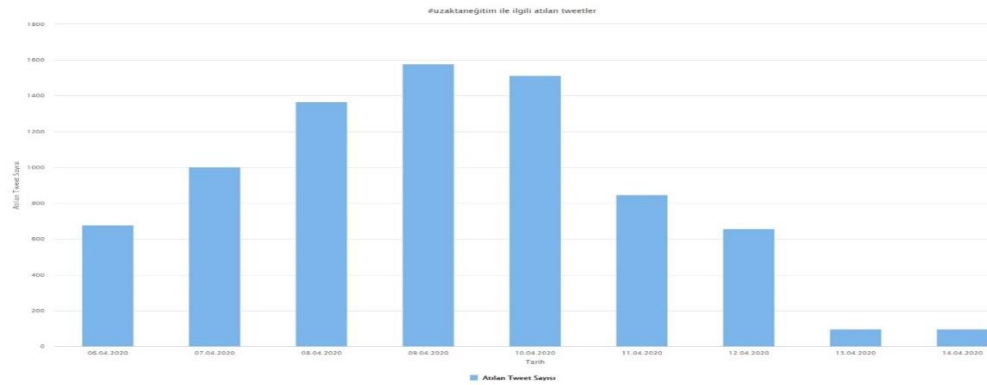


Figure 9. Daily tweet counts with the hashtag #uzaktaneğitim

In the figure above, the number of tweets that users take daily with “hashtag” hashtag are given. It is seen that the most tweets with this hashtag were posted on April 9, 2020. When this date was researched, it was found that some universities started distance education on this date (Dokuz Eylül University, 2020).

2.4. Users who tweet the most with the hashtag #uzaktaneğitim

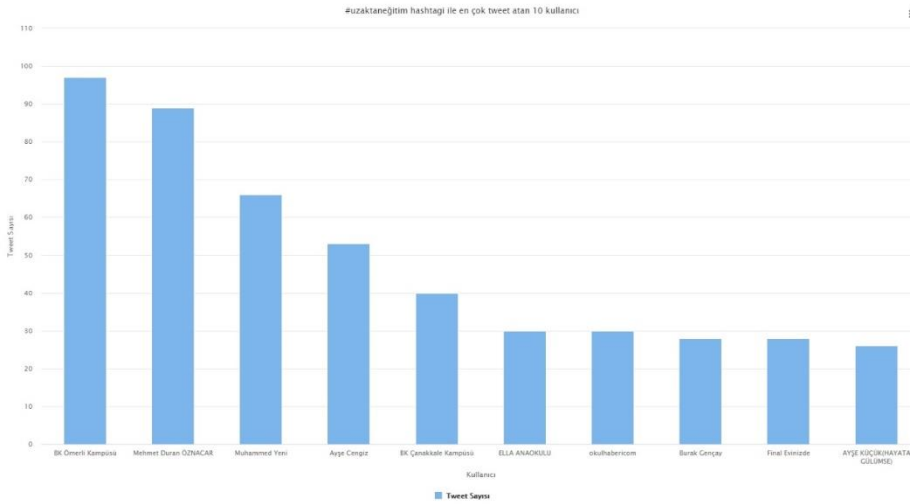


Figure 10. Users who tweet the most with the hashtag #uzaktaneğitim

In the above figure, the users who tweeted the most with “hashtag” hashtag were identified. It is seen that the user who tweeted the most with this hashtag is “BK Ömerli Kampüsü”. When researched about this user, it was determined that the user is the official page of “Bahçeşehir College Ömerli Campus”. Likewise, the second user who tweeted the most is “Mehmet Duran ÖZNACAR”. This user has also been identified as an educator working at the Bahçeşehir College Ömerli Campus.

2.5. Daily tweet counts with #egtkonus hashtag

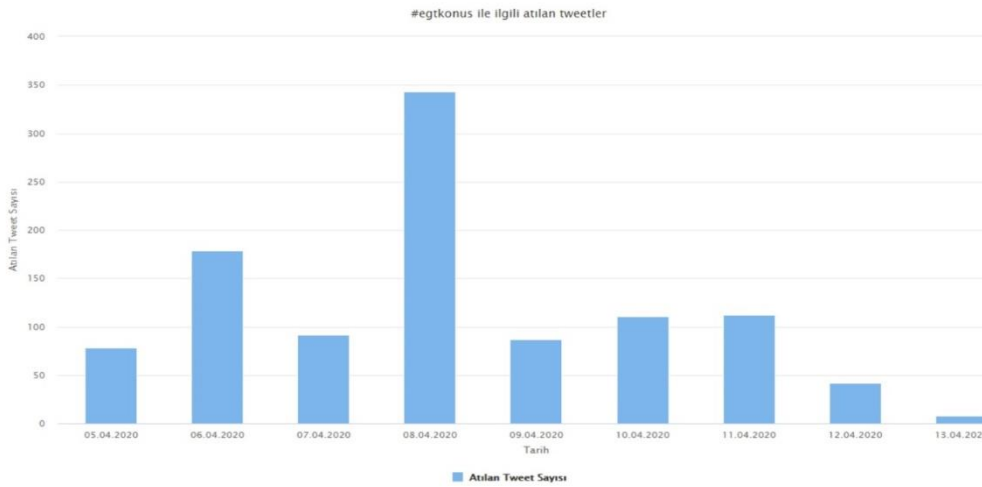


Figure 11. Daily tweet counts with #egtkonus hashtag

In the figure above, the daily tweet counts with the hashtag “#egtkonus” are determined. Looking at these numbers, it is seen that the most tweeted date with this hashtag is April 8, 2020. In the study on this date, it was seen that the “Eğitim Konuşmaları #egtkonus” page named “egtkonus” user organizes a speech at this date.

2.6. Users who tweet the most with the hashtag #egtkonus

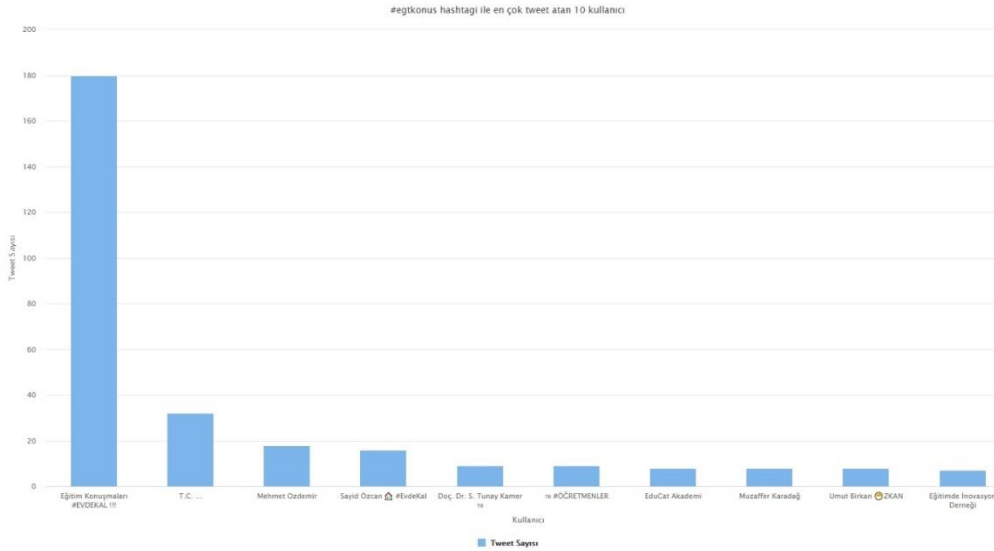


Figure 12. Users who tweet the most with the hashtag #egtkonus

In the figure above, the users who tweeted the most with the hashtag “#egtkonus” were identified. It is seen that the most tweeting user is the “Eğitim Konuşmaları” page. This hashtag is also determined by this page.

2.7. Daily tweet counts with #yök hashtag

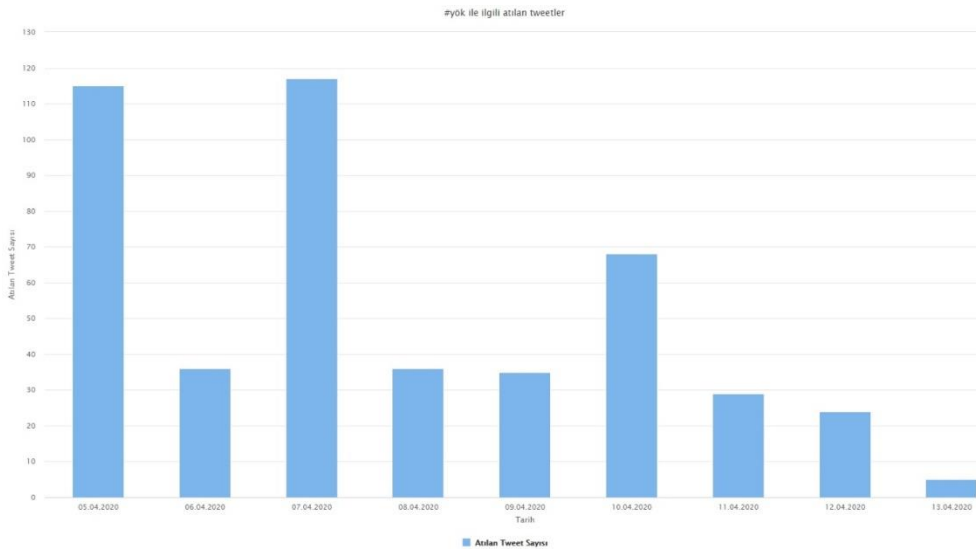


Figure 13. Daily tweet counts with #yök hashtag

In the figure above, the number of tweets sent daily with the hashtag “#yök” has been determined. It is seen that the most tweeted dates with this hashtag are 5 and 7 April 2020. In the study conducted on these dates, it was found out that it was the date when the decision to distance education was made for some universities.

2.8. Users who tweet the most with the hashtag #yök

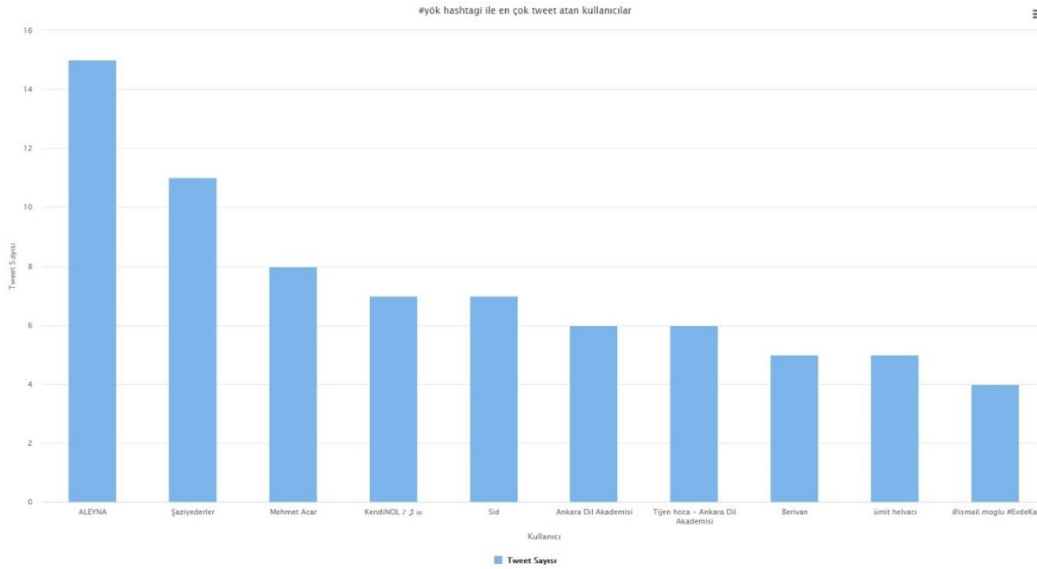


Figure 14. Users who tweet the most with the hashtag #yök

In the above figure, the users who tweeted the most with the hashtag “#yök” were identified. The most tweeted users have not been linked to an institution. In the research on users, it was found that the first two users were Sinop University students as a common aspect.

3. The most talked topics discussed in negative hashtags on distance education on Twitter

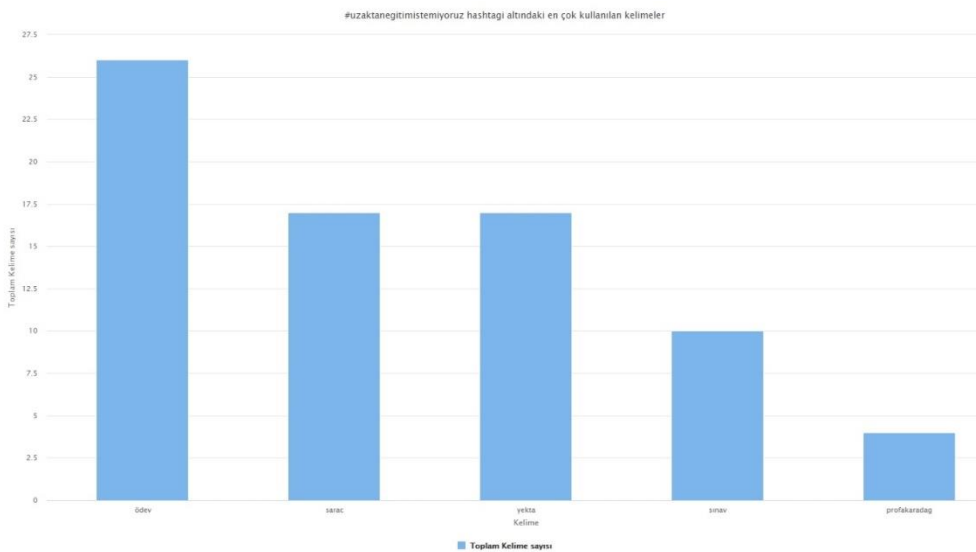


Figure 15. The most talked topics discussed in negative hashtags on distance education on Twitter

In the figure above, the most used words and the numbers of these words are determined under the hashtag “#uzaktaneğitimistemiyoruz”. When the research was done, it was seen that only the hashtags were adequately tweeted with this hashtag and only this hashtag was chosen as the negative hashtag. It is seen that the most used word in this hashtag is “homework”. Following this, the words “yekta”, “sarac” and “exam” are among the most used words. When the name Yekta Saraç was investigated, it was determined that he was the head of the Council of Higher Education.

Since there are not enough tweets about the “#uzaktan” hashtag, the number of tweets per day and the determination of the people who tweeted the most with this hashtag have not been performed.

DISCUSSION, CONCLUSION, RECOMMENDATIONS

When the findings obtained from the research are analyzed, it has been seen that there are logical explanations of the daily change in the number of tweets sent with hashtags about the pre-determined distance education. When we look at the dates that tweeted most about distance education, it is seen that an authority, institution or organization made a statement using the hashtags related to distance education at that date. As a result, the number of tweets people made about distance education on Twitter; it is concluded that the education, institution and organization and the employees in that organization have increased with the explanations made.

Since the tweets about positive hashtags in the research were very few, they were not included in the study. Likewise, since only one of the negative hashtags was taken with a sufficient number of tweets, only that hashtag was included in the research.

When we look at the contents of the tweets with negative hashtags in the research, it is seen that the words of lesson and homework are the most frequently used words regarding distance education. Based on these findings, it can be concluded that students receiving distance education have more problems about homework and exams than other subjects.

When we look at the number of negative hashtags found as a result of the research, it is seen that there are students who are not satisfied with distance education, as seen in the studies of Karadağ and Yücel (2020). Based on this result, it would be appropriate for people working in the field of education to notice these problems and try to correct them.

When we look at the users who tweet the most with the hashtags related to distance education, it is seen that other than students, teachers and people working in the field of education also tweet about these issues. It can be said that with the help of tweets sent by people working in the field of education, they aim to answer people's problems about distance education, what they are curious about and suggestions and help people about this issue.

Although educators and people working in the field of education tweeted, the majority of users tweeting with hashtags related to distance education are students. When viewed positively or negatively; It was seen that there were not enough tweets to be analyzed with positive hashtags, but only 1 of the negative hashtags determined was high enough to be analyzed. Based on this result, it can be said that users post their problems related to distance education in negative hashtags, and information and question tweets with normal hashtags. In both cases, it is possible to say that Twitter can also be used as a research and learning platform, because the tweets about the distance education are expressed by the students. Reed (2013) stated in his research on this subject that social media is a widely used tool due to the developing technology. Also, from this point of view, he concluded that Twitter, especially from social media platforms, has a positive effect on education, learning and student experiences.

It is seen that the number of tweets sent by distance education is the highest in the days of explanation and then it starts to decrease. By looking at this result, it can be said that the opinions and problems of people on these issues decreased after the day of the announcement.

As a suggestion for future research on this topic, Twitter data may be obtained over a longer period of time. However, since the RapidMiner program can capture data up to 8 days before the program is used, it can be said that the researchers who are considering doing the research for the long term should record the data in 8-day periods. It can be said that the researchers who do not want to follow such a method can pull the data with a separate program with the programs written in programming languages such as Java, and then analyze them with the necessary filtering using RapidMiner program.

Another suggestion for researchers working on this topic in the future is that they should increase the number of filters and focus on more detailed topics. As a result of this study, it can be said that more detailed data and more stable results can be obtained.

When we look at the words used in tweets with negative hashtags on distance education, it is seen that homework and exam words are among the most used words. It can be said that the fact that exam and homework subjects do not have negative hashtags indicates that people stated that they had problems or did not like them. Based on this inference, it can be said that the exams and assignments given in the distance education period can be arranged and improved by looking at the negative hashtags. In addition, it can be said that negative hashtags can be analyzed in a longer period in detail, and negative experiences that may be experienced later can be prevented.

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