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Mathematical Doodles in Türkiye and the World

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Abstract: Google Doodles are special designs created by Google for special occasions and historical events. The math-themed doodles created and published by Google between 2000 and December 2022 were examined in this study, which was performed using the document analysis method. 39 math-themed doodles from Google's doodle database were examined. As a result of the content analysis, it was observed that 37 doodles were created to honour mathematicians, while two were created specifically for Pi Day. Two of the 16 Google Doodles in Türkiye that have a mathematical theme are tied to Pi Day, while 14 of them are about mathematicians. One of these mathematicians is from the Republican era, and the other is from the Turkish-Islamic era. The remaining 12 mathematicians come from various nations. However, while doodles honouring well-known Turkish-Islamic mathematicians such as Al-Biruni and Al-Rhazi were published in other countries, they were not published in Google Türkiye. Some suggestions have been developed in line with the results of the study.

Keywords: Google doodles, Mathematics, Mathematicians, Search engine, Mathematics campaign

Introduction

For many people, mathematics is seen as a scary problem that they will be saved as soon as they finish school. For some, mathematics has been a way to understand and love life (Sertöz, 1996). Although the science of mathematics is a serious business, it is not a grumpy and feared discipline, on the contrary, it is a fun, joyous and relaxing field like life (Dönmez, 2002). Bidwell (1993) states that "Mathematics is considered introverted, lifeless, unfeeling, and ultimately discovered… by students. However, including the history of mathematics in our lessons can help students understand that mathematics is open, living, emotional and always engaging." which emphasizes that the history of mathematics can change thoughts about mathematics (Karakuş, 2009). It is also seen that information about the history of mathematics is presented in the relevant parts of the mathematics textbooks within the scope of the renewal of the mathematics curriculum. It is seen that aims such as “encouraging learning by creating interest and curiosity about the history of mathematics” are emphasized in the examples of activities presented in the learning and sub-learning areas of the renewed secondary school mathematics curriculum (Uğurel & Bukova-Guzel, 2010). It will make students and society aware of the great mathematicians and their personalities, the role that mathematics has played in human history, its relation to our culture, and its place in our daily lives (Baki, 2008). Therefore, students can understand that mathematics is a human and sociological phenomenon by learning the history of mathematics. This may also affect their attitudes towards mathematics positively (Yenilmez, 2011). From this point of view, it can be understood how important the history of mathematics is.

The History of Mathematics is given particular importance within the scope of the "Mathematics Campaign" project, which was started in 2022 by the Ministry of National Education (MONE) in Türkiye (EBA, 2022). Thus, it is aimed to destroy prejudices by making mathematics popular. This situation, of course, should be tried to be popularized by using online applications and websites that have become the routine of life.

Google LLC is an American multinational corporation investing in internet search, online information distribution, advertising technologies, and search engines. It develops internet-based services and products. It gets most of its income from advertisements through the Google Ads program, formerly called AdWords. The company was founded by Larry Page and Sergey Brin while they were Ph.D. students at Stanford University (Wikipedia, 2015). The phrase “to google” has also become a verb that is widely used in various languages. The Google brand offers many services that dominate the market today, including its web browser, operating system, and smartphone product line. Google Earth, Google Drive, Google Voice, Adwords, and Gmail are just a few of them (Elmasoğlu, 2016).

Google Doodles are fun, surprising, and sometimes spontaneous changes to the Google logo to celebrate holidays and anniversaries, and honor famous artists, explorers, and scientists. The concept of the doodle first emerged in 1998, before the company was incorporated, when Google founders Larry and Sergey changed the corporate logo to indicate their attendance at the Burning Man festival in the Nevada desert. They placed a stick figure drawing behind the 2nd "o" in the word, Google. Their purpose was to tell Google users that the founders were "out of office" as a comical message. While the first doodle was relatively simple, the idea of decorating the company logo to celebrate significant events was born.

Figure 1. Burning man festival (Google, 1998)

Over time, the demand for doodles has increased in the US and other countries. For this reason, a team of special illustrators (doodlers) and engineers started to create doodles. According to Google, this team sees their task of creating doodles as a group effort to revive the Google homepage and make Google users around the world smile. (Google, 2013). Google has created more than 5,000 doodles for homepages around the world, including math-themed doodles. Maybe this team should have a goal of making Google users love mathematics as well as making them smile.

According to the statistics of 2021, Google is the most visited search engine and website in the world and in Türkiye (Similarweb, 2021). Many people see the Google logo first when they open their web browser. Google's great number of views and its easy reach to internet users can be seen as a very promising tool for the history of mathematics and therefore for the popularization of mathematics. Thus, considering the "Math campaign" project launched in our country, it is thought that Google Doodles can be used for this purpose. This study was carried out to see both the current status of the math-themed Google Doodles and how these doodles differ according to Türkiye and internationally.

Method

This study was carried out with the document analysis method, which is one of the qualitative research methods. This method includes the analysis of documents on the topics to be researched. A document can be defined as the recording of facts related to social life in the form of written texts. These written texts or documents consist of personal records or official documents such as diaries, letters, memories, and photographs (Hitchcock & Hughes, 1995). "Document analysis includes the analysis of written materials containing information about the facts and cases intended to be investigated" (Yıldırım & Şimşek, 2018). Considering the purpose of the study, it is seen that this method is appropriate for the study.

Data Collection Process and Data Analysis

The math-themed doodles created and published by Google between 2000 and December 2022 were examined in this study. During the research process, first the keywords "math", "mathematician" and "geometry" were searched in English, and then the words "matematik", "geometri" and "matematikçi" were searched in Turkish among the doodles indexed in the "Google Doodles" database. As a result of the first searches, 67 different doodles were found. Then, the related doodles were reviewed by two different researchers and it was decided to include 39 doodles related to mathematics in this study in line with the purpose of the study. According to the formula by Miles & Huberman (1994), the consistency rate between coders was found to be 97%.

Table 1. Doodles examined within the scope of the study, publishing dates and distribution of doodles published in Türkiye

Doodle	Year	Published in Google Türkiye
MC Escher's 105th Birthday	2003	x
Gaston Julia's 111th Birthday	2004	x
Percival Lowell's 151st Birthday	2006	x
Zu Chongzhi's Birthday	2009	
Chen Jingrun's Birthday	2009	
Christiaan Huygens' Birthday	2009	
Cahit Arf's 100th Birthday	2010	x
Pi Day	2010	x
Pierre de Fermat's 410th Birthday	2011	x
Hua Luogeng's 101st Birthday	2011	
Ada Lovelace's 197th Birthday	2012	x
Alan Turing's 100th Birthday	2012	x
Al-Biruni's Birthday	2012	
Omar Khayyam's 964th Birthday	2012	
Rhazes' 1147th Birthday	2012	
Grace Hopper's 107th Birthday	2013	x
Leonhard Euler's 306th Birthday	2013	x
Nicolaus Copernicus' 540th Birthday	2013	x
Mihailo Petrović Alas' 145th birthday	2013	
John Venn's 180th Birthday	2014	x
Sofia Kovalevskaya's 164th Birthday	2014	
Maria Gaetana Agnesi's 296th Birthday	2014	
Abu al-Wafa' al-Buzjani’s 1075th Birthday	2015	
George Boole’s 200th Birthday	2015	x
Emmy Noether's 133rd Birthday	2015	
Claude Shannon’s 100th birthday	2016	x
Hertha Marks Ayrton’s 162nd birthday	2016	
Hirotugu Akaike’s 90th Birthday	2017	
Max Born’s 135th Birthday	2017	
30th Anniversary of Pi Day!	2018	x
Johann Carl Friedrich Gauß’s 241st Birthday	2018	
Gottfried Wilhelm Leibniz's 372nd Birthday	2018	
Omar Khayyam’s 971st Birthday	2019	x
Olga Ladyzhenskaya’s 97th Birthday	2019	
Benoit Mandelbrot's 96th Birthday	2020	
Émilie du Châtelet's 315th Birthday	2021	
Celebrating Satyendra Nath Bose	2022	
Julio Garavito's 157th Birthday	2022	
Celebrating Stefan Banach	2022	

Content analysis method was used to analyze the doodles discussed within the scope of the study. Content analysis is used in cases where it is necessary to systematize and digitize the information that was previously collected and organized for a purpose (Fraenkel & Wallen, 2000). Related doodles are classified according to whether they are published in Türkiye, their types and the cultures they belong to.

Results and Discussion

As a result of the content analysis on 39 Doodles that were included within the scope of the study, it was understood that 16 of these doodles were displayed on Google Türkiye. Distribution of doodles by types is presented in Figure 2.

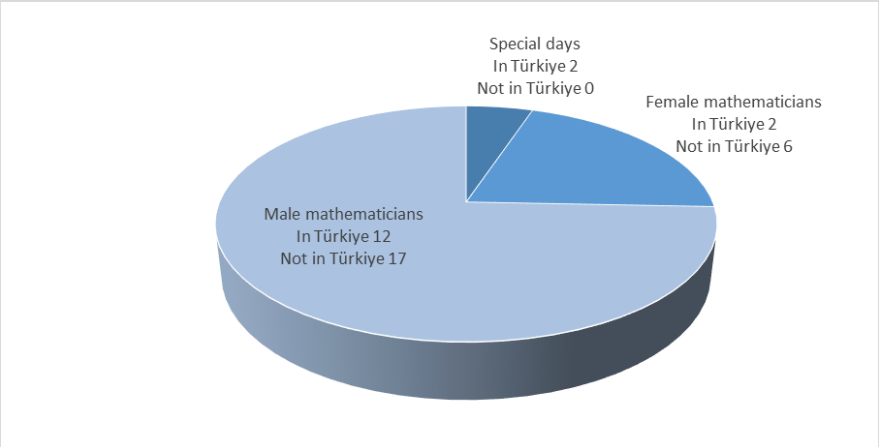

Figure 2. Doodle types examined within the scope of the study and data on their display in Google Türkiye

In the analysis of the data given in Figure 2, it is understood that two of the doodles published by Google were designed for Pi Day, 8 to commemorate female mathematicians and 29 to commemorate male mathematicians. Doodles for twelve male mathematicians and only two for the female mathematicians were published in Google Türkiye. Two doodles designed for Pi day were published in Türkiye as well as around the world. Figure 3 shows the doodle that coloured the Google Türkiye homepage named “30th Anniversary of Pi Day!” published on 14 March 2018.

Figure 3. 30th Anniversary of Pi day (Google, 2018)

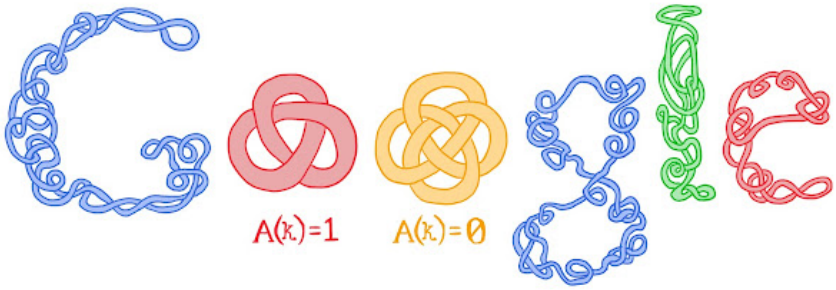

Figure 4. Cahit Arf's 100th birthday! (Google, 2010)

Considering the doodles published in Google Türkiye, it is seen that only one of them was published to commemorate Cahit Arf, one of the most famous and great mathematicians of the republican period. Figure 4 shows the doodle named “Cahit Arf's 100th Birthday!” which was published on the Google Türkiye homepage on 11 October 2010.

The doodle in Figure 4 was only displayed on the Google Türkiye homepage and was not published in any country other than Türkiye. Also, within the scope of the doodles reviewed, it is seen that only one doodle (Omar Khayyam's 971st Birthday) from the Turkish-Islamic period coloured the Google Türkiye homepage on 18 May 2019.

Figure 5. Omar Khayyam's 971st birthday (Google, 2019)

It is seen that the other 14 doodles published in Google Türkiye belong to mathematicians from various countries and nationalities. However, when the doodles included in the study are examined, it is seen that the doodles such as "Al-Biruni's Birthday, Abu al-Wafa' al-Buzjani's 1075th Birthday, Omar Khayyam's 964th Birthday, Rhazes' 1147th Birthday" related to the Turkish-Islamic period are not included in Google Türkiye.

Figure 6. Al-Biruni's birthday (Google Doodles, 2012)

Many of the Chinese, Russian, Indian and South American mathematicians covered in the study were published only on the Google homepages of their own countries. However, European and North American mathematicians enlivened the Google homepages of many countries

Conclusion and Recommendations

The results of the study showed that the majority of the mathematicians commemorated with Google Doodles are male. Although men have been at the forefront in mathematics, as in many other fields, due to the male-dominated culture throughout history, mathematics is a common product of humanity, regardless of religion, language, race and gender. It is of great importance to show people and students that women mathematicians have also made significant contributions to the development process of mathematics, and the lives and scientific studies of women mathematicians who spent extraordinary efforts to reach knowledge (Yıldız & Hacısalihoğlu-Karadeniz, 2017). Thus, students can realize that mathematics is not only a profession developed under the

influence of male mathematicians but also has a structure that grows by being provided by female mathematicians from different languages, religions and races.

Two of the 16 doodles published in Google Türkiye were designed for Pi Day and were published in Türkiye along with the majority of the world. Another interesting result of the study is that out of 14 doodles published on Google Türkiye to commemorate mathematicians, only two of them, one from the Republican period and the other from the Turkish-Islamic period, are culturally related to Türkiye. Although mathematics is a universal profession that does not discriminate against religion, language and race, the fact that all the remaining 12 doodles are from the western world can be considered a reflection of the classical western approach (Sezgin, 1985; Yıldız, 2020). However, the contributions of the medieval Islamic world to mathematics are undeniable. Another interesting issue is that some of the Turkish-Islamic mathematicians are not covered on the Google Türkiye homepage. Mathematicians from the Turkish-Islamic world such as Abu al-Wafa, Al Biruni and Al Rhaze are well known in Türkiye and it is known that Al-Biruni is a Turk (Leaman, 2015; 39). It can be said that not including mathematicians from our own culture is the result of the condescending approach of the west. This applies to Indian, Russian, Balkan and Far Eastern mathematicians as well. Many of the Chinese, Russian, Indian and South American mathematicians covered in the study were published only on the Google pages of their own countries. However, doodles for European and North American mathematicians have been published on Google homepages of many countries.

It is obvious that Google Doodles is also very important in terms of advertising and promotion (Elmasoğlu, 2016). Mathematics can be popularized with the cooperation of MONE with the Google Türkiye office within the scope of the mathematical campaign initiated in Türkiye. For example, Google organizes a competition called 'Google 4 Doodle', created according to certain themes, for elementary school students in many countries every year. As a result of this competition, the most successful logo is published on the Google homepage logo for one day. It is seen that Google is mostly targeting elementary school children between the ages of 6-14 with this competition (Elmasoğlu, 2016). Because the use of various elements such as cartoon characters, animations or child actors to attract the attention of the target audience is the right approach to draw the attention of children to the product in an advertisement about a product that children will use (Elden, Ulukök, & Yeygel, 2009; 105). Math-themed competitions can be organized for mathematics to be considered a product and to attract the attention of certain age groups. Also, in cooperation with the Google Türkiye office, doodles with Mathematics themes and the number of doodles focusing on Turkish mathematicians can be increased.

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