

Public Perceptions, Myths, and Science Communication During COVID-19 Pandemic

Dr. Sevinç Gelmez Burakgazi¹,
Hacettepe University, Ankara, Turkey

Hamdican Yıldırım
Hacettepe University, Ankara, Turkey

Zeynep Aydoğın
Hacettepe University, Ankara, Turkey

Introduction

The new coronavirus, also known as COVID-19, firstly seen in late December 2019 at Wuhan, China, and spread to the world in a short time, was identified as a pandemic by World Health Organization (WHO) on March 11, 2020. During this pandemic, in Turkey, as in many other countries, there has been a rise in false reports, conspiracy theories, and untrustworthy news causing information pollution about unproven cures, healing processes, nutritional support, etc., and leading to anxiety, fear, or misplaced hope in the general population. Each of these information pollutions has had different risks both in the written/oral media and in social media. Among this information pollution, the expectation from society is to access accurate and reliable information; however, the public had difficulty in distinguishing scientific evidence and facts from less reliable sources of information during the pandemic (Bavel et al., 2020). To remove information pollution from the increasingly diverse information in the “information society”, it is necessary to have critical thinking skills (Ortaş, 2018), which points to a public engagement model rather than the traditional view of a deficit model for science communication.

At the beginning of the pandemic period, there has been a boom in studies investigating information sources, trust of authorities, etc., around the world (e.g., Italy, Sweden, Germany, Malaysia, USA). For example, in April 2020, in Malaysia, researchers studied “Public knowledge, perception and communication behavior surrounding COVID-19 in Malaysia”. According to the results, people were more likely to obtain information from social groups, preferred to receive information from visual media, and were less likely to perceive receiving a lot of fake news (Hanafiah & Wan, 2020). In Italian COVID-19 case, 35% of the public were disoriented about public expert advice. That is 35% of the public gathered information from the TV, web channels and their general practitioner. While 43% of the public were optimistic, 22% of the public were pessimistic about social media (Bucchi & Saracino, 2020). Bavel et al. (2020) have studied the use of social and behavioural science to help align human behaviour during COVID-19 pandemic in the USA. In their study, Bavel et al. (2020) covered some topics from social and behavioral sciences that might be relevant to pandemic: threat perception (e.g. prejudice and discrimination), leadership (e.g. trust and compliance, identity leadership), social context (e.g. social norms, social inequality, political polarization), science communication (e.g. conspiracy theories, fake news),

¹ Corresponding author, email: sevincgb@hacettepe.edu.tr

individual and collective interests (e.g. moral decision making, cooperation), and stress and coping (e.g. social isolation and connection, intimate relationships) were studied (Bavel et al., 2020).

Methodology

This is a survey study. The comparisons were made at specific time points (April 2020 and June 2020). The main data collection tool of the study is a questionnaire developed by the researchers. The items related to the variables to be measured were prepared after a comprehensive literature review and finalized through expert opinion. The questionnaire was provided through Google Forms, given the current conditions of the researchers and the restrictions on social life due to the pandemic. The form was handed out to the participants via social media (Twitter, Facebook, Instagram, etc.) and communication applications (WhatsApp, Telegram, etc.). The study was performed at the national level and the sample was composed of individuals over 18. The survey questionnaire consists of items that relate to the previous studies of the first author on science communication, a literature review of the public perception of COVID-19, and WHO's MythBusters page (myths about the pandemic).

Some procedures suggested by Fraenkel et al., (2012) have been followed to prove that the findings of the research are valid and reliable. To provide proof of the content validity, the form was submitted to expert opinion. The opinions of a medical doctor, a specialist who completed her Ph.D. degree in Curriculum and Instruction, and a faculty member who works in the department of Society and Science studies were applied. In line with the expert opinions, communication applications, books, and science center alternatives were added to the information resources sections. Also, ambiguity in the questions was clarified and some questions were revised to be more explicit. The revised form was filled in by three people from different age groups and professions to assess the clarity of the questions by keeping time. In doing this, the validity and reliability of the research were supported, too. In such a way, the questionnaire reached its final form. In the first part of the questionnaire, demographic information (age, gender, educational level, income, etc.) of the participants was collected; in the second part, the participants were asked about the way they access information and how they interpret scientific information; in the third part, the participants were asked a multiple-choice question about the resources which they used to obtain information during the pandemic and myths on the pandemic; in the last part, statements that reflect the perceptions of the participants during the pandemic period were included. To determine the perceptions of the participants about the pandemic, some statements that reflect different views (e.g., the pandemic is out of control, the current state of the epidemic is exaggerated, life will return to its normal course in a few months) and it is aimed to reflect the current situation regarding perception. All questions were mandatory.

Reliability Analysis

The reliability coefficient of the data obtained from the first stage of the study was calculated as .85 and the reliability coefficient of the data obtained from the second stage was calculated as .83. These two values are above the threshold specified (.70) in the literature (Tabachnick & Fidell, 2014). For this reason, we can say that survey instruments' data is reproducible.

Participants of the Study

Prior to the study, relevant permissions were obtained from the Ministry of Health Scientific Research Platform and Hacettepe University Ethics Committee. A total of 582 people (420 in the first phase; 162 in the second phase) living in Turkey answered the survey.

Demographics	First Phase		Second Phase		
	n	%	n	%	
Gender					
T					
	<i>Female</i>	231	55.0	62	38.3
	<i>Male</i>	187	44.5	100	61.7
	<i>Not Specified</i>	2	.5		
Age Groups					
	<i>18-27</i>	156	37.1	56	34.6
	<i>28-37</i>	115	27.4	49	30.2
	<i>38-47</i>	81	19.3	35	21.6
	<i>48-57</i>	43	10.2	14	8.6
	<i>>57</i>	25	6.0	8	4.9
Education Level					
	<i>Primary Education</i>	1	.2		
	<i>Secondary Education</i>	5	1.2	3	1.9
	<i>High School or Associate Degree</i>	158	37.6	41	25.3
	<i>Undergraduate</i>	203	48.3	91	56.2
	<i>Master's Degree</i>	44	10.5	23	14.2
	<i>Doctorate</i>	9	2.1	4	2.5
Working Status					
	<i>Employed</i>	206	49.0	106	65.4
	<i>Unemployed</i>	156	37.1	42	25.9
	<i>Unemployed because of Pandemic</i>	24	5.7	6	3.7
	<i>Retired</i>	34	8.1	8	4.9
Monthly Income (₺)					
	<i>2300 - Below</i>	131	31.2	36	22.2
	<i>2300 - 4000</i>	87	20.7	32	19.8
	<i>4000 - 6000</i>	85	20.2	49	30.2
	<i>6000 - 8000</i>	60	14.3	19	11.7
	<i>8000 - 10000</i>	28	6.7	12	7.4
	<i>10000 - Above</i>	29	6.9	14	8.6
	Total	420	100	162	100

Tab. 1: Demographic Profiles of the Participants

Additionally, at the end of the demographics section, the participants were asked whether there had been COVID-19 cases in their family or close environment and if they had relatives who had died due to COVID-19. The answers given are shown in Table 2.

Questions	First Phase		Second Phase		
	n	%	n	%	
Has anyone been diagnosed with COVID-19 in your family or immediate surroundings?					
	<i>No</i>	353	84.0	137	84.6
	<i>Yes</i>	67	16.0	25	15.4
Have you lost anyone in your family or immediate surroundings to COVID-19?					
	<i>No</i>	395	94.0	152	93.8

Yes	25	6.0	10	6.2
Total	420	100	162	100

Tab. 2: Participants' Surroundings and their interactions with COVID-19

Findings

The participants were first asked which resources they used to access scientific information in their daily lives. In the first stage, 74% (311) of the participants stated that they accessed scientific information mostly from the television, followed by institutional websites with 70% (298), Twitter with 56% (236), and scientists with 49% (208). In the second stage, the television was again the source most often used by the public to access science, followed by institutional websites. Twitter and Instagram overtook the scientists option. Figure 1 illustrates the results.

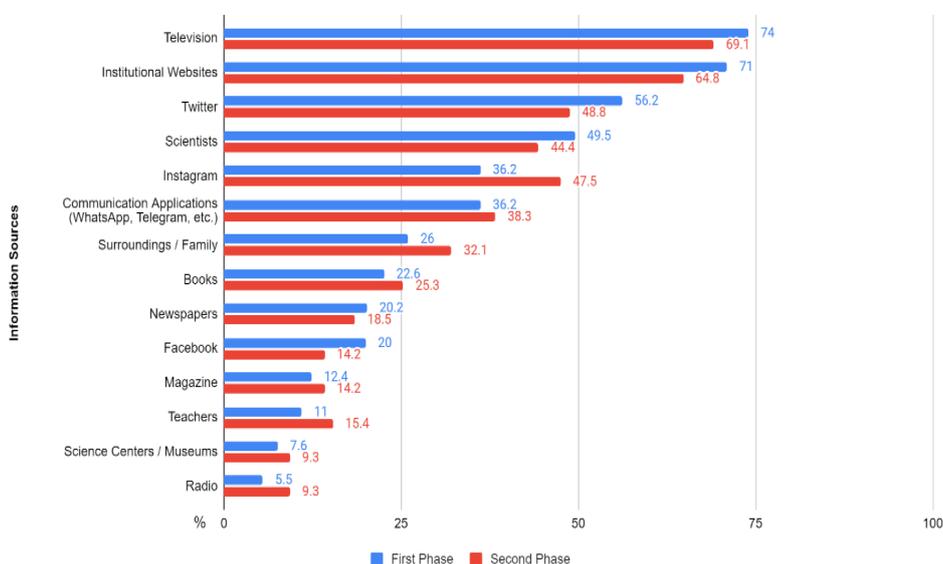


Fig. 1: Information Sources

The participants were asked a question where five opinions about the benefits and harms of scientific research were presented in multiple-choice format. The distribution of the answers given to this question in both stages of the study is given in Table 3. Most of the participants in both phases agreed that the benefits of scientific studies outweigh harmful results. In both phases, only one participant argued that the harmful results of scientific research are greater than the benefits.

Opinions	First Phase		Second Phase	
	n	%	n	%
Benefits of scientific research strongly outweigh the harmful results.	331	78.8	129	79.6
Benefits of scientific research slightly outweigh the harmful results.	57	13.6	18	11.1
Benefits of scientific research are about equal to harmful results.	27	6.4	14	8.6

Harmful results of scientific research strongly outweigh the benefits.	4	1.0	1	.6
Harmful results of scientific research have slightly more than benefits.	1	.2	N/A	N/A
Total	420	100	162	100

Tab. 3: Opinions about Benefits and Harmful Results of the Scientific Research

In the next part of the questionnaire, the participants were asked questions where they could select more than one answer. These questions were about where they got information about the COVID-19 pandemic and the trusted sources among them.

Participants chose institutional websites, the TV, and Twitter as the sources they trusted most in both stages of COVID-19. Figure 2 shows the distribution of the sources that they found reliable during the pandemic.

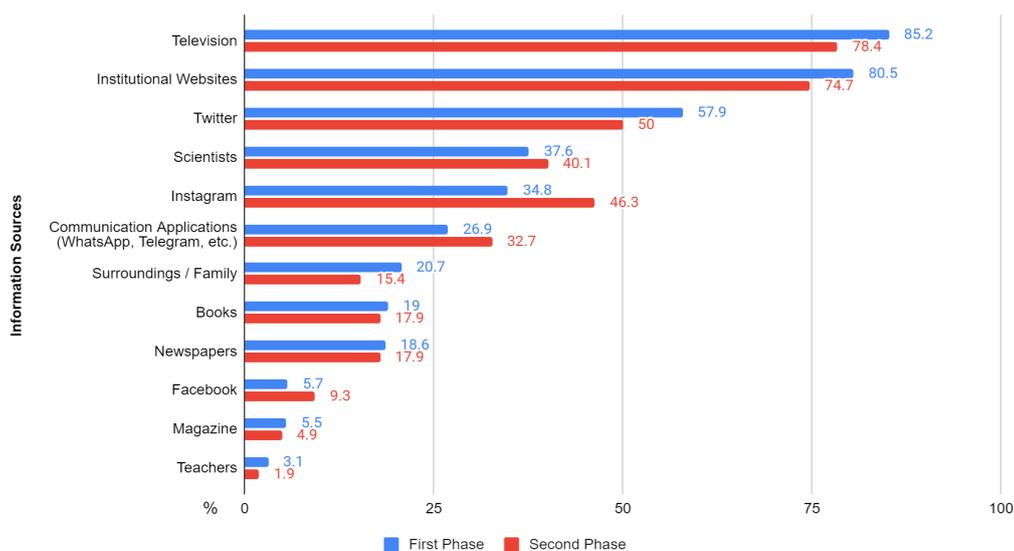


Fig. 2: Reliable Information Sources During COVID-19 Pandemic

Participants were asked which occupational groups they found reliable in obtaining information about the COVID-19 pandemic. In both stages, it was seen that the individuals most trusted by the participants were scientists. It was noted that the least trusted individuals were politicians.

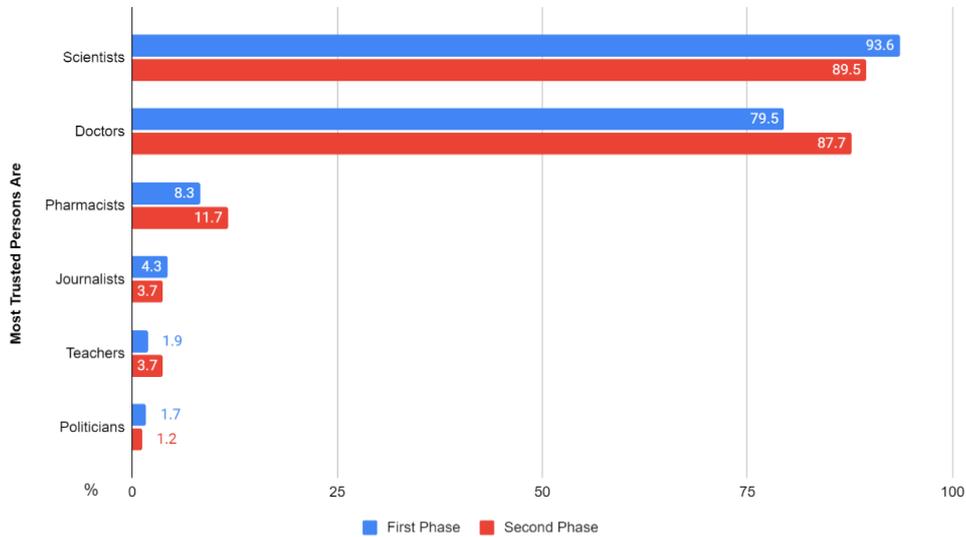


Fig. 3: Most Trusted Persons During COVID-19 Pandemic

Some statements about COVID-19 were presented to the participants and we asked them to indicate which of these statements they agreed with. The statements included facts and some myths about COVID-19. WHO's MythBusters page was used when preparing myths. These myths were then localized considering the context of Turkey (Figure 4). In both phases of the study, the most popular option among the myths was that COVID-19 was a biological weapon.

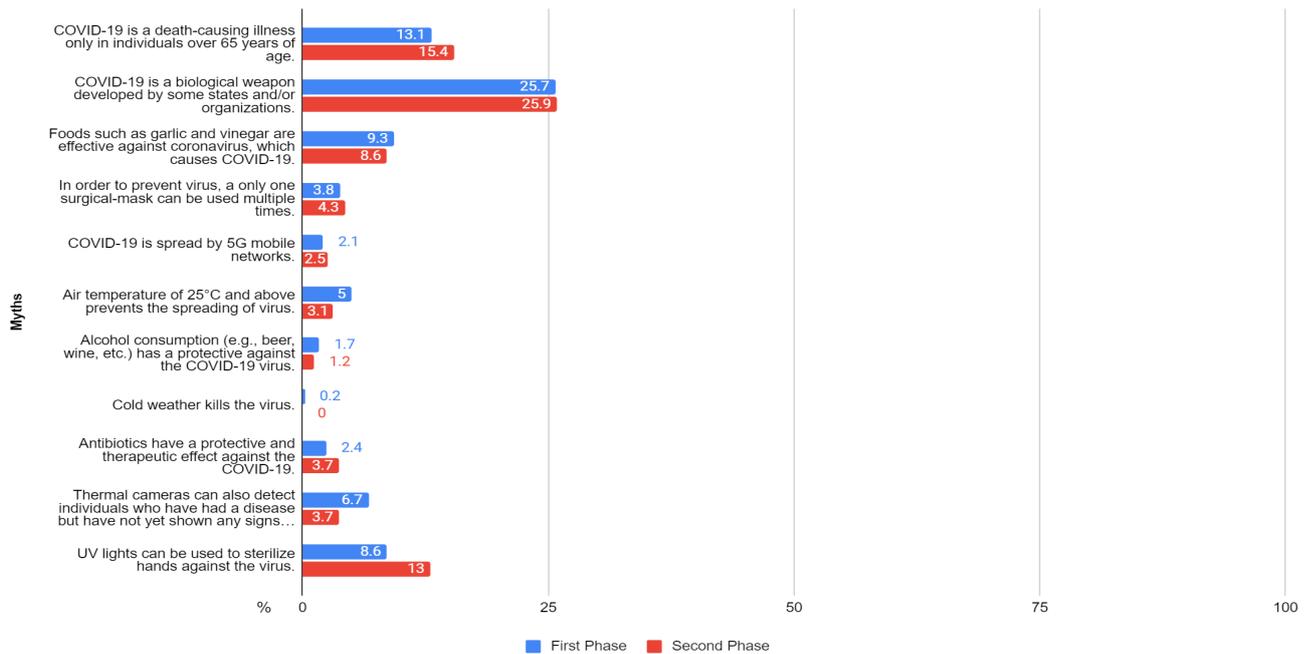


Fig. 4: Myths of COVID-19 Pandemic

In the survey section where the participants' perceptions about COVID-19 were asked, there was consensus when it came to the idea of the importance of taking most personal precautions. While the percentage of those holding this view is 90.4% in the first stage, it is 85.1% in the second stage. Participants also stated that they saw efforts in the world as not enough to prevent the spread of the pandemic.

The percentage of participants who agreed with the view that "To prevent the outbreak from spreading, the measures taken in the world are sufficient" was 3.3% for the first phase and 3.7% for the second phase. In addition, 3.8% of participants in the first phase agreed that COVID-19 was exaggerated, while in the second phase this figure increased to 6.7%. The rate of those factors such as social life, economy, education, and politics of the pandemic is 82.3% for the first phase and 83.3% for the second phase. The ratio of those who thought that life would return to normal in a short time was 48.5% for the first phase and dropped to 32.7% for the second phase.

At the end of the survey, the participants were asked an open-ended question. In this question, the participants were asked to reflect their views on the pandemic.

The vast majority of the respondents who answered this question in the first phase stated that if comprehensive curfew measures were implemented, the rate of spread of the virus would slow down. They also stated that social distancing and sterilization could prevent the spread of the epidemic.

Most of the respondents stated that they thought the world would no longer be the same after the pandemic and that life would change on a wide scale, from social life to the business sector. A small number of participants who expressed their opinions argued that COVID-19 was produced by human hand and in this way, it was aimed at changing something (e.g., economy, politics, public order) in the world.

Discussion

Science, I maintain, is an absolutely essential tool for any society (...)

And if the scientists will not bring this about, who will?

Carl Sagan, 1995, p. 322

This study was conducted to understand public perception, myths, and communication in Turkey during the COVID-19 pandemic. This research shows that people's usual routine for accessing science information didn't change during the pandemic period. The findings of the study are in line with other studies that prove that the public uses television and social media as a source of information during the COVID-19 pandemic (Çerçi, Canöz, & Canöz, 2020; González-Padilla & Tortolero-Blanco, 2020; Hoşgör, Aközlü, and Hoşgör, 2021; Dijck & Alinejad, 2021).

The results showed that people preferred television and institutional websites to access reliable information, whereas magazines and books were less popular. As stated by Peters et al. (2014), this paradigm change in the context of media has shaped the communication of scientists with the public. Scientists also benefit from online media instead of traditional media and publications (Yeo et al., 2014).

Kurulgan and Argan (2007) argued that the internet is an important tool of information technology and ease of access to information. According to their results, the internet is mostly used for

research and communication purposes, in line with previous studies (Gelmez - Burakgazi, 2012; National Science Board, 2016). In his study, Karataş (2020) investigated the social impacts of the COVID-19 pandemic, change, and empowerment, and the participants stated that they follow the news more than ever.

The results showed that people preferred the TV and institutional websites to access reliable information, whereas magazines and books were less popular. Likewise, Twitter had many retweets of scientists' posts. "Online media offer scientists more opportunities to communicate directly with the general public rather than having to rely on journalists as mediators" (Peters et al., 2014, p. 751). This finding was also in parallel with older studies that point to Twitter as the social media of choice for sharing science by scientists (Yeo et al., 2014).

One of the most remarkable results of the current study concerned public trust in scientists. In both stages, it was seen that the individuals most trusted by the participants were scientists. Similarly Bucci and Saracino's study (2020), the most positive judgment was for the Civil Protection Department, the second was local governments and then WHO.

It was shown in both phases of our study that participants had a common belief that scientific research led to far more benefits than harms. In both phases of the study, the most popular option among the myths was that COVID-19 was a biological weapon. In the last part, with open-ended questions, participants stated that the measures being taken around the world were not enough to prevent the spread of the epidemic.

Limitations

All participants in the study may not be representative of the population in Turkey. The questionnaire was spread by the researchers online. However, people's willingness to fill in the questionnaire, and being concerned about the possibility of spam messages or links, directly affected the number of participants.

Implications

Considering the results, the study leads to some suggestions to the public, media, government, and researchers. The public should be able to distinguish fraudulent news from science-based news, seek reliable information, develop science-informed networks and play an active role in sharing this information.

The results indicated that people rely heavily on scientists during global events such as pandemics. Despite the public trust in scientists, people receive information mostly through the TV and institutional websites, both in their daily lives and during global events such as pandemics. During the pandemic, scientists' participation in media sources has increased. As a suggestion here, the effective participation of scientists in these two sources of information might be increased. In such a way, the "layperson" can be provided with useful, valid, and accurate fact-based information. Here, it is important to highlight the importance of using non-technical language in communicating with the public.

Politicians were the least trustworthy authority in contrast to doctors and scientists. To connect strong links between politicians and the public, politicians might better collaborate with mostly trusted sources: Scientists and doctors. This also helps to build bridges between science and

policy. Since social media and TV are among the most preferred sources for accessing information during the pandemic, some collaborations and control mechanisms should be considered by the government and media companies.

Also, it is thought that the current research may be useful at national and international levels in potential future pandemics, as it reveals the trends for the current pandemic period in two periods.

References

- Bavel, J. J. V., Baicker, K., Boggio, P. S., Capraro, V., Cichocka, A., Cikara, M., & Drury, J. (2020). Using social and behavioural science to support COVID-19 pandemic response. *Nature Human Behaviour*, 1-12. doi:10.1038/s41562-020-0884
- Bucchi, M., & Saracino, B. (2020). Italian Citizens and Covid-19. Retrieved from <https://sagepus.blogspot.com/2020/04/italian-citizens-and-covid-19-one-month.html>
- Çerçi, Ü. Ö., Canöz, N. & Canöz, K. (2020). Covid-19 Krizi Döneminde Bilgilenme Aracı Olarak Sosyal Medya Kullanımı. *Selçuk Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*. (44). 184-198.
- Dijck, J. V. & Alinejad, D. (2020). Social Media and Trust in Scientific Expertise: Debating the Covid-19 Pandemic in The Netherland. *Social Media + Society*. doi:[10.1177/2056305120981057](https://doi.org/10.1177/2056305120981057)
- Fraenkel, J., Wallen, N., & Hyun, H. (2012). How to Design and Evaluate Research in Education (8th Ed.). New York, NY: McGraw-Hill.
- Gelmez-Burakgazi, S. (2012). Connecting Science Communication to Science Education: A Phenomenological Inquiry into Multimodal Science Information Sources Among 4th And 5th Graders. (Unpublished doctoral dissertation). Middle East Technical University, Ankara.
- Gonzalez-Padilla, D. A. & Tortorelo-Blanco, L. (2020). Social media influence in the COVID-19 Pandemic. *Int Bran J Urol*, 46(1), 120-124. doi: 10.1590/S1677-5538.IBJU.2020.S121
- Hanafiah, K. M., & Wan, C. D. (2020). Public knowledge, perception and communication behavior surrounding COVID-19 in Malaysia (Version 1). *SageSubmissions*. doi:10.31124/advance.12102816.v1
- Hoşgör, H., Aközlü, Z. & Hoşgör, D. G. (2021). The perception concerning the COVID-19 pandemic: case of Turkey. *The European Research Journal*, 7(2), 116-126. doi: 10.18621/eurj.774757
- Karataş, Z. (2020). Social Impacts of COVID-19 Pandemic, Change and Empowerment. *Turkey Journal of Social Service Research*, 4(1), 3-17.
- Kurulgan, M., & Argan, M. (2007). Information Searching Behaviors of Anadolu University Students over the Internet. (Translated from Turkish). *Journal of Atatürk University Institute of Social Sciences*, 9(1), 291 - 304.
- National Science Board (2016). Science and technology: Public attitudes and understanding (Science and Engineering Indicators 2016). Arlington, VA: National Science Foundation. Retrieved from <https://www.nsf.gov/statistics/2016/nsb20161/uploads/1/nsb20161.pdf>.

- Ortaş, İ. (2018). In The Information and Communication Age, the Importance of Accessing Scientific Information and the Information and Communication Potential of Turkey. *Turkish Librarianship*, (Translated from Turkish) 32(3), 223-232. doi:10.24146/tkd.2018.39
- Peters, H. P., Dunwoody, S., Allgaier, J., Lo, Y. Y., & Brossard, D. (2014). Public communication of science 2.0: Is the communication of science via the "new media" online a genuine transformation or old wine in new bottles?. *EMBO reports*, 15(7), 749–753.
- Sagan, C. (1995). *The demon-haunted world: Science as a candle in the dark*. New York: Random House.
- Tabachnick, B. G., & Fidell, L. S. (2014). *Using Multivariate Statistics*. Boston: Pearson Education Limited.
- WHO [World Health Organization]. (2020). Advice on the use of masks in the context of COVID-19: Retrieved from [https://www.who.int/publications-detail/advice-on-the-use-of-masks-in-the-community-during-home-care-and-in-healthcare-settings-in-the-context-of-the-novel-coronavirus-\(2019-ncov\)-outbreak](https://www.who.int/publications-detail/advice-on-the-use-of-masks-in-the-community-during-home-care-and-in-healthcare-settings-in-the-context-of-the-novel-coronavirus-(2019-ncov)-outbreak)
- Yeo, S. K., Cacciatore, M. A., Brossard, D., Scheufele, D. A. & Xenos, M. A. (2014). Twitter as the social media of choice for sharing science. 13th International Public Communication of Science and Technology conference. Salvadore, Brazil