OPEN ACCESS

Manuscript ID:
EDU-2022-10024754

Volume: 10

Issue: 2

Month: March

Year: 2022

P-ISSN: 2320-2653

E-ISSN: 2582-1334

Received: 10.12.2021

Accepted: 05.02.2022

Published: 01.03.2022

Citation:
Yilmaz, Gül Kaleli, and Damla Sönmez. "Determining the Perceptions of Pre-Service Mathematics Teachers towards Mathematics Education through Visual Metaphors in the Covid-19 Process." *Shanlax International Journal of Education*, vol. 10, no. 2, 2022, pp. 18–28.

DOI:
https://doi.org/10.34293/education.v10i2.4754

Determining the Perceptions of Pre-Service Mathematics Teachers towards Mathematics Education through Visual Metaphors in the Covid-19 Process

Gül Kaleli Yilmaz
Uludag University, Turkey
https://orcid.org/0000-0002-8567-3639

Damla Sönmez
Aydınlar University, Turkey
https://orcid.org/0000-0002-9342-7884

Abstract
The Covid-19 pandemic, which has affected the whole world, has led to a number of changes in education as well as in many other fields . The most important change experienced was that education transformed into online platforms. Education on online platforms has led to several effects on students, and as a result, significant changes have been observed in students' perceptions of mathematics education. The aim of this study was to determine the perceptions of pre-service mathematics teachers, who started university during the Covid-19 pandemic and took courses with synchronous distance education, through visual metaphors. The phenomenology method was used in the study. The sample of the study consisted of 31 first-year mathematics teachers who had never taken a face-to-face course at a university before. In sample selection, purposive sampling method was used. A metaphorical perception form was used to collect data. The participants were asked to make a drawing for the mathematics education they received through synchronous distance education during the Covid-19 pandemic and to explain the drawing. The findings were analyzed using content analysis method. Thus, codes were identified and then categories were established by bringing similar codes together. The findings showed that metaphors were grouped under the categories of education process and emotions. It was found both in the drawings and the explanations that the participants had a negative perception of distance mathematics education during the pandemic process. In addition, it was revealed that the participants were afraid to ask questions because they had not met their friends and teachers before, and therefore the lessons were inefficient. In line with these results, suggestions were presented to improve the efficiency of distance mathematics education.

Keywords: Covid-19, Drawing, Visual Metaphor, Mathematics Education

Introduction

The novel coronavirus, which emerged in Wuhan, China in 2019 and is still spreading, has brought about a significant effect on individuals (Pembecioğlu, 2020). It has changed what individuals are accustomed to and drastically changed their lives (Zhao, 2020). The crisis that the pandemic has created around the world has had profound effects on economic, psychological and social life as well as education and health system (Can, 2020). In education, one of the areas most affected by the coronavirus, distance education has became important during the corona COVID-19 pandemic. Distance education has become an obligation in all levels of education from primary school to university, especially in the restrictions introduced in the early stages of the pandemic.

Distance education is a form of education where the teacher and the learner are not physically in the same place, but are distant from each other (Adıyaman, 2002). Distance education activities are carried out either synchronous or

asynchronous. Synchronous education is an environment where students and teachers interact with each other in different places at the same time and thus it enables mutual communication. Asynchronous education, on the other hand, do not take place in the same place and at the same time and thus there is no communication between the student and the teacher. Instead, the documents required for the course are shared with the student on the internet and the instruction is carried out free from interaction (Yorgancı, 2015). With the pandemic, synchronous distance education has gained importance and new tools have been introduced. Especially in tertiary education, different synchronous distance education tools such as Zoom, Google Meet, Adobe Connect have been frequently used. With the education carried out through these tools, the loss of student attraction and participation have been relatively eliminated. Studies on the effectiveness of distance education have revealed that during the distance education process, students were not able to benefit from the educational activities due to problems such as lack of proper technological tools, lack of internet connection or limited internet connection (Bakırcı, Doğdu and Artun, 2021; Keskin and Özer Kaya, 2020). Similar to other courses, mathematics courses were carried out through simultaneous distance education tools. In this process, while some students benefited from the lessons, others did not. Distance mathematics education in the period when schools were closed, aimed at enabling students to benefit from all educational activities, preventing them from leaving school and providing equal opportunity (Bayburtlu, 2020; Şen, 2021). However, in many studies, it has been revealed that students have negative attitudes towards mathematics lessons conducted through synchronous distance education (Demir, 2020) and that students did not benefit from the lessons (Tican and Toksoy Gökoğlu, 2021). Students' perceptions of distance education play an important role in these negative attitudes. Therefore, in order to make distance education more effective, the negative perceptions of the students should be identified clearly and removed. One of the effective tools to determine perceptions is metaphors.

The word metaphor originates from the combination of the ancient Greek words "meta" (to transfer) and "phrein" (to carry) (Cebeci, 2013). In Turkish, it means analogy and skewing (Aydın, 2006). Metaphor can be defined as a correct match from a source domain to the target domain (Lakoff, 1992). For example, Saban (2004) analogized the teacher to a gardener. Just as a gardener looks after his saplings, the teacher also takes care of his students. This example shows the extent of a match from the target to the domain (Saban, 2004). People express their daily experiences through different methods and metaphors (Güven and Dak, 2017). One of these methods is visual metaphors. Visual metaphor, in general, can be defined as an image that reveals a certain relationship or similarity between unrelated visual elements (Buzrul, 2019). Visual metaphors, expressed by drawing objects, convey what is happening in the inner world of an individual through different images and enables cognitive comparisons (Güven and Dak, 2017).

Studies in the literature shows that many national and international studies were carried out on distance education during the Covid-19 pandemic (Cassibba, Ferrarello, Mammana, Musso, Pennissi, and Taranto, 2021; Doğan and Koçak, 2020; Mulenga and Marban, 2020; Türker and Dündar, 2020). The number of studies on distance mathematics lessons is also quite high (Batdal Karaduman, Akşak Ertaş and Duran Baytar, 2021; Demir, 2020; Demir, Kaleli Yılmaz and Sert Çelik, 2021; Özdemir Baki and Çelik, 2021; Tican and Toksoy Gökoğlu, 2021). In addition, metaphor studies are common in the literature (Ayçiçek, 2021; Bozkurt, 2020; Çağırgan, Batdal Karaduman and Sönmez, 2021; Doğan and Sönmez, 2019; Kaleli Yılmaz and Güven, 2015). It is also emphasized in many studies that students have negative attitudes towards mathematics lessons conducted through simultaneous distance education and that they cannot benefit from the lessons (Demir et al., 2021). These negative results require the examination of students' perceptions of distance education. In the literature, perceptions are frequently examined with verbal metaphors, but the number of studies using visual metaphors is limited. In this context, the aim of this study is to determine the perceptions of pre-service mathematics teachers, who started their university education during the Covid 19 pandemic, through

visual metaphors and verbal explanations. Within the scope of this purpose, the main research question of the present study was: "What are the perceptions of pre-service mathematics teachers who attended distance education?". Accordingly, the following sub-questions were addressed in the study:

- What are the metaphor codes and categories obtained from the drawings and explanations of the pre-service teachers?
- What are the visual metaphors that shape the perceptions of pre-service teachers about mathematics education?

Method

In this section, detailed information about the research design, sample, data collection tools and data analysis is presented.

Design of the Research

In this study, phenomonographic research method (phenomenology) was adopted. The phenomenology design is used to obtain in-depth and detailed information about the known facts (Yıldırım & Şimşek, 2018). In phenomenology, the relevance of the individuals' experiences to the phenomenon is investigated by examining their experiences (Onat Kocabıyık, 2016). Various phenomenological-based data collection methods can be used in phenomenological research, including interviews, participant observation, focus group interviews, and analysis of personal texts (Lester, 1999). In this study, the phenomenology method was preferred because it was anticipated to determine the perceptions of pre-service mathematics teachers, who had never received face-to-face education at a university and took all their courses through distance education, during the Covid-19 process.

Study Group

The sample of the study consisted of 31 pre-service teachers (29 female, 2 male) studying in the first year of mathematics education department of a state university in the Marmara region of Turkey. Purposive sampling method was used in sample selection. Care was taken to ensure that all of the pre-service teachers participating in the study had never taken a face-to-face course at the university. Participation in the study was on a voluntary basis and all of the ethical considerations were strictly followed. The names of the participants were anonymized and each of them was coded as C1, C2, … and C31. The pre-service teachers with the codes of C10 and C13 are male, while the others are female.

Data Collection Tools

The Metaphorical Perception Form developed by the researchers was used as the data collection tool. In order to determine their perceptions about mathematics education carried out with distance education through visual metaphors in the Covid-19 process, the participants were asked the following question:

> "Dear participant, in the space below, draw the first thing that comes to your mind when you think of mathematics education, considering the distance education courses you took during the Covid-19 process. The drawing does not need to be beautiful. Draw a possible picture you can think of and please explain why you made such a drawing."

Analysis of Data

The data obtained from the study were analyzed using content analysis method, which is one of the qualitative data analysis methods. In this sense, first, visual metaphors and explanations presented by the participants were examined, and then codes in the responses were determined. Then, the related codes were brought together to form categories. For example, the teacher's inability to see the students during the online lessons was classified under the uncontrolled metaphor code, which was then grouped under the education process category. Other codes and categories were established in a similar way. The coding was done by both researchers and the reliability of the data was calculated using the formula "Reliability = Consensus / (Agreement + Disagreement)" (Miles and Huberman, 1994). The agreement between the two researchers was found to be at an acceptable level (82%). When two reserachers had different ideas in classifying one of the coding, a consensus was reached in different codings and a common decision was made. In

addition, the data were examined by two experts in the field of mathematics education in order to check the validity and reliability. The validity of the data was increased by quoting the opinions of pre-service mathematics teachers in the findings section.

Ethical Considereations

In this study, all the rules specified in "Higher Education Institutions Scientific Research and Publication Ethics Directive" were strictly followed. Actions specified under the title of "Actions Contrary to Scientific Research and Publication Ethics" were not carried out. In addition, ethical permission required to carry out the study was obtained from Bursa Uludağ University Social and Human Sciences Scientific Research and Publication Ethics Committee (02.07.2021/ E-20585590-302.08.01-2468)

Findings

The findings were examined under two headings. First, the codes and categories established based on the drawings and explanations of the participants were presented. Second, the drawings made by the participants, in other words visual metaphors, and their comments were introduced.

Metaphor Codes and Categories Obtained from Pre-service teachers' Drawings and Drawing Descriptions

The participants were asked to draw the first thing that came to their minds when they thought of mathematics education, taking into account the online lessons they had attended, and to explain why they made such a drawing. Each drawing and explanation were transcribed, and the following codes and categories were obtained as a result of the content analysis. Table 1 shows the codes, metaphors and remarkable elements in drawings obtained through visual metaphor analysis.

Table 1: Visual Metaphor Code and Categories

Categories	Visual Metaphor Code	Remarkable Elements in Drawings
Education Process	Insufficiency	• Being away from the educational environment • Just looking at the screen
	Lack of Control	• Teacher's inability to obtain answeres when he/she ask questions to students • Teacher's inability to see the students during the online lessons • Difficulty in taking the register • Students' unwillingness to attend to the lecture, sleeping, etc.
	Lack of Support	• Not being able to ask questions to the teacher • Teacher's inability to answer the students' questions adequately
	Abstract	• Students' inability to touch geometric shapes • Being content with reading what is written on the screen instead of using pen and paper in the lesson
	Inequality	• Lack of technological tools • Lack of internet connection • Power cut
Emotions	Loneliness	• Student sitting alone at a table in a room • The teacher who teaches alone
	Apathy	• Nothing clear from the facial expressions • Frozen facial expressions • Inability to understand emotions due to masks on faces
	Unhappiness	• Unhappy facial expression

Emotions	Loss of Motivation	• An uneven environment • Being torn between listening to lectures and playing computer games
	Indifference	• Watching a match • Listening to music, songs • Messaging on • Sleeping
	Lumpishness	• A choked body from gaining weight • Weighing error due to excess weight

As shown in Table 1, the metaphors obtained from the drawings are grouped under two categories as "educational process" and "emotions". In Table 2, the metaphor codes in the education process category and the participants who drew for these metaphors are indicated. In addition, the participants' explanation for each metaphor is presented under the table.

Table 2: Metaphors used by the Participants for the "Education Process" Category

Education Process Category	Pre-service teachers	Frequency	%
Insufficiency	C3, C5, C8, C10, C11, C12, C16, C17, C18, C19, C20, C21, C22, CÖ25, C26, C29, C30, C31	17	38
Lack of Control	C7, C8, C12, C13, C14, C17, C19, C20, C21, C22, C25, C26, C27, C30	14	31
Lack of Support	C2, C4, C14, C21, C28	5	11
Abstract	C6, C7, C20, C26, C30	5	11
Inequality	C8, C21, C25, C26	4	9
Total		45	100

As seen in Table 2, pre-service teachers created metaphors in five different categories in the education category: insufficiency, lack of control, lack of support, abstract and inequality, respectively. The explanation of C21 about insufficiency was that *"I can't enjoy sitting in front of a screen and I can't get productive". C8's expressed lack of control by saying that "The teacher gives a lecture, but does not know to whom he is speaking, but the student listens to the lecture, but all he does is looking at the screen and asking questions from time to time. There is a wall between the teacher and the students. The computer and the phone replaced the pen and the book."*. Furthermore, C14's explanation about lack of support was as follows: *"In post-Covid online education, students are afraid to contact the teacher because they are not used to it or because they are embarrassed, they cannot ask questions even if they do not understand". In addition, C26 mentioned Abstract by stating that "He cannot fully understand and learn what the teacher is trying to teach". C25's explanation about inequality was that "The troublesome process and the impossibilities brought the society to a solution like online education. I can critically comment on the resolution value of this solution as follows: Unequal opportunities (desk, internet, computer, tablet, phone...)"*.

Table 3 demonstrates metaphor codes and the frequency of the participants for the Emotion category.

Table 3: Metaphors used by the Participants for the Emotions Category

Emotions Category	Teacher Candidate Codes	Frequency	%
Loneliness	C1, C2, C3, C10, C11, C12, C13, C14, C15, C16, C17, C18, C20, C21	14	32
Apathy	C3, C4, C5, C6, C7, C9, C10, C11, C15, C18, C29	11	26
Unhappiness	C8, C11, C16, C20, C25, C29, C30	7	17

Loss of Motivation	C11, C13, C16, C26, C30	5	12
Indifference	C8, C11, C17, C26, C27	5	12
lumpishness	C16	1	2
Total		43	100

The participants used six different metaphors in the category of Emotions: loneliness, apathy, unhappiness, loss of motivation, apathy, and lumpishness, respectively. The explanation of C2 about Loneliness was that *"When the department I won was announced, I started to dream that I would study mathematics. However, it was a great disappointment that the Covid-19 epidemic broke out and I learned that I will start the 1st grade with distance education. It was a great shortcoming that my first university year was spent in front of the computer, wandering around the rooms. This drawing describes these: My computer, my desk, my tea, the online lesson and me…"*. The explanation of C10 about Apathy was as follows: *"A student who receives education without feeling any emotion, without seeing his/her teacher and friends through distance education"*. C20 explained Unhappiness by saying that *"The teacher is unhappy"*. In addition, C30 mentioned Loss of Motivation by expressing that *"There are many factors in the home environment that will attract your attention. The fact that your bed is a few rooms away at most is a bad stimulus"*. The explanation of C17 about Indifference was as follows: *"Sometimes, when your computer is on for the lesson, you are not able to take care of the lesson because of trying to wake up from sleep or the things need to get done at that moment in the house"*. C16 described lumpishness as follws that *"I think that although our professors worked more efficiently in post-Covid-19 mathematics education, I tried to explain that our brain and soul were numb due to being imprisoned in our room while following us on the inefficient computer, which was not fully passed, and the mathematics classes we attended were not very productive, as we became depressed and increasingly clumsy"*.

Findings Related to Visual Metaphors Created by Pre-service Mathematics Teachers

In this section, an example of the drawings made by pre-service teachers and explained in the previous section is presented.

Figure 1: C10's Drawing about Insufficiency

Figure 1 shows a student trying to listen to a lecture in a closed environment on a bed in his room at home. He is alone and the interaction is completely gone. There is no discipline. In addition, he does not have any expression. He is listening to the lesson in a numb state.

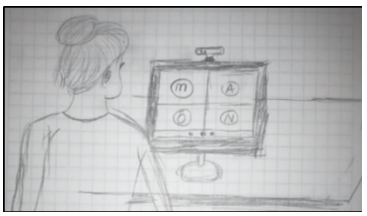

Figure 2: C19's Drawing about Lack of Control

The teacher gives the lesson in an online environment. However, the students' cameras are turned off. The teacher is not sure whether they understand the lesson or not. The teacher does not have any opportunity to observe the students. The interaction between the teacher and the participants has completely disappeared.

Figure 3: C14's Drawing about Lack of Support

Lessons are carried out on the computer screen. Teacher and student are not in the same environment.

Interaction between teacher and student is removed. Although the teacher transfers the knowledge, he/she cannot reach the student. He/she cannot answer the questions in the mind of the student. Situations such as accessing the knowledge and asking questions is not possible for the student.

Figure 4: C6's Drawing about Abstract

It is possible to consider mathematics as an abstract lesson in that is the computer screen is dark.

Figure 5: C25's Drawing about Inequality

There is not equal opportunity in distance education .The fact that the student cannot attend the class because there is no electricity in her house is a proof of this argument.

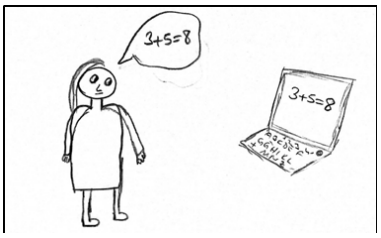

Figure 6: C3's Drawing about Loneliness

It is noteworthy that it is an isolated environment. The individual in the drawing is not happy, instead it is portrayed as if he/she were frozen. There are only students and computers in the environment. Mutual interaction is lost.

Figure 7: C3's Drawing about Apathy

In the drawing, everything is computerized. People's emotions are incomprehensible since their faces are covered with masks.

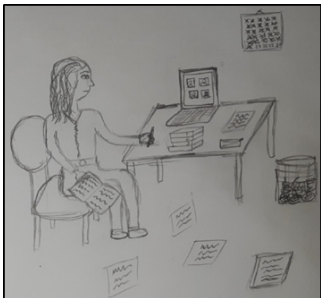

Figure 8: C11's Drawing about Unhappiness

The student is unhappy and unemotional. There is chaos in the drawing.

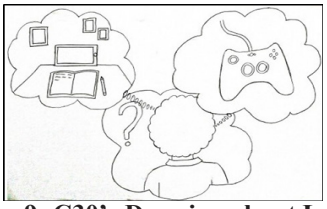

Figure 9: C30's Drawing about Loss of Motivation

Lessons are carried out through the computer screen and thus became more abstract. The student tries to decide between playing the game and attending to the lesson. He/she has lost his/her motivation.

Figure 10: C17's Drawing about Indifference

Courses are transferred to the online environment. Although the lesson starts early in the morning, he/she does not need to worry of being late for the lesson because it is at the student's home. That is the reason why he/she does not wake up. There is no school discipline in distance education. The light on the computer indicates that the lesson has started. However, since the teacher cannot see the students, he/she continues to sleep. The student is not interested in the lesson.

Figure 11: C16's Drawing about Lumpishness

After the pandemic, the colors in the student's life have disappeared. He/she lost all his/her motivation. Everything is limited to a computer in a room. It is almost like a prison. The railings in the front of the drawing proves this. In addition, the walls resembles prison walls. Furthermore, he/she is gaining weight, which is evident with the scale which has given an error. The posture of the student is also an indication that he/she has become clumsy.

Discussion, Conclusions and Recommendations

In this study, the perceptions of pre-service mathematics teachers, who started their university education during the Covid-19 pandemic and took all their courses through distance education, were examined through visual metaphors. The findings showed that visual metaphors can be grouped under two categories: educational process and emotions. In the "educational process" category, the metaphors of "inefficiency, lack of control, lack of support, abstract and inequality" were identified. As the metaphor codes shows, the perceptions of the participants towards the education process were negative. The drawings and explanations revealed that the participants often did not benefited from the mathematics lessons conducted through distance education. In addition, it was found that many of them were interested in non-educational activities during the lesson and the online lessons cannot be controlled as is the case in traditional classroom environment. It was also seen that they were afraid to ask questions to the teacher and they were not able to receive sufficient support. Since all educational activities were carried out through the internet, it was difficult to attend the lessons due to some reasons such as internet connection problems, lack of hardware and different responsibilities to be done at home, etc. Studies in the literature indicate that pre-service teachers have negative perceptions and attitudes towards simultaneous distance education (Kaleli Yılmaz and Güven, 2015; Karatepe, Küçükgencay and Peker, 2020). Yolcu (2020) emphasized that pre-service teachers have negative experiences about distance education due to the reasons such as lack of insufficient opportunities to ask questions, lack of communication with the teacher and peers, distraction in the home environment, etc. These findings are similar to the results obtained in the present study.

Second, visual metaphors were grouped under "emotions" category. In this category, the metaphors of "loneliness, apathy, unhappiness, loss of motivation, indifference and Lumpishness" were identified. Similar to education process category, visual metaphors in emotions category revealed that the perceptions of the participants towards mathematics education conducted through distance education were negative. Many of the participants said that they attended to the lectures while they are having tea or coffee, food and often lying down. They also stated that they may engage in different non-educational activities such as playing computer games while listening to the lecture. In addition, it was found that they became very clumsy because they attented to the lectures on the computer all the time and that they could not feel any emotion in the lessons taught with a mask. They added that they lost motivation and felt unhappy because their attention was constantly distracted. The studies in the literature reported detailed findings about the negative features of distance education (Arar, Öneren and Yurdakul, 2021; Yolcu, 2020). It is frequently emphasized that students who cannot interact face-to-face with their

classmates and instructors, in particular, experience loss of motivation as a result of distraction (Brown, 2017; Çilek, Uçan and Ermiş, 2021). In this context, it can be said that the results of the present study are in line with the studies in the literature. However, there are also studies reporting positive attitudes on distance education and emphasizing the advantages of it (Atik, 2020; Paydar and Doğan, 2019). Unfortunately, not even a single positive metaphor was used by the participants in the present study. This study was carried out in the first year of the pandemic, when people were more afraid of, away from sociality, felt bad because of the restrictions and forced to compulsory distance education. In addition, the participants had dreamed of university for years, thinking about the friendships and social environments they would establish there. However, the pandemic, which was dominated by both fear and uncertainty, completely disappointed them. In this context, the fact that the students did not use any positive metaphor can be expected. The other reasons for these negative perceptions may be lack of synchronous distance education practices, practitioners' attitudes and lack of technological equipment and infrastructure.

Participants expressed that one of the most important disadvantages of distance education carried out during the pandemic was that it hindered equal opportunity in education. Han, Demirbilek and Demirtaş (2021) found in their study with school administrators and teachers that inequality in education increased in the distance education process. It has been stated in many studies that especially the children of low-income families living in rural areas have significant problems in attending lessons during distance education. However, only 4 participants (C8, C21, C25, C26) expressed these problems in this study. This means that the practice of distance education and the practitioners played a greater role in the negative perceptions of the participants. In particular, the fact that students attended to lectures while they were in bed or doing something else, and that they did not have to turn on the cameras paved the way for loss of control. In that case, in order for synchronous distance education activities to be beneficial, students should be included more in the process, environments where they can feel as if they are in the classroom environment should be provided, students should be allowed to use cameras and microphones when necessary, and communication opportunities between students and teachers should be increased.

Finally, although the Covid-19 pandemic is expected to end , distance education will always exist. Therefore, it is recommended to provide synchronous environments where more control is ensured, participation is mandatory, both teachers and students use cameras and microphones. More fun, interactive and communicative environments should be provided to create more positive perceptions towards distance mathematics education.

References

Adıyaman, Zehra. "Foreign Language Teaching through Distance Education." *The Turkish Online Journal of Educational Technology*, vol. 1, no. 1, 2002, pp. 92-97.

Arar, Tayfun, et al. "The Place of Distance Education Process in the Perception of Graduate Students in the Scope of COVID-19: The Case of Kirikkale University." *Journal of University Research*, vol. 4, no. 2, 2021, pp. 154-67.

Atik, Ali Derya. "Pre-service Science Teachers' Perception of Distance Education: A Metaphor Analysis." *International Journal of Scholars in Education*, vol. 3, no. 2, 2020, pp. 148-70.

Aydın, İbrahim Hakki. "A Philosophic Methaphor "To be on the Way"." *Dinbilimleri Akademik Araştırma Dergisi*, vol. 6, no. 1, 2006, pp. 9-22.

Ayçiçek, Burak. "Metaphorical Perceptions of High School Teachers Regarding the Hidden Curriculum." *Shanlax International Journal of Education*, vol. 9, no. 4, 2021, pp. 280-93.

Bakırcı, Hasan, et al. "Investigation of Professional Achievements and Problems of Science Teachers in the Distance Education Process of Covid-19 Pandemic Period." *Ahi Evran Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*, vol. 7, no. 2, 2021, pp. 640-58.

Batdal Karaduman, Gülşah, et al. "Investigation of Teachers Experiences Regarding Mathematics Courses Carried Out by Distance Education."

International Primary Education Research Journal, vol. 5, no. 1, 2021, pp. 1-17.

Bayburtlu, Yavuz Selim. "Turkish Education during Covid-19 Pandemic Distance Education Process." *Electronic Turkish Studies*, vol. 15, no. 4, 2020, pp. 131-51.

Bozkurt, Aras. "Images and Perceptions of Primary School Students towards Distance Education during Coronavirus (COVID-19) Pandemic: A Metaphor Analysis." *Uşak Üniversitesi Eğitim Araştırmaları Dergisi*, vol. 6, no. 2, 2020, pp. 1-23.

Brown, Liz. "New Technologies: A Transfer of Power." *Design Management Review*, vol. 28, no. 1, 2017, pp. 18-21.

Buzrul, Handan Yaprak. *An Investigation of the Contributions of Metaphoric and Ironic Expression to Art Education*. Marmara University, 2019.

Can, Ertuğ. "Coronavirus (Covid-19) Pandemic and Its Pedagogical Reflections: Open and Distance Education Practices in Turkey." *Açıköğretim Uygulamaları ve Araştırmaları Dergisi*, vol. 6, no. 2, 2020, pp. 11-53.

Cassibba, Rosalinda, et al. "Teaching Mathematics at Distance: A Challenge for Universities." *Education Sciences*, vol. 11, no. 1, 2021.

Cebeci, Oğuz. *Metafor ve Şiir Dilinin Yapısal Özellikleri*. İthaki Publishing, 2013.

Çağırgan, Dilek, et al. "Visual Analysis of the Classroom Teacher Candidates' Metaphorical Perceptions Related to the Mathematics Course." *European Journal of Education Studies*, vol. 8, no. 4, 2021, pp. 76-100.

Çilek, Adem, et al. "The Opinions of Classroom Teachers on Distance Education During the Pandemic Process." *TURAN: Center for Strategic Studies*, vol. 19, no. 49, 2021, pp. 308-323.

Demir, Barış. "Investigation of Vocational School Students' Attitudes to Mathematics Courses Conducted with Distance Education." *Social Mentality and Researcher Thinkers Journal*, vol. 6, no. 39, 2020.

Demir, Barış, et al. "Teachers' Attitudes and Opinions on Mathematics Lessons Conducted with Distance Education due to Covid-19 Pandemic." *Turkish Online Journal of Distance Education*, vol. 22, no. 4, 2021, pp. 147-63.

Doğan, Soner, and Esma Koçak. "A Study on Distance Learning Activities in the Context of the EBA System." *Journal of Economics and Social Research*, vol. 7, no. 14, 2020, pp. 110-24.

Doğan, Zeynep, and Damla Sönmez. "Investigating Metaphorical Perceptions of 4th Grade Students in Primary School Towards Mathematics Course Through the Visuals They Created." *Turkish Studies*, vol. 14, no. 1, 2019, pp. 245-62.

Güven, Sibel, and Gizem Dak. "Visual Metaphors Created by Prospective Teachers with Regards to Public Personnel Selection Examination (KPSS)." *Journal of Education and Humanities*, vol. 8, no. 15, 2017.

Han, Ferhat, et al. "Views of School Administrators and Teachers on Distance Education during the COVID-19 Pandemic." *Cumhuriyet International Journal of Education*, vol. 10, no. 3, 2021, pp. 1168-93.

Kaleli Yılmaz, Gül, and Bülent Güven. "Determining the Teacher Candidates' Perceptions on Distance Education by Metaphors." *Turkish Journal of Computer and Mathematics Education*, vol. 6, no. 2, 2015, pp. 299-322.

Karatepe, Fadimana, et al. "What are the Perspectives of Teacher Candidates on Synchronous Distance Education? A Survey Study." *Journal of Social and Humanities Sciences Research*, vol. 7, no. 53, 2020, pp. 1262-74.

Keskin, Merve, and Derya Özer Kaya. "Evaluation of Students' Feedbacks on Web-Based Distance Education in the COVID-19 Process." *İzmir Kâtip Çelebi Üniversitesi Sağlık Bilimleri Fakültesi Dergisi*, vol. 5, no. 2, 2020, pp. 59-67.

Lakoff, George. "The Contemporary Theory of Metaphor." *UC Berkeley Previously Published Works*, 1992.

Lester, Stan. "An Introduction to Phenomenological Research." 1999.

Miles, Matthew B., and Micheal A. Huberman. *Qualitative Data Analysis: An Expanded*

Sourcebook. Sage, 1994.

Mulenga, Eddie M., and José M. Marban. "Prospective Teachers' Online Learning Mathematics Activities in the Age of Covid-19: A Cluster Analysis Approach." *EURASIA Journal of Mathematics, Science and Technology Education*, vol. 16, no. 9, 2020.

Onat Kocabıyık, Oya. "Phenomenology and Grounded Theory: A Comparison in Terms of Some Features." *Trakya Üniversitesi Eğitim Fakültesi Dergisi*, vol. 6, no. 1, 2016, pp. 55-66.

Özdemir Baki, Gülşah, and Elif Çelik. "Secondary Mathematics Teachers' Mathematics Teaching Experiences in Distance Education." *Western Anatolia Journal of Educational Sciences*, vol. 12, no. 1, 2021, pp. 293-320.

Paydar, Seyhan, and Adem Doğan. "Teacher Candidates' Views on Open and Distance Learning Environments." *Education and Technology*, vol. 1, no. 2, 2019, pp. 154-62.

Pembecioğlu, Nilüfer. "COVID-19 Media Literacy and Its Effects on Children." *Çocuk ve Medeniyet*, vol. 5, no. 9, 2020, pp. 73-112.

Saban, Ahmet. "Entry Level Prospective Classroom Teachers' Metaphors about the Concept of Teacher." *The Journal of Turkish Educational Sciences*, vol. 2, no. 2, 2004, pp. 131-55.

Şen, Emine Özgür. "Evaluation Study of Middle School Mathematics Courses Broadcasted on TV Through Distance Education in the Pandemic Process." *Dicle University Journal of Ziya Gökalp Faculty of Education*, no. 40, 2021, pp. 71-83.

Tican, Canses, and Derya Toksoy Gökoğlu. "Opinions of Middle School Mathematics Teachers about Distance Education Mathematics Lessons." *MSKU Journal of Education*, vol. 8, no. 2, 2021, pp. 767-86.

Türker, Abdullah, and Erkan Dündar. "The Opinions of High School Teachers on Distance Learning Which is Carried Out Through EBA (Educational Informatics Networks) during COVID-19 Pandemic Period." *Milli Eğitim Dergisi*, vol. 49, no. 1, 2020, pp. 323-42.

Yıldırım, Ali, and Hasan Şimşek. *Sosyal Bilimlerde Nitel Araştırma Yöntemleri*. Seçkin Publishing, 2018.

Yolcu, Hacı Hasan. "Preservice Elementary Teachers' Distance Education Experiences at the Time of Coronavirus (COVID-19) Pandemic." *Açıköğretim Uygulamaları ve Araştırmaları Dergisi*, vol. 6, no. 4, 2020, pp. 237-50.

Yorgancı, Serpil. "The Effects of Web based Distance Education Method on Students' Mathematics Achievements." *Kastamonu Education Journal*, vol. 23, no. 3, 2021, pp. 1401-20.

Zhao, Yong. "COVID-19 as a Catalyst for Educational Change." *Prospects*, vol. 49, 2020, pp. 29-33.

Author Details

Gül Kaleli Yilmaz, *Uludag University, Turkey,* ***Email ID****: gulkaleliyilmaz@hotmail.com*

Damla Sönmez, *Turkey,* ***Email ID****: damlasonmez91@gmail.com*