Metaphorical Perceptions of Pre-Service Social Studies Teachers Towards Environmental Pollution

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Abstract: This study aims to examine pre-service social studies teachers' perceptions of environmental pollution as expressed through metaphors. To this end, the study seeks to answer the following question: into which categories can the pre-service teachers' perceptions of environmental pollution be grouped? The study employs a qualitative research method and a phenomenological design. The research was conducted during the 2024–25 academic year with 161 pre-service social studies teachers enrolled at a state university in Ankara. In line with the study's purpose, the pre-service teachers were provided with a form containing the expression 'Environmental pollution is like ... because ...'. Their responses were analysed using content analysis. The results of the study revealed that the pre-service teachers generated 106 valid metaphors, which were classified into seven categories. The categories with the highest number of metaphors were: Harmful; Increasing Problem Over Time; Creating Bad Appearance; and Causing Discomfort. The pre-service teachers most frequently used the concepts of cancer and disease in their metaphors. The study suggests raising awareness at both the individual and societal levels regarding environmental pollution, as well as adopting a more holistic approach to environmental education.

Keywords: environmental pollution, pre-service social studies teachers, qualitative research, metaphor

Sosyal Bilgiler Öğretmen Adaylarının Çevre Kirliliğine Yönelik Metaforik Algıları

Özet: Bu araştırmanın amacı, sosyal bilgiler öğretmen adaylarının çevre kirliliğine yönelik algılarını metaforlar aracılığıyla incelemektir. Bu amaç doğrultusunda öğretmen adaylarının çevre kirliliği ile ilgili algıları hangi kategoriler altında toplanmaktadır? sorusuna cevap aranmıştır. Nitel araştırma yönteminin benimsendiği bu çalışmada olgubilim deseni kullanılmıştır. Araştırma 2024-2025 eğitim öğretim yılında Ankara'da bir devlet üniversitesinde öğrenim gören 161 öğretmen adayı ile gerçekleştirilmiştir. Araştırmanın amacı doğrultusunda öğretmen adaylarına "Çevre kirliliği ….. benzer. Çünkü …." ifadesinin yer aldığı bir metafor formu verilmiştir. Öğretmen adaylarının cevapları içerik analizi yöntemi ile analiz edilmiştir. Araştırmada elde edilen sonuçlara göre öğretmen adaylarının 106 geçerli metafor ürettiği ve bu metaforların yedi farklı kategoride sınıflandırıldığı tespit edilmiştir. Zarar Verme, Zamanla Artan Sorun, Kötü Görüntü Oluşturan ve Rahatsızlık Verme kategorileri en fazla metaforların üretildiği kategoriler olmuştur. Öğretmen adayları en fazla kanser ve hastalık kavramlarıyla metafor üretmişlerdir. Çevre kirliliğine yönelik hem bireysel hem de toplumsal farkındalığın arttırılması ve çevre kirliliği eğitimi konusunda bütüncül yaklaşımların benimsenmesi önerilerinde bulunulmuştur.

Anahtar kelimeler: çevre kirliliği, sosyal bilgiler öğretmen adayı, nitel araştırma, metafor

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INTRODUCTION

Today, environmental pollution is one of the most significant global environmental problems. Industrialisation, urbanisation and unsustainable consumption habits have significantly increased the destruction of the natural environment. This increase in environmental destruction negatively affects not only the integrity of ecosystems, but also human health and quality of life. To better understand the concept of environmental pollution, it must first be defined.

At its most basic, the environment refers to all the natural and man-made elements that living things need to survive and interact with each other (Sever & Yalçınkaya, 2018, p. 2). However, this integrity deteriorates as a result of human activities, leading to multidimensional problems such as environmental pollution. The Environmental Law (T.C. Cumhurbaşkanlığı Mevzuat Bilgi Sistemi, 2025) defines environmental pollution as 'any adverse effect on the environment that may impair the health of living things, environmental values, or ecological balance'. Additionally, the Environment Foundation (2025) defines environmental pollution as the destruction of natural habitats by human hands in unnatural ways, thereby negatively affecting the vital activities of living things.

Çepel (2009), on the other hand, defines environmental pollution as a situation that threatens the health of living things and causes structural damage to the inanimate environment as a result of harmful substances being mixed into natural environments such as air, water and soil. These definitions reveal that environmental pollution is not only the deterioration of the physical environment, but also a complex, multidimensional problem that endangers life.

The relationship between humans and nature has evolved over time, undergoing a radical transformation with the Industrial Revolution. Afterwards, nature was viewed merely as a resource to meet human needs, which led to increased consumption rates and serious environmental pollution. People started living not just to survive, but to consume (Karataş, 2018). Combined with factors such as industrialisation, urbanisation and the excessive and unconscious use of natural resources, this consumption-oriented approach has become the main cause of environmental pollution, transforming the negative effects of human activities on nature into a systematic structure. Consequently, environmental issues have become a global concern.

Individuals must interact with the environment to meet their basic needs and sustain their lives. However, environmental degradation is inevitable when the natural balance of the environment is not observed in this interaction process. In fact, the academic literature frequently emphasises that human interventions exacerbate the problem of environmental pollution (Suluk, 2024). Environmental pollution is categorised as air, water or soil pollution according to the environment in which it occurs and the natural resources it affects. These types of pollution disrupt the ecological balance and pose a direct threat to life. It should also be kept in mind that an incident of environmental pollution can trigger more than one type of pollution simultaneously, leading to multidimensional consequences.

Preventing environmental pollution requires comprehensive strategies at all levels, from individuals to government institutions. In this process, the responsible behaviours demonstrated by environmentally conscious individuals in their daily lives play a crucial role. Environmental education is a key tool in helping individuals develop this awareness and sense of responsibility. Permanent solutions to environmental pollution depend on individuals gaining environmental awareness from an early age. In this respect, it is of great importance to increase efforts to raise environmentally conscious individuals within educational institutions.

Integrating environmental education into the curriculum will raise social awareness and contribute to solving environmental problems in a sustainable way. In our country, topics such as environmental pollution, its causes, the effects of human activities on the environment, and ways to protect the environment are conveyed to primary school students through life science, social studies, and science courses. The aim is to develop environmental awareness and raise environmentally conscious individuals.

Examining the literature reveals Uyanık's (2017) study of primary school students' views on environmental pollution, Yazıcı, Kaya and Ekiz's (2018) study of middle school students' metaphors on environmental pollution, and Kıvrak and Uyanık's (2020) study of primary school Year 4 students' views on environmental pollution. ; Yazıcı, Karakuş and Aliç's (2021) study of the cognitive structures of gifted students in relation to the concept of environmental pollution; Çetin and Sayan's (2023) study of primary school students' views on environmental pollution; and Çıtak's (2023) study of Web 2.0 tools and 5th grade students' attitudes towards environmental pollution; Güleçyüz's (2023) e-design study on environmental pollution in accordance with the blended learning model; Işık Öner's (2024) analysis of primary school students' perceptions and drawings about environmental pollution; and Tuğrul's (2024) teaching of environmental pollution to secondary school students through games. The literature also contains studies examining pre-service social studies teachers' views, attitudes and visual representations of the concept of the environment. For example, Bülbül and Yılmaz (2019) examined pre-service social studies teachers' views on environmental concepts and citizenship, while Karadağ and Acar (2020) examined their awareness of environmental issues. Karatekin et al. (2014) investigated their participation in solving environmental problems, and Artun et al. (2013) examined factors affecting their environmental literacy levels.

Kayalı (2010) and Öcal (2013) both examined the attitudes of pre-service teachers towards environmental problems, the former focusing on Turkish and social studies teachers, and the latter on social studies teachers only. Additionally, Uymaz (2021) investigated the views of prospective social studies teachers on current global issues. Conversely, Karakuş and Yel (2019) analysed the perceptions of pre-service social studies teachers regarding global warming through an analysis of the participants' drawings. Similarly, Hamalosmanoğlu (2020) examined pre-service social studies teachers' visual perceptions of environmental problems through pictures drawn by the teachers. The social studies course is one of the most important for developing the cognitive, affective and psychomotor areas of middle school students with regard to the environment. Determining the mental images of prospective social studies teachers, who will be the teachers of the future, is therefore of particular importance. Therefore, this study is expected to contribute to the existing literature on this topic. This study sought to answer the question: Into which categories can the cognitive structures of pre-service social studies teachers regarding environmental pollution be grouped?

METHOD

Research Design

The study examined the cognitive structures of pre-service social studies teachers regarding environmental pollution using a phenomenological design, one of the qualitative research methods. This design focuses on phenomena that are familiar but not well understood (Yıldırım & Şimşek, 2018, p. 69). In other words, it is a research design that aims to emphasise the perceptions and experiences of individuals from their own perspective (Ersoy, 2017, p. 84).

Study group

This research was conducted during the spring semester of the 2024–25 academic year. It was conducted with first, second, third and fourth year students studying social studies teaching at a state university in Ankara. A total of 161 pre-service teachers participated in the study. The gender distribution of the participants is as follows: 105 female and 56 male.

Data Collection Tool

Concepts play a key role in human life. In this framework, metaphors enable us to understand a situation from the perspective of a concept by relating it to a different concept (Eraslan, 2011). Lakoff and Johnson (2015) define metaphors as using other elements to describe a thought or phenomenon; in other words, they shape the intellectual process in an original and creative way (as cited in Ballı, 2024).

In the study, the "Metaphor Form" developed by the researchers and consisting of two parts was used to collect data. In the first part of the form, a directive containing the name of the researchers, the purpose of the researcher, the statements that the data obtained will be used in accordance with scientific ethics and will not be used for any other purpose is included. In the second part of the form, the students were asked to write their metaphors about environmental pollution by writing the sentence "Environmental pollution is like/similar to .... Because.." sentence was included.

Data Collection

After obtaining the necessary permissions, the researchers distributed the forms to the pre-service teachers. Afterwards, the pre-service teachers were given an explanation of what a metaphor is, using examples unrelated to the subject to help them understand the concept and create a framework for it in their minds. Then, the pre-service teachers were asked to fill in the form by developing a metaphor reflecting their individual thoughts. They were given 15 minutes to do this.

Data Analysis

The data obtained within the scope of the research were evaluated by content analysis method. The main purpose of this type of analysis is "to reach concepts and relationships that can explain the collected data" (Yıldırım & Şimşek, 2018, p. 242). The metaphors created by pre-service social studies teachers were analyzed in four stages. These are;

1. Coding and sorting phase: At this stage, the metaphorical forms created by the participants were coded. The researcher examined all the forms in detail. During this process, forms without a justification, containing an invalid metaphor or left blank were identified and excluded from the evaluation (55 out of 161). Thus, 106 forms on the subject of 'environmental pollution' were found suitable for analysis.

2. Category Development Phase: The metaphors included in the evaluation were analysed again, taking into consideration their common features, meaning, sources, and cause-effect relationships. As a result of this process, seven categories were formed in the research. After obtaining the necessary permissions, the researchers distributed the forms to the pre-service teachers. The pre-service teachers were then given an explanation of what a metaphor is, using examples unrelated to the subject to help them understand the concept and create a framework for it in their minds. Then, the pre-service teachers were asked to fill in the form by developing a metaphor reflecting their individual thoughts. They were given 15 minutes.

3. Representative Metaphor Compilation Phase: The metaphors belonging to each category were re-evaluated and a sample metaphor that best reflects the relevant category was selected.

Validity and Reliability

In qualitative studies, elements such as participant confirmation, expert opinion, the use of multiple coders and direct quotations are required to ensure the research is valid and reliable. In this study, an expert opinion was obtained from a faculty member specialising in social studies education. Additionally, the participants' metaphor examples were conveyed via direct quotations. Furthermore, all processes related to the study were explained in detail.

Ethical Statement

The ethical approval required for the study was reviewed at the meeting of the Gazi University Ethics Committee dated May 13, 2025, and numbered 08, and it was unanimously concluded that the study is ethically appropriate to be conducted.

FINDINGS

In this part of the study, the results of the analysis of the metaphors about environmental pollution were analyzed under items and shown in the Table 1.

Table 1. Metaphor categories developed by the participants for th e concept of "Environmental Pollution".

No	Category Name	Metaphor	Number of Metaphors	Metaphors
1	Damaging	Garbage (f:2), Gossip (f:1), Rabies (f:1), Darkness (f:1), Natural Disaster (f:1), Smoking (f:2), Cancer (f:3), Fungus (f:1), Honor Killing (f:1), Disease (f:3), Stale Bread (f:1), Human (f:1), Virus (f: 3), Air Pollution (f:1), Polluted Clothes (f:1), Germ (f:1), Enemy (f:1), Global War (f:1), Men (f:1), Poison (f:3), Monster (f:2), Politics (f:1), Noise Pollution (f:1), Evil (f:1)	24	35
2	Increasing Problem Over Time	Addiction (f:1), Microbe (f:1), Cancer (f:5), Small Crack in a Glass Jar (f:1), Accumulation of Dirty Drops (f:1), Unhealthy Food (f:1), Virus (f:1), Snowball (f:3), A Fading Flower (f:2), Dirt Left at the Bottom of the Sink (f:1), Wrong Note in a Song (f: 1), Disease (f:1), Weight (f:2), Smoke (f:1), Homework (f:1), Avalanche (f:1), Social Decay (f:1), Men (f:2), Slowly Spreading Poison (f:1), Corruption (f:1), Rusting Machine (f:1), Insomnia (f:1), Bacteria (f:1), Parasite (f:1), Garbage Bin (f:1)	25	34
3	Creating a Bad Image	Rat (f:1), Untended ivy (f:1), Skunk (f:1), Garbage dump (f:1), Dirty water (f:1), Unplanned construction (f:3), Haystack in the desert (f:1)	7	9
4	Discomfort	Stray Animals (f:1), Smoke (f:1), Bad Smell (f:1), Gray Clouds (f:1), Rotten Fruit (f:2), Garbage Bin (f:1), Politicians (f:1), Caste System (f:1)	8	9
5	Fatal	Cutting off the branch (f:1), Cancer (f:2), Murder (f:1), Cigarette (f:1), Apocalypse (f:1), Monster (f:1), Poison Needle (f:1)	7	8
6	Diversity	Ashura (f:1), Brain (f:1), Garbage Pile (f:1), Jewelry Box (f:1), World Problem (f:1), Soil (f:1), Octopus (f:1)	7	7
7	Complexity	Brain (f:1), Fuzzy Mind (f:2), MP (f:1)	3	4

According to Table 1, the participants developed 106 metaphors for the concept of "environmental pollution". Of the metaphors developed, 81 of them were created by one participant. It was determined that 24 metaphors related to environmental pollution were used by more than one participant. When the frequency distribution of the metaphors is analyzed, it is seen that "cancer" (f:10) and "disease" (f:4) metaphors are the most frequently used ones. The metaphors developed were grouped into 7 categories based on their meanings.

Category 1: Damaging
When Table 1 is examined, it is seen that a total of 35 participants created 24 metaphors in the category of "damaging". When the frequency distribution of the metaphors in this category is examined, the most frequently used metaphors are "cancer" (f:3), 'disease' (f:3) and "virus" (f:3). Some of the metaphor examples created by the participants in this category are as follows:
"Environmental pollution is like cancer. Because it harms people like cancer." (T,75)
"Environmental pollution is like a disease. Because where there are both, there is harm and unhappiness." (T,59)
"Environmental pollution is like a virus. Because it disrupts the natural balance and harms the world." (T,48)

Category 2: Increasing Problem over Time
When Table 1 is examined, it is seen that a total of 32 participants created 25 metaphors in the category of " increasing problem over time ". When the frequency distribution of the metaphors in this category is examined, it is seen that the most frequently used metaphor is "cancer" (f:5). Some of these metaphor examples are presented below.
"Environmental pollution is like cancer. Because it spreads slowly and causes problems." (S,28)
"Environmental pollution is like a snowball. Because once it starts, it grows into a huge problem." (T,77)
"Environmental pollution is like men. Because it gradually makes your living space uninhabitable." (T,71)

Category 3: Creating a Bad Image
When Table 1 is examined, it is seen that a total of nine participants created seven different metaphors in the category of "creating a bad image". When the frequency distribution of the metaphors in this category is analyzed, the most frequently used metaphor is "Unplanned construction" (f:3). Some of the related metaphor examples are presented below.
"Environmental pollution is like unplanned construction. Because it does not make us happy in terms of appearance." (T,88)
"Environmental pollution is like a untended ivy. Because it creates a chaotic and dirty image." (T,40)

Category 4: Discomfort
When Table 1 is examined, it was determined that a total of nine participants produced eight different metaphors in the category of "discomfort". When the frequency distribution of the metaphors in this category was analyzed, it was found that the most frequently used metaphor concept was "rotten fruit" (f:2). Looking at the reasons why the participants developed the metaphor they created in all of the categories;
"Environmental pollution is like rotten fruit. Because it spreads bad odor around." (T,54)
"Environmental pollution is like politicians. Because it disturbs and disrupts the comfort of life." (T,87)

Category 5: Fatal

When Table 1 is examined, it is seen that a total of eight participants created seven different metaphors in the "fatal" category. When the frequency distribution of the metaphors in this category is analyzed, the most frequently used metaphor is "cancer" (f:2). A few of these metaphor examples are presented below.

"Environmental pollution is like cancer. Because as cancer kills people, environmental pollution destroys the world." (T,39)

"Environmental pollution is like the apocalypse. Because they both bring the end of the world." (T,80)

Category 6: Diversity

When Table 1 is examined, it was determined that a total of seven participants created seven different metaphors in the "diversity" category. Looking at the frequency distribution of the metaphors in this category, it was determined that each participant developed one metaphor. Some of the related metaphor examples are as follows:

"Environmental pollution is like soil. Because they both contain a lot of things." (T,82)

"Environmental pollution is like the brain. Because there are many parts of the brain, and there are many types of environmental pollution. " (T,44)

Category 7: Complexity

When Table 1 is examined, it is seen that a total of four participants created three different metaphors in the "complexity" category. When the frequency distribution of the metaphors in this category is examined, it is determined that the most frequently used metaphor is written with the concept of "fuzzy mind" (f:2). Some of the examples created by the participants in this category are as follows.

"Environmental pollution is like a fuzzy mind. Because it does not allow them to continue their lives in a healthy way." (T,10)

"Environmental pollution is similar to an MP. Because they both create chaos." (T,14)

RESULTS and CONCLUSION

This study examined participants' perceptions of environmental pollution through metaphors. The findings showed that environmental pollution is perceived as a physical threat at an individual and social level, as well as being a multifaceted environmental problem with health, aesthetic, psychological and even existential dimensions.

The fact that participants most frequently categorised environmental pollution as 'damaging' and an 'increasing problem over time' indicates their high awareness of the direct effects of this environmental problem on quality of life. This finding aligns with international studies that have examined the detrimental impact of environmental pollution on human health and ecosystems (Kollmuss & Agyeman, 2002; World Health Organization, 2018), as well as with studies conducted in Turkey (Güven, 2013; Çakır & Akkuş, 2017; Doğan, 2017; Uyar & Karakuş, 2022). Doğan (2017) examined the environmental perceptions of secondary school students, and Uyar and Karakuş (2022) investigated the effect of poster use on environmental perceptions. Both studies concluded that students agreed that environmental pollution negatively affects human health. Arık and Yılmaz (2017) also examined pre-service science teachers' mental structures regarding environmental pollution through metaphors. The metaphors developed by pre-service teachers emphasised that environmental pollution harms life and that this harm increases over time. Hamalosmanoğlu's (2020) study with pre-service social studies teachers revealed that participants mostly established a relationship between environmental issues and waste from factories and rubbish.

The fact that participants chose health-centred metaphors such as 'cancer', 'disease' and 'virus' clearly shows that environmental pollution is primarily perceived as a health threat. While these metaphors suggest that environmental pollution endangers human life in visible and invisible ways, studies on environmental awareness in Turkey have also found that people mostly associate the environment with health (Uyar & Karakuş, 2022; Işık Öner, 2024). Işık Öner (2024) investigated middle school students' perceptions of environmental pollution and found that they used the disease metaphor, while Uyar and Karakuş (2022) found that students emphasised disease and cancer in posters about the environment. A study by Arık and Yılmaz (2017) found that pre-service teachers associated environmental pollution with diseases, bacteria, and viruses. Another study by Gürlen and Köseoğlu (2019) with university students found that soil pollution was explained in terms of 'disease, unhealthy life and death'. Similarly, the metaphorical images produced by Kızılay (2020) most frequently featured the concepts of 'virus, bacteria and germ'.

The categories of 'discomfort' and 'creating a bad image' show that environmental pollution directly affects individuals' aesthetic perception and psychological well-being. Environmental psychology literature argues that deterioration of the natural environment causes mental health problems, stress and anxiety in individuals (Kaplan & Kaplan, 1989; Pretty et al., 2005). In Turkey, evidence suggests that unplanned construction, inadequate waste management and visual pollution negatively impact individuals' quality of life (Demirel & Demirel, 2010; Özdemir, 2012).

Metaphors such as 'deadly' and 'apocalypse' demonstrate that environmental pollution is not only perceived as an everyday issue, but also as a global disaster that endangers the survival of humanity and the planet. This aligns with studies that highlight the fact that global environmental issues such as climate change, biodiversity loss and resource consumption are pushing the planet's boundaries (Rockström et al., 2009). Studies conducted in the Turkish context also reveal that both students and adults perceive environmental issues as a cause for concern in the future (Doğan, 2017; Uyar & Karakuş, 2022).

In the 'diversity' and 'complexity' categories, environmental pollution was evaluated by participants as a multidimensional phenomenon stemming from various sources with a complex structure in terms of solutions. Similar studies conducted with secondary school students in Turkey reveal that students perceive environmental pollution as not only a physical problem, but also a multifaceted environmental issue shaped by social, economic, and cultural factors, and complex in terms of the solution process. For instance, Doğan (2017) and Uyar and Karakuş (2022) found that students recognised the impact of environmental pollution on human health, the balance of ecosystems and quality of life, and that pollution has diverse sources and requires social cooperation, education and individual awareness to solve. Similarly, Özcan and Demirel (2019) and Uğur and Öküzcüoğlu (2022) found that secondary school students understand environmental issues as multidimensional and view solutions as complex processes. Arık and Yılmaz (2017) found that pre-service teachers also perceive environmental pollution as a complex issue.

In conclusion, the findings of this study demonstrate that perceptions of environmental pollution are formed in the minds of individuals in both concrete (e.g. physical damage and aesthetic degradation) and abstract (e.g. anxiety, fear and existential threat) dimensions. Environmental education and social awareness activities should consider this multi-layered perception and develop holistic approaches focusing not only on transferring information, but also on fostering emotional awareness and environmental ethics. Both the international and Turkish literatures emphasise this conclusion,

revealing the need to strengthen the culture of individual responsibility and social cooperation in tackling environmental pollution.

Conflict of Interest

The authors declare that there are no conflicts of interest with other persons or organizations related to this article.

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