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## **SOSYAL BİLGİLER ÖĞRETMEN ADAYLARININ IŞIK KİRLİLİĞİ HAKKINDAKİ GÖRÜŞLERİ\***

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### **ÖZET**

Bu çalışmanın amacı Sosyal Bilgiler öğretmeni adaylarının ışık kirliliği hakkındaki görüşlerini belirlemektir. Bu araştırma nitel araştırma yöntemine göre tasarlanmıştır. Araştırmada betimsel tarama yöntemi kullanılmıştır. Çalışmada amaçlı örnekleme yöntemlerinden maksimum çeşitlilik örnekleme kullanılmıştır. Çalışmada, Ağrı İbrahim Çeçen Üniversitesi Eğitim Fakültesi Sosyal Bilgiler Öğretmenliği bölümünde 1., 2., 3. ve 4. sınıflardan oluşan toplam 40 öğrenci yer almıştır. Verilerin toplanmasında araştırmacılar tarafından geliştirilen 6 açık uçlu sorudan oluşan yarı yapılandırılmış görüşme formu kullanılmıştır. Görüşme formunda yer alacak sorular hazırlandıktan sonra uzman görüşüne başvurulmuştur. Uzman görüşü alındıktan sonra sorular tekrar düzenlenerek 20 öğretmen adayı üzerinde pilot uygulama yapılmıştır. Pilot uygulaması yapılan görüşme formu düzenlenerek uzman görüşüne tekrar sunulmuştur. Uzmanlardan gelen geri dönüt alındıktan sonra görüşme formuna son şekli verilip 2016-2017 eğitim-öğretim yılının bahar yarıyılında uygulanmıştır. Verilerin analizinde betimsel analiz yöntemi kullanılmıştır. Çalışmanın sonucunda, Sosyal Bilgiler öğretmen adaylarının genel olarak ışık kirliliği hakkında bilgi sahibi oldukları fakat bazı öğretmen adaylarının konu hakkında bilgi sahibi olmadıkları tespit edilmiştir. Sosyal Bilgiler Öğretmen adayları kirliliğin genel olarak canlı ve cansız varlıklara zarar verdiğini, ışık kirliliğinin kirlilik çeşitleri arasında yer aldığını belirtmişlerdir. Işık kirliliğinin sebepleri arasında aşırı ışık kullanımı, evlerden ve binalardan taşan ışıklar, doğru ışık kullanımının yapılmamasını gösteren öğretmen adayları, ışık kirliliğinin hem insanlar hem de canlı ve cansız çevre üzerinde önemli olumsuz etkilere neden olduğunu belirtmişlerdir. Öğretmen adayları ışık kirliliğinin etkilerini azaltmak için insanların bilinçlendirilmesi gerektiği konusunda görüş belirtmiştir. Bazı öğretmen

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adaylarının ise bu konuda bilgi sahibi olmamaları dikkat çekici bir sonuçtur.

**Anahtar Kelimeler:** Sosyal Bilgiler, ışık kirliliği, öğretmen adayı.

## **VIEWS OF THE SOCIAL TEACHER CANDIDATES ABOUT LIGHT POLLUTION**

### **ABSTRACT**

The purpose of this study is to determine the views of social studies of teachers candidates about light pollution. This research is designed by using qualitative research method. In the research, case studies that is one of the qualitative research methods is used. Case study is a kind of research that offers a rich perspective on analyzing the learning, learning and management implications of what educators and students have gained through experiences they have gained. Maximum diversity one of the purpose sampling methods sampling was used. A totally 40 students from 1st, 2nd, 3rd and 4th grades were included in the Social Studies Teaching Department of Ağrı İbrahim Çeçen University Faculty of Education. A semi-structured interview form consisting of 6 open-ended questions developed by researchers was used to collect the data. After the questions that take place in the interview form were prepared, expert opinion was consulted. After the expert opinion was received, the questions were revised and piloted on 20 teacher candidates. Pilot application form was prepared and presented again to expert opinion. After receiving the feedback from the experts, the final form was given to the interview form and applied in the spring semester of 2016-2017 academic year. In the analysis of the data, a descriptive analysis method was used. As a result of the study, it was determined that social science teacher candidates generally have information about light pollution but having this information is not enough for some of them. Social Studies Teacher candidates have shown that pollution damages living and non-living assets in general and that light pollution is among pollution types. Excessive use of light among the causes of light pollution, lights overflowing from houses and buildings, and prospective teachers showing the absence of correct light use, have indicated that light pollution causes significant negative effects on both humans and the living and nonliving environment. Teacher candidates have expressed the opinion that people need to be conscious in order to reduce the effects of light pollution. It is remarkable that some teacher candidates should not have knowledge in this regard.

### **STRUCTURED ABSTRACT**

The environment is, in its most general sense, the whole system of natural and human elements in which human beings live and which they constantly utilize, in which the history is in relation and interact with each other (Kocakurt and Güven, 2005, 34-38). Although human beings have lived in harmony with their environment for centuries, the environment

has begun to emerge as a problem when environmental conditions have started threatening nutrition and reproduction, the two important functions of living. The most important cause of the environmental problems that disturb the balance between man and nature is the great industrial revolution. Light pollution, which is an important type of pollution, has also recently been involved in environmental pollution.

Light pollution is caused by incorrect outdoor lighting applications. A good lighting installation is expected to illuminate only the areas that are intended for lighting purposes. However, this installation leads to light pollution when it goes out of the areas that need to be illuminated and sends extra light to the areas that need to be illuminated or illuminate other areas (Onuk, 2008, 24). Until the beginning of the 20th century, together with developing technology, the concept of light pollution, which did not make any sense, has been caused by some mistakes that occurred in lighting designs. The light pollution, which has become a major problem of modern cities, was thought to have influenced astronomers observing the sky at first when it took its place in architectural illumination.

The aim of this study is to determine the views of pre-service teachers of Social Studies about light pollution. This research is designed according to qualitative research method. Qualitative Descriptive Study was used in the study. In these researches, purposeful sampling methods are used which do not carry out the purpose of generalization to the universe but to obtain rich data (Büyüköztürk, 2014, 91-92). In this direction, convenience sampling method is used in the study. In the study, a total of 40 students from 1<sup>st</sup>, 2<sup>nd</sup>, 3<sup>rd</sup> and 4<sup>th</sup> grade in the Social Studies Teaching Department of Faculty of Education, İbrahim Çeçen University of Ağrı were included. A semi-structured interview form consisting of 6 open-ended questions developed by researchers was used to collect the data. After the questions that will take place in the interview form were prepared, expert opinion was consulted. After the expert opinion was received, the questions were revised and piloted on 20 pre-service teachers. The interview form whose pilot scheme was completed was edited and expert opinion was re-consulted. After receiving the feedback from the experts, the final form was given to the interview form and applied in the spring semester of 2016-2017 academic year. Descriptive analysis method was used to analysis of data. During the analysis of the data, 20 interview forms were filled out as they were mis-filled and the opinions of 40 teacher candidates were included.

Pre-service social studies teachers evaluated the concept of pollution that pollution is as a result of the destruction of natural conditions by people, negatively affects the environment, living and inanimate assets in general. On generally analyzing the views of pre-service Social Studies teachers on pollution types, it was seen that all of the pre-service teachers who participated in the study indicated environmental pollution. Noise, light, air, water, soil pollutions are among the pollution types mentioned by most of the teacher candidates. The fact that most of the pre-service teachers expressed that the light pollution is among pollution types is of higher importance as it indicates that they have information about light pollution.

On analyzing the views of the pre-service teachers on whether the light pollution is an environmental problem, it is seen that 38 pre-service teachers considered light pollution as an environmental problem as it damages living and non-living assets, damages economy and environment. This indicates that the pre-service teachers participating in the study are aware that light pollution is an environmental problem. . It can be said from this result that most of the pre-service teachers participating in the study are aware of the light pollution and some pre-service teachers do not have enough knowledge about the subject.

Pre-service social studies teachers stated that unnecessary light use, unconscious people, advertising panels, lights overflowing from houses and buildings, technological developments, the use of commercial light and using poor quality light cause light pollution. The opinions expressed by the pre-service teachers participating in the study on the causes of light pollution show that they have knowledge about light pollution. Pre-service Social Studies teachers stated that light pollution has adverse effects on living and non-living assets, leading to various diseases such as eye diseases in humans, adverse effects of excessive light on the economy and causing traffic accidents and they have offered suggestions in general to prevent light pollution like avoiding unnecessary lighting, making people aware of this issue, making correct lighting, saving and collective light-off activities.

**Keywords:** Social Studies, light pollution, teacher candidate.

## Introduction

The environment is, in its most general sense, the whole system of natural and human elements in which human beings live and which they constantly utilize, in which the history is in relation and interact with each other (Kocakurt and Güven, 2005, 34-38). Although human beings have lived in harmony with their environment for centuries, the environment has begun to emerge as a problem when environmental conditions have started threatening nutrition and reproduction, the two important functions of living. The most important cause of the environmental problems that disturb the balance between man and nature is the great industrial revolution. Nevertheless, with the rapidly increasing population in the 21st century pushing the environmental limits, pushing the resources and ecosystems on the earth, adversely affecting nutrition, education and health services, facing the danger of diminishing and disappearing of the living species, increasing pollution rates and increasing climate change have become major environmental problems (Yucel and Morgil, 1998, 84-91). Light pollution, which is an important type of pollution, has also recently been involved in environmental pollution.

*Light pollution is the use of light in the wrong place, wrong amount, wrong direction and wrong time (Alper, 2004, 3).* Light pollution is caused by incorrect outdoor lighting applications. A good lighting installation is expected to illuminate only the areas that are intended for lighting purposes. However, this installation leads to light pollution when it goes out of the areas that need to be illuminated and sends extra light to the areas that need to be illuminated or illuminate other areas (Onuk, 2008, 24).

Until the beginning of the 20th century, together with developing technology, the concept of light pollution, which did not make any sense, has been caused by some mistakes that occurred in lighting designs. The light pollution, which has become a major problem of modern cities, was

thought to have influenced astronomers observing the sky at first when it took its place in architectural illumination. However, in the process, it has started to have negative effects on human health by causing degradation of ecological balance, decreasing biological diversity. (Fitöz, Sunar and Saraf, 2009, 1).

The most important way to prevent light pollution, which has a negative effect on both the environment and human health, is to make educational studies on the subject and raise awareness about light pollution among people (Aydın, 2015, 143). Various studies in the literature have revealed the causes and effects of light pollution. Crawford, (2001) emphasized that incorrect outdoor illumination caused light pollution. Osman, Isobe, Navar and Morcos (2001), Çetegen and Batman (2005) emphasized that light pollution is an important environmental problem. Özyürek and Aydın (2015), have studied the views of students about the applications of light pollution. Percy (2001) and Hanel (2001) found that people do not have enough knowledge about light pollution in their study on causes, consequences and solution proposals of light pollution. Köklükaya and Selvi (2015) studied the perceptions of pre-service science teachers on light pollution. Sever, Kelleci and Koz (2014) have dealt with the issue of examining the environmental awareness of pre-service teachers on light pollution. When the literature is examined, no studies on light pollution in Social Studies have been found. On the other hand, when the Social Studies Curriculum is examined, it is understood that there is a course that can actively involve environmental education. Therefore, this study aims to eliminate this gap in the literature.

### **Purpose**

The aim of this study is to determine the views of pre-service teachers of Social Studies about light pollution.

### **Method**

This research is designed according to qualitative research method. *“Qualitative research, is an approach to discover and understand the meanings of a social or humane problem that individuals or groups attribute. The research process includes developing questions and process steps, usually collecting data from the participants' own environment, performing inductive data analysis by reaching general themes from specific situations, and interpreting the meaning of the data.”* (Creswell, 2013/2014, 4).

Qualitative research can be defined as *“a qualitative research method in which qualitative data collection methods such as observation, interview and document analysis are used and a qualitative process is carried out to reveal perceptions and events in a natural and realistic way.”* (Yıldırım and Şimşek, 2008, 39).

Qualitative Descriptive Study was used in the study. The Qualitative Descriptive Study is a descriptive study based on the naturalistic paradigm, in which the in-depth analysis of phenomenology, embedded theory, ethnography studies are not examined and interpreted but only the interviews, observations, document analysis methods and social events and phenomena are presented unchanged (Arslantürk and Arslantürk, 2013; Lambert and Lambert, 2012; Walker, 2012).

### **Sample**

Generalization in quantitative research is not aimed at. Therefore, in qualitative research it is usually not possible to work with large groups (Glesne, 2011/2015, 59). In these researches, purposeful sampling methods are used which do not carry out the purpose of generalization to the universe but to obtain rich data (Büyüköztürk, 2014, 91-92). In this direction, convenience sampling method is used in the study. *“This sampling method gives speed and practicality to research. Because*

*in this method the researcher chooses a situation that is close and easy to access* "(Yıldırım and Şimşek, 2008, 113). In the study, a total of 40 students from 1<sup>st</sup>, 2<sup>nd</sup>, 3<sup>rd</sup> and 4<sup>th</sup> grade in the Social Studies Teaching Department of Faculty of Education, İbrahim Çeçen University of Ağrı were included. Gender, class and age of the pre-service teachers participating in the study are presented in Table 1.

**Table 1. Personal Information of Pre-service Teachers Participating in the Study**

Personal Information of the Pre-service Teacher	f
<b>Gender</b>	
Female	23
Male	17
<b>Grade</b>	
1 <sup>st</sup> grade	10
2 <sup>nd</sup> grade	10
3 <sup>rd</sup> grade	10
4 <sup>th</sup> grade	10
<b>Age</b>	
17-20	13
21-25	20
25 and above	7

When Table 1 is examined, 23 of the pre-serice teachers of Social Studies participating in the study are composed of females and 17 of them are males. Ten pre-service teachers from each grade participated in the study. 13 of the participants are between 17-25, 20 of them are between 21-25 and 7 of them are 25 years old and above.

#### **Data Collection**

A semi-structured interview form consisting of 6 open-ended questions developed by researchers was used to collect the data. After the questions that will take place in the interview form were prepared, expert opinion was consulted. After the expert opinion was received, the questions were revised and piloted on 20 pre-service teachers. The interview form whose pilot scheme was completed was edited and expert opinion was re-consulted. After receiving the feedback from the experts, the final form was given to the interview form and applied in the spring semester of 2016-2017 academic year.

#### **Analysis of the Data**

In the analysis of the data, a descriptive analysis method was used. Descriptive analysis is the analysis of the data by considering the preliminary theoretical framework considering the literature, or the draft or transient code derived from the interview and observation variables, taking into account the literature. (Yıldırım and Şimşek, 2008, Miles and Huberman, 1994/2015, Creswell, 2013/2015, Creswell, 2013/2014, Patton, 1990/2014). In this study, the analysis of the data was carried out from the questions in the interview form. During the analysis of the data, 20 interview forms were filled out as they were mis-filled and the opinions of 40 teacher candidates were included.

#### **Findings and Interpretation**

In this section, social science pre-service teachers' opinions about pollution concept, types of pollution, light pollution are presented and interpreted by frequency and percentage values. The opinions of pre-service teachers of social science about the concept of pollution are presented in Table 2.

**Table 2. Social Studies Pre-service Teachers' Views on Pollution**

Pollution	f	%
The environmental conditions are adversely affected	11	27,5
The negative conditions that damage life	8	20
It is everything that negatively affects living and non-living things	8	20
Factors affecting people negatively	7	17,2
I have no idea	3	7,5
Negative damages caused by people in natural surroundings	2	5
It's the case of not being clean	1	2,5
<b>Total</b>	<b>40</b>	<b>100,0</b>

On analyzing the Table 2, 11 of the pre-service teachers (27,5 %) participating in the study presented their opinions about pollution concept as “The environmental conditions are adversely affected”, 8 of them (20 %) as “The negative conditions that damage life”, 8 of them (20 %) as “It is everything that negatively affects living and non-living things”, 7 of them (17,5 %) as “Factors affecting people negatively”, 3 of them (7,5 %) as “I have no idea”, 2 of them (5%) as “Negative damages caused by people in natural surroundings”, 1 of them (2,5%) as “It's the case of not being clean”. Some of the answers given to the question are as following:

Ö31-coded participant,

*“It is factor that damages the environment and the people, negatively affects them and creates permanent or provisional affects.”*

Ö21-coded participant,

*“Pollution is defined as humane events that damage the people and substantially the environment where men live.”*

Ö2-coded participant,

*“It is the event that the natural environment is destructed consciously or unconsciously by mankind.”*

Pre-service teachers have defined the concept of pollution as a concept that in general affects the environment and the human in a negative way. 3 pre-service teachers stated that they have no idea about the subject. The opinions of pre-service social studies teachers regarding the types of pollution are presented in Table 3.

**Table 3. The Opinions of Pre-service Social Studies Teacher Regarding Types of Pollution**

Types of Pollution	f	%
Environmental Pollution	40	23,6
Noise Pollution	35	20,7
Light Pollution	29	17,1
Air Pollution	27	15,9
Water Pollution	23	13,6
Soil Pollution	6	3,5
Radioactive Pollution	4	2,3
Space Pollution	2	1,1
Atmospheric Pollution	1	0,5
Fashion Pollution	1	0,5
Information Pollution	1	0,5
<b>Total</b>	<b>169</b>	<b>100,0</b>

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When Table 3 is analyzed, it is seen that 40 (23,6 %) of the pre-service teachers participating in the study stated “Environmental pollution”, 35 (20,7 %) of them stated “Noise pollution”, 29 (17,1 %) stated “Light pollution”, 27 (15,9 %) of them stated “Air pollution”, 23 (13,6 %) of them stated “Water pollution”, 6 (3,5 %) of them “Soil pollution”, 4 (2,3 %) of them stated “Radioactive pollution”, 2 (1,1 %) of them stated “Space pollution”, 1 (0,5 %) of them stated “Atmospheric pollution”, 1 (0,5 %) of them stated “Fashion pollution and 1 (0,5 %) of them stated Information pollution” as types of pollution. Only one of the pre-service teachers stated environmental pollution as pollution types. When Table 3 is examined, all of the pre-service teachers indicated environmental pollution among the pollution types, but light pollution is the most mentioned pollution type after noise pollution. The opinions of pre-service social science teachers on whether environmental pollution is an environmental problem are presented in Table 4.

**Table 4. Opinions of Pre-service Social Studies Teachers on Whether Light Pollution is an Environmental Problem**

Light Pollution	f	%
Yes, because it harms human health	17	42,5
Yes, because it harms humans and the environment	6	15
Yes, because it harms human beings, the environment and the economy	4	10
Yes, because it harms the environment	3	7,5
Yes, because it harms humans and animals	2	5
Yes, because it causes more energy consumption	2	5
Yes, because it harms living life	2	5
No, it's not a harmful problem	2	5
Yes, because it is used at the wrong time, in place and in quantity	1	2,5
Yes, because it damages the plants	1	2,5
<b>Total</b>	<b>40</b>	<b>100,0</b>

When Table 4 is examined, 17 (42.5%) of the prospective teachers who participated in the study about whether the pollution of light is environmental problem stated "Yes, because it harms human health", 6 (15%) stated "Yes, because it harms humans and environment", 4 (10 %) “Yes, because it harms human beings, the environment and the economy”, 3 (7,5 %) stated “Yes, because it harms the environment”, 2 (5 %) stated “Yes, because it harms humans and animals”, 2 (5 %) stated “Yes, because it causes more energy consumption”, 2 (5 %) stated “Yes, because it harms living life”, 2 (5 %) stated “No, it's not a harmful problem”, 1 (2,5 %) stated “Yes, because it is used at the wrong time, in place and in quantity” and 1 (2,5 %) stated “Yes, because it damages the plants.” Some of the answers given about the question are:

Ö2-coded participant:

*"Yes, because in an environment exposed to light, physical and mental disorders occur in the individual. For example, visual impairment."*

Ö14-coded participant,

*"Yes, because over-lighting causes more energy consumption. This causes our resources to be used wildly. The life of our world will shorten quickly. "*

Ö34-coded participant,

*"Looking at satellite photographs taken from the sky, it is understandable that excessive use of light causes light pollution. At first sight, the cities where people work with color revelations are beautiful, but then it becomes a problem and people are disturbed. "*

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Ö19-coded participant,

*"Light pollution is not an entirely environmental problem, but it is a problem for the humans rather than for the environment. Because sometimes some light and the color of the light can strain the eyes. It can even affect your eyesight. "*

Most of the pre-service teachers pointed out that light pollution is an environmental problem, stating that light pollution affects the environment, living and non-living assets, and the economy. Two of the pre-service teachers have expressed the opinion that the light is not an environmental problem but it only affects human health negatively. The opinions of pre-service social studies teachers on the causes of light pollution are presented in Table 5.

**Table 5. Pre-service Social Studies Teachers' Views on the Causes of Light Pollution**

Causes of Light Pollution	f	%
Usage of unnecessary light	23	42,5
People are unconscious	13	24
Advertising panels	3	5,5
Lights overflowing from houses and buildings	3	5,5
Traffic lights	2	3,7
Technological developments	2	3,7
Use of poor quality light	2	3,7
No idea	2	3,7
Modernization movements	1	1,8
Commercial interests	1	1,8
Global warming	1	1,8
Depletion of the ozone layer	1	1,8
<b>Total</b>	<b>54</b>	<b>100,0</b>

When examining Table 5, it is seen that 23 (42.5%) of the prospective teachers participated in the study stated "Usage of unnecessary light", 13 (24%) stated "People are unconscious", 3 (5,5%) stated "Advertising panels", 3 (5,5%) stated "Lights overflowing from houses and buildings", 2% (3,7%) stated "Traffic lights", 2 (3,7%) stated "Technological improvements", 2% (3%), 7 "Usage of poor quality light", 1 (1.8%) "Modernization movements", 1 (1.8%) "Commercial interests", 1 (1.8%) "Global warming", 1 (1.8%) stated that "Depletion of the ozone layer" is the cause of light pollution. 2% (3,7%) of the pre-service teachers stated no idea about the causes of light pollution. Some of the answers given to the question are:

Ö16-coded participant,

*"Increasing lights from neighborhoods, homes, street lamps do not just shine light on their destination, they are disturbing by sending too much light to the neighborhood."*

Ö19-coded participant,

*"I think the most important reason for the light pollution is that the people are pretentious. For example, when a building is being built, they bring more pollution by decorating the outside and the ceiling with more lighting. "*

Ö34-coded participant,

*"In crowded cities, people are seen as a means of economic development, and the lighting of the places are decorated with extreme lightning to attract people's attention, which is the cause of light pollution. Another reason is the use of excessive light for lighting purposes. "*

It is seen that the pre-service social studies teachers who participated in the study focused in general on such things as the unnecessary use of light, the unconsciousness of people, the use of excessive light for commercial purposes, the use of disproportionate light in illuminating houses and buildings, and the use of excessive light by technological developments. 2 of the pre-service teachers stated no idea about the causes of light pollution. The opinions of pre-service social science teachers on the effects of light pollution are presented in Table 6.

**Table 6. Opinions of Pre-service Social Studies Teachers on the Effects of Light Pollution**

Effects of Light Pollution	f	%
Negative effect on human health	32	51,6
Negative effect on the economy	9	14,5
Damage to the environment	9	14,5
Damage to the living things	4	6,4
No idea	4	6,4
Being exposed to radiation	1	1,6
Causing traffic accidents	1	1,6
Damage to the animals and plants	1	1,6
Causing global warming	1	1,6
<b>Total</b>	<b>62</b>	<b>100,0</b>

When Table 6 was examined, it was found that 32 (51.6%) of the pre-service teachers participated in the study about the effects of light pollution stated "Negative effect on human health", 9 (14.5%) stated "Negative effect on the economy", 9 (14,5 %) stated "Damage to the environment", 4 (6,4 %) stated "Damage to the living things", 1 (1,6 %) stated "Being exposed to radiation", 1 (1,6 %) stated "Causing traffic accidents", 1 (1,6 %) stated "Damage to the animals and plants" and 1 (1,6 %) stated "Causing global warming." 4 (6,4 %) of the pre-service teachers did not expressed any idea about the causes of the light pollution. The vast majority of pre-service teachers stated that light pollution negatively affects human health. Some of the answers given to the question are:

Ö8-coded participant,

*"Eye disturbance caused by excessive light can cause a negative health condition. In addition, light pollution is also a negative aspect materially."*

Ö21-coded participant,

*"With the light pollution, increasing health problems make life uninhabitable. Especially in recent times, such as increased eye diseases and cancer types. "*

Ö34-coded participant,

*"The appearance of various biological diseases in humans, damage to organs such as the eye and brain, damage to the human body due to the consumption of energy sources with excessive light use."*

Pre-service social studies teachers who participated in the study generally stated that light pollution damages human health, environment, living and non-living assets, and excessive light usage negatively affects the economy. The fact that 4 pre-service teachers do not expressed any opinion on the subject indicates that some pre-service teachers do not have knowledge about the subject. Table 7 indicates the recommendations of the pre-service social studies teachers about the prevention of light pollution.

**Table 7. The Recommendations of the Pre-service Social Studies Teachers about the Prevention of Light Pollution**

<b>Preventing Light Pollution</b>	<b>f</b>	<b>%</b>
Avoid unnecessary lighting	15	26,3
People should be enlightened	15	26,3
Correct lighting should be done	13	22,8
Saving should be done	6	10,5
No idea	5	8,7
Mass light shutdown activities should be done	1	1,7
The price for electricity must be raised	1	1,7
Legal rules should be applied	1	1,7
<b>Total</b>	<b>57</b>	<b>100,0</b>

On analyzing Table 7, 15 (26,3 %) of the pre-service teachers participating in the study stated about the prevention of the light pollution “Unnecessary lighting should be avoided”, 15 (26,3 %) stated “People should be enlightened”, 13 (22,8 %) stated “Correct lighting should be done”, 6 (10,5 %) stated “Saving should be done”, 1 (1,7 %) stated “Mass light shutdown activities should be done”, 1 (1,7 %) stated “The price for electricity must be raised” and 1 (1,7 %) stated “Legal rules should be applied.” 5 (8,7 %) of the pre-service teachers participating in the study did not express any idea about how to prevent light pollution. The vast majority of pre-service teachers stated that unnecessary lighting should not be used to prevent light pollution, correct lighting should be done and people should be aware of this issue. Some of the answers given to the question are:

Ö31-coded participant,

*“A project in which everyone turns their lights off can be applied a few times a year. People can be made aware of turning the lights off in places where nobody is.”*

Ö26-coded participant,

*“The light shouldn’t be used unnecessarily; appropriate lightning should be used and the streets lights should be designed not to scatter the light.”*

Ö24-coded participant,

*“To prevent light pollution, fluorescent lamps should be used in the sunlight color, unnecessary lights should not be turned on, compulsory public spot broadcasts should be created in social media and visual media about light pollution and damage to people.”*

Pre-service social studies teachers participating in the study have suggested in general that the prevention of light pollution should include the use of no unnecessary lights, correct lighting with the right tools, awareness of people in this way in various ways, saving, collective light-closing activities. The fact that 5 pre-service teachers do not give any opinion on the subject shows that they do not have any knowledge about light pollution.

### **Results, Discussion and Recommendations**

Pre-service social studies teachers evaluated the concept of pollution that pollution is as a result of the destruction of natural conditions by people, negatively affects the environment, living and inanimate assets in general. The fact that 3 pre-service teachers did not express any idea about the pollution concept can be attributed to their lack of sufficient knowledge about the subject.

On generally analyzing the views of pre-service Social Studies teachers on pollution types, it was seen that all of the pre-service teachers who participated in the study indicated environmental pollution. Noise, light, air, water, soil pollutions are among the pollution types mentioned by most

of the teacher candidates. The fact that most of the pre-service teachers expressed that the light pollution is among pollution types is of higher importance as it indicates that they have information about light pollution.

On analyzing the views of the pre-service teachers on whether the light pollution is an environmental problem, it is seen that 38 pre-service teachers considered light pollution as an environmental problem as it damages living and non-living assets, damages economy and environment. This indicates that the pre-service teachers participating in the study are aware that light pollution is an environmental problem. Two pre-service teachers stated that light pollution is not an environmental problem but only a negative effect on human health. It can be said from this result that most of the pre-service teachers participating in the study are aware of the light pollution and some pre-service teachers do not have enough knowledge about the subject. Percy (2001) and Hanel (2001) have found that people do not have enough information about light pollution in their study. Therefore, it can be said that there is parallelism between the studies.

Pre-service social studies teachers stated that unnecessary light use, unconscious people, advertising panels, lights overflowing from houses and buildings, technological developments, the use of commercial light and using poor quality light cause light pollution. The opinions expressed by the pre-service teachers participating in the study on the causes of light pollution show that they have knowledge about light pollution.

Pre-service Social Studies teachers stated that light pollution has adverse effects on living and non-living assets, leading to various diseases such as eye diseases in humans, adverse effects of excessive light on the economy and causing traffic accidents. The fact that 4 pre-service teachers did not give an idea about the effects of light pollution may be due to their lack of knowledge about light pollution. It can be concluded that this result is in parallel with the results of studies done by Percy (2001) and Hanel (2001).

Social Studies Teacher candidates have offered suggestions in general to prevent light pollution like avoiding unnecessary lighting, making people aware of this issue, making correct lighting, saving and collective light-off activities. The fact that 5 pre-service teachers did not give an idea about the effects of light pollution may be due to their lack of knowledge about light pollution. It can be said that this result is in parallel with the results of studies done by Percy (2001) and Hanel (2001).

The light pollution brought by the developing technology has become one of the important environmental problems of today. Light pollution is a major problem in terms of both living and non-living environment as well as it has adverse effects on human health. Therefore, it would be useful to make various informing activities for people to become aware of this problem.

Pre-service teachers who will train future generations should have information about the light pollution which will be a big problem of today and tomorrow, and it is very important for future generations to be conscious about this issue. Despite the fact that most of the pre-service teachers participating in the study are knowledgeable in this regard, the fact that some pre-service teachers are not sufficiently informed about light pollution is a major problem. Therefore, it is thought that it would be beneficial to organize seminar studies on light pollution for pre-service teachers who will train future generations and to put a compulsory course under the name of environmental problems, including light pollution to undergraduate programs.

Even once a year, collective light-off activity should be done and that would help people to be aware of light pollution.

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#### **Turkish Studies**

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