

An Investigation on Turkish Prospective Primary School Teachers' Perceptions about Global Warming

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Abstract: This research aims to determine the perceptions of teacher candidates who are responsible for preparing various education activities in primary schools for students about global warming. This case study is carried out at Giresun University Faculty of Education during the academic year 2008-2009. A total of 89 teacher candidates participated in the study. The data of the study are obtained from the open-ended questionnaire form. The results showed that more than one third of the teacher candidates have insufficient knowledge or misconception about global warming. Also the candidates expressed very important opinions about the problems that will be caused by global warming. However the results disclosed that most of them didn't show enough effort to decrease global warming in their daily life.

Key words: Global Warming • Prospective Primary School Teachers • Environment Education

INTRODUCTION

Nowadays the increasingly using of fossil fuel results in emission of the gases (CO_2 , O_3 , CH_4 , N_2O , CFCs etc.) in the atmosphere and this causes greenhouse effect. These gases keep the sun rays from going out of the atmosphere after reflecting on the earth. This situation increases the temperature on the earth and is named as Global Warming. It is getting more dangerous day by day and it does not only affect the countries which cause the excessive emission of the gases, but also affect the other countries and force all world states to act together. On this matter lots of conferences were arranged (Vienna Convention in 1985, Montreal Protocol in 1987, Rio Declaration in 1992, Kyoto Protocol in 1997, Buenos Aires Climate Summit in 1998, Marrakech Pact in 2001, Bali Climate Change Conference in 2007, Ponzan Climate Change Conference in 2008, etc.) and it was expressed that a variety of responsibilities should be implemented.

Despite many problems occurred in applying the decisions made in the conferences in order to decrease the emission of the greenhouse gases, it is certain that the most important step to take is to make the society conscious of global warming. To make the society conscious, first of all elementary and junior high school students and then high school and college students should be educated because the researches showed that both students and teachers have insufficient knowledge or misconceptions about global warming. When some of

the researches are overviewed, it is seen that the students do not have sufficient knowledge [1] and they do not show interest in these matters [2]. It is disclosed that students thought global warming is a result of the depletion of the ozone layer [3-6] and they had other misconceptions like this [7-10]. Negev [11] stated that teaching curriculums should be revised for the environmental education. Both curriculums and environmental education programs increased the level of knowledge of students and their attitudes changed in a positive way [12]. Because of this teachers have huge responsibilities in getting students comprehend the environmental issues [13].

Researches carried out on teachers and teacher candidates showed that they must have professional information about acid rain, ozone layer depletion, greenhouse effect, global warming and environmental issues [10,14] so that they become more sophisticated and provide effective education for children [15].

In Turkey, Ministry of Education published a circular letter in 2007-2008 education years for the first time (Date 28.08.2007, article 7997, Global Warming Circular Letter 2007/66) and called for this circular letter to be a guide in educating elementary and junior high school students about the precautions they should take for global warming. To do this, various visual materials were used. Besides, some schools arranged planting tree activities; photograph exhibitions; poetry, painting and project competitions [16].

When it is considered that elementary and junior high school students' old knowledge affect their new learning [17] and they take more responsibilities in comparison with young people and adults [18], it is certain that especially primary school teacher candidates should be more sophisticated about this subject.

The purpose of this study is to expose the perceptions of the prospective primary school teachers who are responsible for arranging various education activities for students and expose the precautions they take individually for global warming to set a good model to students.

MATERIALS AND METHODS

Research Model: The case study about global warming was made to determine the perceptions of the teacher candidates. The data of the research were obtained from the open-ended questionnaire form prepared by the researcher. It was composed of two parts including demographic information and open-ended questions. In the part of demographic information; gender, age and class were asked. In the part of open-ended questions such as [1,6] there were 4 questions which were

- “How do you define Global Warming?”,
- “In case Global Warming continues, what do you think we are going to encounter danger?”,
- “What do you think we can do individually at home to decrease Global Warming? What kind of precautions do you take?”
- “What do you think we can do individually outside to decrease Global Warming? What kind of precautions do you take?”.
- It took approximately 25-30 minutes to fill out the questionnaire form by the participants.

Sample: The research was conducted in Giresun University Faculty of Education Department of Primary School Teaching in Turkey. The sample is a composition of the 6th term the teacher candidates who took “Environmental Education Course” between September 2007 and January 2008 (4th term) and passed both two exams of the course. Environmental Education Course was scheduled as two hours a week and in total the class was 28 hours. In this course basic concepts and information of global warming were told with the headline “ecological problems” and this unit of the course lasted 4 hours. This process general education methods (explanation method, discussion method and question and answer

method) was used. The course had two examinations; one midterm and one final examination. 98 teacher candidates took the course and 9 of them failed midterm and final exams. When the exam papers of these 9 candidates were analyzed, it was seen that their answers about basic concepts and information about global warming were not sufficient so they were not included in the research. Consequently 89 candidates who were successful in the exams were included in the research; consisting of 29 male and 60 female, aged between 19 and 23.

Data Collection and Analysis: The data gathered from open-ended questions were classified and grouped by three researchers independent from each other. Later these groups were codified and grouped in one dimension being compared to each other. Interrater agreement was established through comparison of independent analysis of three randomly selected data sets, resulting in overall agreement of greater than 87%. Again by analyzing these data; (f) frequency distributions were determined. Perceptions of the teacher candidates took place in the research and this perception opinions supported the results of the analysis.

RESULTS

The results of the questionnaire form showed that the majority of the participants correctly answered the questions. However, important misunderstandings about Global Warming were also identified through the analysis of the participants' written responses. These results discussed in detail in the following sections respectively from question 1 to question 4.

Question 1. How do you define Global Warming?: 50 of the teacher candidates who were involved in the research gave right answers about why and how the global warming occurred and 39 of the teacher candidates expressed wrong or insufficient answers which may be defined as misunderstandings that do not coincide with current scientific knowledge. This situation showed that the teachers still have misunderstandings about how the global warming occurred although they learned necessary concepts and information about the topic one year ago. Some of these misconceptions of the teacher candidates are presented in Table 1.

It is seen Table 1 that the teacher candidates only mentioned carbon dioxide (N=16) as the harmful gas although there are other gases like ozone, methane, nitrogen, oxide and CFCs that cause global warming.

Table 1: The participants' misunderstandings about the Definition of Global Warming

Defination	f	Perceptions
Misunderstandings	39	<ul style="list-style-type: none"> • "Global Warming is the increase of carbon dioxide in the air as a result of the ozone layer depletion." • "Global Warming is a result of the damage in the ozone layer caused by harmful gases and the smoke coming out of factories and also a result of the ozone layer not being able to hold the sun rays completely." • "Global Warming is the ozone layer depletion as a result of people's destruction and some forces of nature." • "With the effect of the ozone layer depletion in the atmosphere, sun rays rise from the ground to the atmosphere and form a warm layer." • "The depletion of the atmosphere because of some gases causes harmful rays coming from the sun warm up the earth." • "As a result of people's activities, the ozone layer depletes and harmful rays come to earth and the temperature increases." • "Global Warming is the increase in the temperature of earth because of the ozone layer depletion." • "Global Warming is a result of people's activities depleting the ozone layer and also a result of the harmful rays reaching the earth directly and warming it up." • "Global Warming is the increase in the temperature of earth as a result of some gases depleting the ozone layer."

Table 2: Perceptions of the teacher candidates about the dangers that may occur as a result of Global Warming

Perceptions	f
• Water shortage occurs.	58
• Ice fields melt and then sea levels increase.	55
• Climates change.	52
• Plant and animal types disappear.	42
• Drought occurs.	36
• Wars happen.	26
• Famine occurs.	24
• Diseases occur.	24
• Natural disasters (flood, hurricanes, etc.) happen.	21
• Desertification occurs.	18
• Immigration happens.	16
• Environmental pollution (air, water and soil) increases.	14
• Other (forest fires, ice age, acid rain, etc.)	6

Table 3: The perceptions of the teacher candidates about the precautions must be taken at home and the precautions they already taken for Global Warming

precautions must be taken <i>at home</i>	f	precautions already taken <i>at home</i>	f
• Water extravagance should be decreased.	74	• I pay attention to water consumption.	63
• Electricity extravagance should be decreased.	68	• I pay attention to electricity consumption.	54
• The use of harmful materials for the ozone layer should be decreased.	35	• I do not use the harmful materials for the ozone layer.	13
• The use of fuel consumption to warm up should be paid attention.	24	• I pay attention to the use of fuel consumption to warm up.	5
• Informing work should be done.	11	• I do informing work.	3
• The use of cleaning products which contain harmful chemicals should be decreased.	10	• I do not use the cleaning products which contain harmful chemicals.	1
• The recycled products should be used	10	• I use the recycled products.	2
• Food extravagance should be decreased.	4	• I pay attention to food consumption.	4
• I do not know.	---	• I do nothing.	19

Table 4: The perceptions of the teacher candidates about the precautions to be taken outside and the precautions they already taken for global warming

precautions must be taken <i>outside</i>	f	precautions already taken <i>outside</i>	f
• Public transportation should be used.	32	• I use public transportation.	8
• The environment should not be polluted.	31	• I do not pollute environment.	20
• Informing work should be done.	24	• I do informing work.	9
• Trees should be planted.	18	• I plant trees.	5
• Water consumption should be decreased.	7	• I pay attention to water consumption.	4
• Electricity consumption should be decreased.	4	• I pay attention to electricity consumption.	3
• I do not know.	19	• I do nothing.	51

Almost two third of the candidates generalized this gases as “harmful gases”, “gases that make greenhouse effect” or “some gases”. This situation engenders the thought that the teacher candidates mostly know carbon dioxide as a cause for global warming but do not know other gases. On the other hand it is seen that 39 of the teacher candidates have misunderstandings about why and how the global warming occurs. Almost all of them have the idea that ozone layer depletion is a result of the sun rays reaching the earth more and increasing the temperature on earth.

Question 2. “In case Global Warming continues, what do you think we are going to encounter danger?”:

All of the teacher candidates answered this question. Their perceptions were presented in Table 2 being analyzed.

The teacher candidates expressed that the increasing of the temperature causes a change of the climates (52 participants); change of the climates causes the melting of the ice fields (55 participants), natural disasters (21 participants), drought (36 participants) and desertification (18 participants). The teacher candidates also expressed that drought and desertification cause a reduction in the clean water resources (58 participants), occurrence of many diseases (24 participants) and famine (24 participants); the decrease in the living quarters cause immigration (16 participants) and wars happen (26 participants). More than one third of the teacher candidates have misunderstandings about how and why global warming occurs. In spite of this finding, the given answers question 2 showed that majority of the participants are aware of the dangers that may occur as a result of Global Warming.

Question 3. What do you think we can do individually at home to decrease Global Warming? What kind of precautions do you take?:

The opinions of the teacher candidates about the precautions to be taken at home and the precautions they already taken for global warming are presented in Table 3.

In general, the teacher candidates mentioned that the precaution to take at home is to “decreasing of the consumption”. To do this, water (74 participants), electricity (68 participants), fuel (24 participants) and food (4 participants) consumption should be decreased. The teacher candidates also mentioned that the use of the products containing harmful chemicals should be decreased. They listed the use of recycled products (N=10) and doing informing work in the family as the precautions to be taken at home for global warming. Even though the precautions that the teacher candidates think

that they should take at home and the precautions that they take at home are parallel, there is a huge decrease in application of the precautions at home. The teacher candidates mentioned that they mostly reduce to the use of water while taking a shower, doing laundry and washing the dishes (N=63) and the use of electricity using economic light bulb, turning off the lights which they do not use and not leaving the televisions or computers in stand-by mode (N=54), etc. However it is observed that they do not take the other precautions at home that they mentioned in Table 3. The other important finding is that, although all of the teacher candidates express perceptions about the precautions to be taken at home, 19 of the candidates do nothing at home to decrease global warming. The reason for not taking precautions was mentioned as “I am not interested” (10 participants), “It does not come to my mind” (6 participants) and “I am being lazy” (3 participants).

Question 4. What do you think we can do to decrease global warming as individuals outside? What kind of precautions do you take?:

The perceptions of the teacher candidates about the precautions to be taken outside and the precautions they already taken to decrease global warming are worked up presented in Table 4.

32 of the participants stated that the use of public transportation is an important precaution to be taken outside for global warming. This precaution was followed by “not polluting the environment” (31 participants), “informing society about the issue” (24 participants) and “planting trees” (18 participants). 19 of the participants mentioned that they did not know what precautions could be taken outside. The teacher candidates already took the precautions “I do not pollute the environment” (20 participants), “I inform the society” (9 participants) and “I prefer to use public transportation” (8 participants) before all else. It was seen that 51 of the teacher candidates do nothing about the issue. Among these candidates, 19 of them said they did not know what could be done, 15 of them said they were not interested in the issue, 13 of them said it did not come to their mind and 4 of them said they were being lazy.

DISCUSSION

In the research it is seen that the teacher candidates have gathered some misunderstandings although they studied basic concepts and gained information about global warming in the environmental education course. This result is parallel with the researches in literature [3-10]. In the researches which aim to define teachers’ informative and conceptive sufficiency about global

warming, greenhouse effect, ozone layer and acid rain, it is revealed that they have some misconceptions [4,10,15,19-21]. The idea that greenhouse effect is a result of the ozone layer depletion is a very common misconception. In this concern, researchers stated it is necessary to inform teacher candidates about basic concepts of environmental education. It is stated that this is the only way teacher candidates could be sophisticated and provide effective education to students.

In addition to that, although the teacher candidates expressed important and meaningful opinions about the problems that may occur because of the global warming continuity and about the precautions to be taken at home and outside, it is seen that they do not have enough effort in practice. Even most of the candidates do nothing at home and outside to decrease global warming. Gambro and Switzky [2] mentioned in their research that there is not enough attention on these problems and no effort to solve these problems. For this reason, they stated that activities, which motivate and improve critical thinking to find solutions for environmental issues, should be arranged in addition to basic concepts and information. In this content, besides having lectures about basic concepts and information, the teacher candidates should participate in various social activities (membership to student communities, planting tree activities, preparation of various conferences and panels about the issue, preparation of projects in the related courses, etc.). This would help to educate more conscious and sophisticated teachers.

Generally, environmental educational lectures given to the teacher candidates are not sufficient enough because they only content basic concepts and information. So, these lectures need to be supported by various activities. This would make the teacher candidates turn the information into a life style. If the teacher candidates have this attitude, it would be possible to educate more conscious students about the global warming issue. If the teacher candidates are made aware that the world is not inherited from our forefathers, but it is borrowed from our children, we do not need to doubt that the students will be more sensitive about global warming.

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