A survey study on Environmental Knowledge of Education Faculty students

Dündar YENER, Erkan KALIPCI[*],

Selcuk University, Education Faculty, Konya, TURKEY

Abstract: It is not enough to only use technology and laws for solving environment problems. In order to deal with environment problems and generate solutions, it is necessary that the individual be educated, sensitive and aware. For this reason, education institutions and the particular individuals who provide education in the future should make advances in environmental education. In accordance with this idea of the study, the aim is to determine to what degree science teacher candidates who complete their education, who will provide education to the new generation, are aware about the environment and what they know about this subject from primary school to the present. In order to achieve this goal, a questionnaire application for the science teacher candidates was created that has questions about environment problems. Secondly, the results are compared with some teacher candidates' information level who attended different universities and different departments. According to these results, it has been determined that teacher candidates' answers in general in social but not scientific fields who are raised as conscious and sensitive individuals about environment do not have good environmental pollution information. Moreover when comparing three student groups, it is seen that science teacher candidates' information level about environment is more than biology and chemistry teacher candidates, and biology teacher candidates' information level is more than chemistry teacher candidates. Because of this, environment education programs are to be looked over in their details and contents of lessons are arranged with environmental emphasis from primary school up to their whole life. New instruction strategies should be improved and environment educational curriculum is given in a practical and practiced form. In order to deal with environmental pollution at a national and international level, it is necessary that developed individuals who are conscious about their environment and environment problems and are conscious, have ability to think, and find solutions about environment protection be present. In order to realize this goal, it is necessary that environment education be provided to all students.
Key words: Environmental knowledge, Pollution, Education, Konya

Introduction

One of the basic causes for environment problems in our present day arises from industrialization in the modern world where industrialized people used nature based upon the principle of merciless self interest (Erten, 2003). There was a balance that has continued in its own function for centuries, but from that time it had started to spoil and the people have continued to pollute the environment whether consciously or unconsciously (Bozkurt & Cansüngü, 2002).

One of the most important duties for people nowadays is to purify nature for the future generations. To find a solution to this problem, it is of paramount importance that we raise people who can find permanent solutions to environment problems who are conscious and beneficial for people. In recent years, people have become aware of the environment and have gained information about it easily thanks to information technology in the world. In light of this civilized community organizations' numbers and activity increases day by day. To educate communities about environment and environment education, it is important that we should

[*] Corresponding author: *e-mail: ekalipci@hotmail.com, Tel: +90-332 3238220; Fax: +90-332-3238225*

change and modify their lifestyle behaviour and make them aware of new things. In other words, people must not consider the most important thing to be formalistic education today but that the application of this education should be considered. For it is certain that some people who do not like or care about nature and they continue this behaviour as well as create new problems (Uzun & Sağlam, 2005, Uzun & Sağlam, 2006).

It is possible that people can fulfil their duties and responsibilities toward the environment with a sound education. Especially students who are in important departments of education are in need of extensive learning about the environment (Soran et al., 2000). Moreover, there are some studies related to this subject and they show that environmental education is not at a sufficient level and that mere rote memorization is a very poor method to use and thence teachers must give up this method. This aim can become true through perfect education to the teachers and the people who will be teachers to thereby educate others about the environment. Only sensitive and conscientious teachers can lead students to become conscious and sensitive to their responsibilities about the environment (Nevin et al., 2004).

With this thought in mind, the aim of this study is to emphasize the importance that science teacher candidates who will educated the future generation after they have completed their education from the primary school to university level to be interested and aware about the environment and have firm knowledge for their level of educational teaching. Moreover, related to this work, there are some different studies. In these studies there are some comparisons made with students who are educated in different departments about environment information and interest.

Material and Method

From primary school to university, science teacher candidates' reaction to statements about environment words, views, information level and interests are determined. In this study there are some questions to science teacher candidates. Questions are related to the environment. This questionnaire was given to students who study at Selcuk University science educational faculty. The first to the fourth class each consists of 50 students totalling 200 teacher candidates.

Questions given to teacher candidates were given under three classifications in the questionnaire. In the first part, personal information was inquired. In the second part, some words were given related to the environment and teacher candidates express and explain these words. Thanks to this line of questioning we can determinate their extent of environmental knowledge. In the third part; the aim is to know candidates' views and opinions about the environment. Questions which are in the questionnaire at the bottom:

A) Please answer the questions: What is the name of the high school that you graduated from? Which lessons did you see related to environment and biology in high school? Do you learn about the preservation of the environment in university?

B) Please write one sentence about the following words from what you understand: "protection filter", "get a puncture ozone layer ","acid rain", "PVC", "ecology", "flora", "fauna", "greens", "churn", " recycling", "TEMA", "affect of greenhouse", "bioindicator", "eutrification", "biosphere", "migrate", "erosion".

C-) Please write your view of the following questions at the bottom.

1-) Why would or do we need to establish an environmental ministry?

2-) What do you know about environmental protection law?

3-) What is the recycling material in environment protection? Please give examples.

4-) What are the community, universities and industry sectors' duties in environmental protection? (Soran et al., 2000).

The answers which are given by teacher candidates were classified and obtained choices and percentage were calculated. Some answers which are totally different from other answers are named "other". In this questionnaire the questions were given from Soran et al. (2000) study. Moreover, in this study, science teachers candidates' answers were compared to biology and chemistry teachers' answers in Yücel et al. (1998) and Soran et al. (2000) study.

Results

According to the answers' results which are given in the first part; teacher candidates graduation proportions are 61.4% "classical high school", 22.8% "Anatolian high school", 15.7% "Teacher high school", "Super high school" or "Foreign language high school".

Table 1. Percentages rate teacher candidates' answer which they give in questionnaire

1-PROTECTION FILTER				
For environment; substance, filter which hinder transition harmful substance 32.7%	Filter and layer which hinder transition harmful beam. 8.7%	It prevents poisons gas which obtain from factory chimney and car pipe 29.4%	The other 15.4%	I do not know -empty 13.8%
2- GET A HOLE OZONE LAYER				
Sun's harmful beam reach earth's surface and negative effects in life 29.5%	Chemistry material which are in perfume and spray damages in ozone layer 31.6%	In atmosphere O_3 density reduce, it can not strain harmful beam or florocarbon demolish ozone structure 7.8%	Ozone density decrease as can not catch U.V. beams or comes directly the world 10.9%	
The other 8.2%	I don't know- empty 12.0%			
3-ACID RAIN				
Because of increasing CO_2 and air pollution, harmful materials come in the world 25.0%	Dangerous and/or environment disaster or the end of the world 7.0%	After destinity deposition poisons and harmful gas it comes as a rain 21.7%	One result from get a hole ozone layer 2.0%	
A rain which damage plants or destroy forests 11.2%	The other 5.2%	I do not know- empty 27.9%		
4- PVC				
Door, window 23.7%	Heat isolation 2.0%	Plastic material 21.3%	Carcinogen material and/or material which do not disappear long time 8.0%	
Coating or isolation material 3.0%	Polyvinyl chloride 9.7%	Organic material or chemist material 3.0%	The other 1.0%	I do not know- empty 28.3%
5-ECOLOGY				
Environment or environment science 43.6%	Living creature science 8.0%	Natural balance 10.0%	Environment where alive and lifeless are interaction 17.4%	
Science branch which examine alive's environment and each other 20.0%	The other 1.0%	I do not know- empty 0%		
6-FLORA				
Plant , plant group and/or plant cover % 21.6	Classification unit % 1.0	Examine animals % 2.0	Plant's living area % 5.3	

Plants variety 2.0%	Science branch which examine plants 9.3%	The other 54.6%	I do not know- empty 4.2%

7-FAUNA

Science branch which examine animals 10.0%	Animal group that grow up certain area 3.0%	Plant group 2.0%	The other 3.0%	I do not know- empty 82.0%

8-GREENS

It means related to the environment 6.0%	Alive which have chloroplast and make photosynthesis 21.9%	Trees, forests or plants, green areas 53.1%	The other 2.0%	I do not know- empty 9%

9-CHURN

Harmful product which contains at the end of the operation in factories 13.0%	Environment pollution or to be left harmful or harmless materials 16.9%	chips 12.9%	After using materials parts of useless or useless everything 41.5%	
The other 8.1%	I do not know- empty 9.6%			

10- RECYCLİNG

recycling 23.7%	The other 2.0%	I do not know-empty 75.3%

11-TEMA

Cognizant of environment protection 21.2%	A cognizant establish for planting tree 18.7%	Cognizant of struggle erosion 11.6%	Association that protects tree and green, prevent erosion 13.1%
Turkey erosion struggle and cognizant of plant trees 28.4%	The other 3.0%	I do not know- empty 4.0%	

12-EFFECT OF GREENHOUSE

Because of increasing CO_2 gas to warm up area 12.0%	Sun energy's catch by sera gas 4.3%	To get a hole ozone layer 3.0%	Global warming 14.0%	Hormone 9.0%
Production plant in suitable area even wrong season 13.1%	As CO_2, CO corrosive gas catch the UV band come by sun light 3.0%	The other 6.3%	I do not know-empty 35.3%	

13-BİYOİNDİCATÖR

Material which damages alive 6.0%	Material which slow down biologic reaction 7.0%	Material that effect alive negatively or stop alive reaction 9.0%	Biologic parenthesis 21.2%
Parenthesis that supply definition chemist material 4.0%	The other 10.0%	I do not know-empty 42.8%	

63.9% teacher candidate took biology 1, 2, 3 in high school, 32.6% teacher candidate took biology 1, 2, 3 and "environment and people" and/ or "health education" and/or "environment and ecosystem". Approximately, 3.5% teacher candidates did not take biology and environment lessons. In Table 1, there is a percentage rate of science teacher candidates' 1, 2, 3, 4 of class answers about the environment.

"Eutrification", "biosphere", "migrate" and "erosion" questions and answers are not shown in table. For the word "eutrification", 2% of teacher candidates answered as " pollution that is caused by churns in lake or sea'' 4.3% as ''nitrogen vicious circle", 3.4% as "plant growing abnormally", 1% as "decay, decomposed rotten smell". 87.3% teacher candidates stated that they do not know this word. For the word "biosphere" 55.2% of teacher candidates answered "a layer wherein things live and can continue to live their life part''. 22% of teacher candidate give ''atmosphere's layer" as the answer. Approximately, 12% teacher candidates stated that they do not know. 97% teacher candidates stated "erosion" as "soil change position, to be dragged, soil straps, soil loss or soil abrasion where the trees are little". 64% of teacher candidates to "migrate" answered as "because of obligatory causes to move from one place to another" and %32 answered "people and animals or any living thing that changes its place of living". In the third part of the questionnaire, teacher candidates' answers are given at the bottom.

Why do we need to establish an environmental ministry? 53% of teacher candidates answered to this "for environment protection, to find solutions to environmental problems and/or it establishes a solution for nature's environmental problems to disappear", 21% stated "the ministry will check the industry sector, produce projects and prevent pollution", 11% of teacher candidates stated that the ministry's duties are to plant trees and protect forests" and 13% of them state that the ministry is to make bring awareness about the environment."

For the question "what do you know about environment law?" 85% of teacher candidates could not answer this question or they marked "I do not know''. Only 7% stated that this law is "obtained for environmental protection and if you pollute environment, you must pay fine."

The question to "what is recycling material?'' Most of the teacher candidates answered this question. 75% of teacher candidates answered to "recycling." Answers to "what is recycling material?" was 86% of teacher candidates stating " after using some materials, some processes are applied to them and then we can them again" and 40% of teacher candidates gave plastic, paper and glass as examples. These examples indicate that teacher candidates think that recycling materials are only plastic, paper and glass. In this regard, we can easily infer that teacher candidates do not have adequate information about this topic.

"Community duties about environmental protection" were that approximately 32% of teacher candidates stated that "environment protection and supply a clean to the environment, respond to the people who pollute the environment and/or thanks for the ones who provided sound education, and sensitized the new generation about the environment". 25% of teacher candidates' answered "to grow trees, do not make fire in forests, and not to throw garbage on the floor". They also give some concrete suggestions.

The question to "what are the universities' duties in environment protection? "55% of teacher candidates answer this question as "universities should arrange some seminars, lectures, scientific assembling and tree pole companies and to become conscious at both an individual and community level". 10% of teacher candidates stated that it meant "to decrease environmental pollution by universities making scientific research and projects". 15% of teacher candidates thought that environment awareness should be given from the freshman year.

The question to "what are the industry sector's duties in environmental protection?" 75% of the candidates answered "the industry sector's garbage is a cause of production that should be purified and/or use protective filters for their chimneys and in a nutshell not to damage nature".

Yücel et al. (1998) questioned 240 chemistry teacher candidates of Hacettepe University of Ankara and Soran et al. (2000) questioned 222 biology teacher candidates of the same

university with the same questions that were then given to teacher candidates at Selcuk University in the Education Faculty for Science Education. The answers of the latter were compared with Yücel and Soran's surveys. The results are given below:

"Protection filter" was correctly defined by 65% of the science teacher candidates, 66% of biology teacher candidates, and 57% of chemistry teacher candidates.

"Get a hole ozone layer'' was correctly defined by 85% of science teacher candidates, 76% of biology teacher candidates and 63% of chemistry teacher candidates.

"Acid rain" was correctly defined by 60% science teacher candidates, 42% of biology teacher candidates, and 11% of chemistry teacher candidates.

"PVC" was correctly defined by 9.7% of science teacher candidates, 3.15% of biology teacher candidates and 4% of chemistry teacher candidates as "Polivinilklorür". 21.3% of science teacher candidates, 14% of biology teacher candidates, and %13 of chemistry teacher candidates defined it as a "plastic material". Approximately, 10% of biology teacher candidates defined it as "difficult to break into pieces in nature" and make connection between PVC and environmental pollution.

"Ecology" was correctly defined by 43.6% of science teacher candidates, 53% of biology teacher candidates, and 40% of chemistry teacher candidates as an environmental science and knowledge about the environment. 6% of biology teacher candidates and 20% of science teacher candidates' defined this word totally correctly and in detail.

"Flora" was correctly defined by 25% of science teacher candidates, 25% of biology teacher candidates and 10% of chemistry teacher candidates.

"Fauna" was correctly defined by 3% of science teacher candidates, 20% of biology teacher candidates and 3% of chemistry teacher candidates.

"Greens" were correctly defined by 6% of science teacher candidates, 30% of biology teacher candidates and 23% of chemistry teacher candidates.

"Churn" was correctly defined by 86% of science teacher candidates, 77% of biology teacher candidates and   69% of chemistry teacher candidates.

"Eutrification" was correctly defined by 2% of science teacher candidates and 6% of biology teacher candidates.

"Biosphere" was correctly defined by 55.2% of science teacher candidates, 41% of biology teacher candidates and 20% of chemistry teacher candidates.

"Erosion" was correctly defined by 97% of science teacher candidates, 94% of biology teacher candidates and 76% of chemistry teacher candidates.

"Migrate" was correctly defined in relation to the environment by 96% of science teacher candidates, 68% of biology teacher candidates and 31% of chemistry teacher candidates.

"Cause of establishing Environment Ministry'' - 53% of science teacher candidates, 69% of biology teacher candidates and 41% of chemistry teacher candidates gave answer as "environment protection and being against environment pollution". 13% of science teacher candidates, 12% of biology teacher candidates and 20% of chemistry teacher candidates think that this ministry is to be established for awareness about the environment.

"Environment law" was correctly defined as "legal directed environment protection" by 7% of science teacher candidates, 19% of biology teacher candidates and 17% of chemistry teacher candidates.

"Recycling material" was correctly defined by 86% of science teacher candidates, 71% of biology teacher candidates and 3% of chemistry teacher candidates. Moreover, 40% of science teacher candidates gave plastic, paper and glass as examples. Example providers rated as a plastic material is 13% biology teacher candidates. 32% chemistry teacher candidates give plastic material and coke thin as an example.

"Communities' duties for environment protection" was correctly defined as "being sensitive and careful to not pollute the environment by 32% of science teacher candidates, 40% of biology teacher candidates and 34% of chemistry teacher candidates. 34% of chemistry teacher candidates solely stated "being conscious" 30% of biology teacher candidates stated "being conscious and giving importance to education about this subject." 9% of biology teacher

candidates and 20% of chemistry teacher candidates stated that we should use recycling materials and 25% of science teacher candidates stated that "we should grow trees, do not make fires in forests and not to throw garbage."

"Universities' duties" - 55% of science teacher candidates, 48% biology teacher candidates and 18% chemistry teacher candidates correctly stated that the university community and students individually should be conscious. 12% of biology teacher candidates and 30% of chemistry teacher candidates stated that universities should arrange symposiums, congresses and meetings.   For throwing garbage, 15% of science teacher candidates, 17% of biology teacher candidates and 11% of chemistry teacher candidates answered that environment awareness lessons should be given. 15% of chemistry teacher candidates stated that universities should cooperate with industries, 8% think that experimental cannot be gotten rid of casually. 8% of biology teacher candidates think that universities should make scientific research. 10% of scientific teacher candidates think that in order to decrease environment pollution, universities should conduct scientific research and projects.

"Industry sector's duties" 75% of science teacher candidates stated that the industry sectors should purify harmful waste or use filters for their chimney and not to damage nature. 41% of biology teacher candidates stated that they should use protection filters, refining productions should be established and after refining the waste, it should be returned to nature. 10% of biology teacher candidates and 23% of chemistry teacher candidates' stated that recycling material should be used. 16% of biology teacher candidates and 11% of chemistry teacher candidates think that waste should not be dumped into the lake and sea.

Discussions and Suggestions

The aim of this investigation is to emphasize the importance of science teacher candidates who will educate the new generation, after they have finished their studies, from primary school to the present, should be aware about the environment and have sound information for their level.

As stated, we compared our questionnaire results given to 200 science teacher candidates with the questionnaire results of Yücel's et al. (1998) 240 chemistry teacher candidates Soran's et al. (2000) 222 biology teacher candidates. The results have been charted in Table 2 below.

Table 2: Comparing answers that are given by science teacher, biology and chemistry teacher candidates

Questions	Science teacher candidates	Biology teacher candidates	Chemistry teacher candidates
Erosion	97%	94%	76%
Get a hole ozone layer	85%	76%	63%
Churn	86%	77%	69%
TEMA	95%	73%	*
Migrate	96%	68%	31%
Protection filter	65%	66%	57%
Biosphere	55%	41%	20%
Acid rain	60%	42%	11%
Effect greenhouse	30%	16%	*
Bioindicatör	21%	14%	*
Eutrificasion	2%	6%	*
Flora	25%	30%	10%
Fauna	3%	20%	3%
Ecology	20%	6%	0%
Recycling	24%	30%	*
Greens	6%	30%	23%

According to these results, science teacher candidates' level of information about the environment is higher than biology and chemistry teacher candidates and the biology teacher candidates' level of information was higher than chemistry teacher candidates.

It indicated that 75% of science teacher candidates, 58% of biology teacher candidates did not answer or did not know the word "recycling." Moreover, 42% of science teacher candidates and 68% of biology teacher candidates did not answer or did not know the word "bio-indicator". "PVC", "Recycling", "bioindicator" and "Eutrification" words were not known by most teacher candidates. "What do you know about environment law? 85% of science teacher candidates, 69% of biology teacher candidates and 64% of chemistry teacher candidates did not know or did not answer this question. We can easily state that teacher candidates did not have knowledge about number 2872 environment law and its contents.

13.1% of science teacher candidates and 8.5% of biology teacher candidates defined the greenhouse effect as supply to suitable area where one can grow plants and even suitable seasons. 9% of science teacher candidates and 1.3% biology teacher candidates made a connection with hormones. Teacher candidates confused the word greenhouse and the greenhouse effect so they made such errors. According to this result, we can state that teacher candidates do not know really anything about global warming. Moreover, a few of the students confused the words fauna and flora.

In Table 1, teacher candidates' answers are not scientific but general. Moreover, sound knowledge about the environment is what is needed for these teacher candidates who although are raised in a conscientious way do not have sound information about the environment. In order to solve environmental problems and prevent future ones it is not enough to only use technology and create environmental laws.

In our country, students' environmental education starts with the *Life Science* in primary school. And with some parts such as science, chemistry and biology this education continues in university. It has been seen that students, after receiving such education, start to forget only a short time thereafter. They can not construct words and knowledge and have been unable to etch such knowledge into their consciousness permanently. Moreover, we can understand from the students' answers that at some point later, wrong information may arise and continue and thence they have incorrect information and word identification errors.

The environment educational programs which are given from primary school up their entire academic life should be looked over and the lessons' content should be composed with a strong emphasis on environmental education. New instruction strategies should be improved and environmental education details should be given in a practical and application form. Moreover, at the high school and university level environment education lessons should be obligatory. For in order to deal with environment pollutions at a national and international level, we should raise students to be aware of their environment and environmental challenges with the tools of the ability to think, investigate and find solutions to protect the environment. In sum we should provide them with suitable surroundings and education.

If our aims contain the below-stated items, it will be particularly beneficial:

1) Individuals and communities should gain awareness and sensitivity about the environment as a whole and environment problems.

2) Individuals and communities should obtain basic sound information and experience about the environment and environmental problems

3) Individuals and communities should have objective value judgements and thoughtfulness about the environment and we should supply suitable places for their active participation and application of such.

4) We should provide individuals at every social, intellectual and economic level opportunity for active participation in regard to knowledge of environment problems (Bozkurt *et al.,* 2007).

References

Bozkurt, O., 2007, Çevre Eğitimi, Aydoğdu, M., Gezer, K. (editör), 'Çevre Bilimi', Sayfa No:213, Anı Yayıncılık, Ankara

Bozkurt, O., Cansüngü, Ö., 2002, 'İlköğretim Öğrencilerinin Çevre Eğitiminde Sera Etkisi ile İlgili Kavram Yanılgıları', Hacettepe Üniversitesi Eğitim Fakültesi Dergisi, Sayı No:23, Sayfa No:67-73, Ankara

Erten, S., 2003, '5.Sınıf Öğrencilerinde Çöplerin Azaltılması Bilincinin Kazandırılmasına Yönelik Bir Öğretim Modeli', Hacettepe Üniversitesi Eğitim Fakültesi Dergisi, Sayı No:25, Sayfa No:94-103, Ankara

Nevin, Ş., Cerrah, L., Saka, A., Şahin, B., 2004, 'Yüksek Öğretimde Öğrenci Merkezli Çevre Eğitimi Dersine Yönelik Bir Uygulama', Gazi Üniversitesi Eğitim Fakültesi Dergisi, Cilt 24, Sayı 3 (2004), Sayfa No: 113-128, Ankara

Soran, H., Morgül, F.İ., Yücel, S., Atav, E., Işık, S., 2000, 'Biyoloji Öğrencilerinin Çevre Konularına Olan İlgilerinin Araştırılması ve Kimya Öğrencileri ile Karşılaştırılması', Hacettepe Üniversitesi Eğitim Fakültesi Dergisi, Sayı No:18, Sayfa No:128-139, Ankara

Uzun, N., Sağlam, N., 2005, 'Sosyo-Ekonomik Durumun Çevre Bilinci ve Çevre Akademik Başarısı Üzerindeki Etkisi', Hacettepe Üniversitesi Eğitim Fakültesi Dergisi, Sayı No:29, Sayfa No:194-202, Ankara

Uzun, N., Sağlam, N., 2006, 'Orta Öğretim Öğrencileri İçin Çevresel Tutum Ölçeği Geliştirme ve Geçerliliği', Hacettepe Üniversitesi Eğitim Fakültesi Dergisi, Sayı No:30, Sayfa No:240-250, Ankara

Yücel, S., Morgül, F.İ., 1998, 'Yüksek Öğretimde Çevre Olgusunun Araştırılması', Hacettepe Üniversitesi Eğitim Fakültesi Dergisi, Sayı No:14, Sayfa No:84-91, Ankara