

Students' Cognitive Awareness about the Reasons of Environmental Problems

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Abstract: Globalization is an unchanging fact of modern time and this reality influences humanity by its positive and negative consequences. Unfortunately, natural environment is the most influenced area from negative consequences. Humanity has started to face with the results of problems emerging from global warming such as drought, ecological imbalance or extinction of some species. This confrontation brought about the necessity of environmental education. Current education program in Turkey involves objectives related to environmental awareness; however, students' awareness about those issues seems to be insufficient. Hence, this study was aimed to investigate seventh grade students' environmental awareness by using qualitative data collection tools. By compiling newspaper articles in line with the research problem, incomplete stories were created. Students were asked to complete these stories. After examining completed stories, 20 students having different environmental awareness were selected as a focus group to make interviews. The interview data were analyzed by content analysis. Results indicated that almost half of the students have knowledge about the ecological cycles. On the other hand, one third of students inferred that environmental pollution and improper human behavior caused global warming and this resulted in deterioration of the natural balance, and threatening bees to become extinct.

Key words: *Environmental education • Socio-scientific issues • Story completion • Globalization*

INTRODUCTION

National Science Education Standards [1] emphasized that “an important purpose of science education is to give students a means to understand and act on personal and social issues” (p.107). Therefore, science education researchers have given importance to social issues in science topics. Research revealed that socio-scientific issues help (SSI) students to improve their critical thinking skills and decision making abilities [2], moral sensitivity [3, 4], and nature of science conceptualization [2, 5, 6]. Lots of environmental issues such as global warming, flood disaster, nuclear energy usage can be evaluated as SSI. Especially in recent years, societies have faced to these and other similar environmental issues. Individuals must possess the environmental literacy to overcome these environmental problems. Disinger and Roth defined the environmental literacy as “the capacity to perceive and interpret the relative health

of environmental systems and take appropriate action to maintain, restore or improve the health of those systems” [7] and indicated “environmental knowledge” as one of the major components of the environmental literacy. Knowledge and attitudes are essential components of environmental literacy to change behavior in environmental education [8]. And also attitude towards the environment is influenced by the level of knowledge about the environment [9, 10]. Therefore, this study examines the environmental knowledge of students in Turkey by using two incomplete stories about the environmental problems.

MATERIALS AND METHODS

In this qualitative research, students' cognitive awareness toward environmental issues was explored by using phenomenological approach. Phenomenological approaches help the researchers to understand the

phenomena in detail by means of rich descriptions of data [11]. As a part of students' daily lives, it is significant to explore how students perceive and associate environmental issues in their mind. Therefore, by examining newspaper reports about the environmental problems of the last 10 years, incomplete stories about two problems were prepared. Students were asked to investigate the reasons of the problems without any given information related to the problem. For this purpose, two incomplete stories were asked 99 seventh grade students from a metropolice, two urban and two rural schools to complete in one week intervals. The first story which was "Old and Sweet Dream", a little girl had seen a honeybee species in a magazine produced delicious food called as honey. She asked her grandfather to tell about what honey was like. Her grandfather said that one species of bee could make honey; however, that species disappeared. Little girl asked her grandfather what happened to bees. In this story, students were asked to put themselves into grandfather's shoes and respond little girl's question. In the second story used as a data collection tool was "Wrong Estimate". In this story, farmers chased away skylarks (farm land birds) because they thought that these birds reduced the yield and farmers could not glean sufficient harvest. However, after skylarks went from the farmland, the situation went from bad to worse. Villagers consulted an official to understand the situation. After this situation was explained to students, they were asked to put themselves into these

official shoes and evaluate this situation. In the light of student-completed stories, from each school a total of ten focus groups consisting 6 students was formed in terms of their cognitive awareness. Data was coded by open coding and themes were created in terms of cognitive awareness. The students who had insufficient knowledge were also encoded as "do not have knowledge".

Findings: The first incomplete story was determined whether the students were aware of why bees disappeared. While 54 students expressed their opinions about possible reasons of the disappearance of bees correctly, 45 students did not have knowledge about this issue. The second incomplete story related to ecological cycle revealed that only 38 students had knowledge about the issue, and 61 of them were not familiar with the issue (Table 1).

In Table 2, students' cognitive awareness toward ecological cycle collected by story 1 was given. 37 students among total of 99 students were aware of ecological cycle. Other 63 students' ideas were coded under seven themes. Since one student had more than one expression, there were more than 63 themes in total. In theme 1, students gave the reasons of products' decay as birds, insects, ants, etc. In second theme, a lot of rain and drought factors were shown as the reasons. Under theme of wrong agricultural practices, students pointed out opening irrigation channels by villagers, unconscious agriculture. In other themes, students listed factors such

Table 1: Frequencies of cognitive awareness

Awareness	Material	Metropolice	Urban		Rural		Total
			City 1	City 2	Village 1	Village 2	
Have knowledge	Story 1	16	11	11	8	8	54
	Story 2	15	9	5	6	3	38
Do not have knowledge	Story 1	24	9	7	2	3	45
	Story 2	25	11	13	4	8	61

Table 2: Cognitive awareness of the ecological cycle

No	Themes	M	Urban		Rural		Total	Overall
			C ₁	C ₂	V ₁	V ₂		
-	Ecological cycle	15	9	4	6	3	37	37
1	Animal factor	7	4	2	1	1	15	65
2	Climate conditions	2	4	3	-	5	14	
3	Wrong agricultural practices	1	3	3	2	3	12	
4	Human factor	1	3	2	1	-	7	
5	Flora	-	2	2	-	-	4	
6	Global warming	-	4	-	-	-	4	
7	Irrelevant	9	-	-	-	-	9	

Table 3: Cognitive awareness of disappearance of bees

	No	Themes	M	Urban		Rural		Total	Overall
				C ₁	C ₂	V ₁	V ₂		
Have knowledge	1	Human behavior	11	5	6	7	2	31	123
	2	Disruption of natural balance	9	7	3	5	3	27	
	3	Global warming	4	5	1	10	6	26	
	4	Extinction	4	6	8	3	4	25	
	5	Environmental pollution	5	4	1	2	2	14	
Do not have knowledge	24	9	7	2	3	45	45		

as cutting trees, infertile soil, disposal of toxic barrels, and destroying crops. In the story, villagers who destroyed skylarks disrupted ecological cycle, and face the challenge of losing their harvest. Students were asked to complete a story by analyzing the issue. Students who gave incorrect information about the issue did not only use expressions about the problem but also stressed many environmental problems.

In Table 3, students' ideas about why honey is no longer in our dining table was given. Of the 99 students, 45 students were not aware of the issue. Ideas of 44 students who used correct statements for the issue were coded under the five themes. Students thought that environmental pollution and improper human behaviour caused global warming and global warming resulted in deterioration of the natural balance, and threatening bees to become extinct. In addition, they listed the causes of global warming while completing stories. In interviews, students stated that they had learned about global warming, which was unaddressed in the texts, from media tools and science teachers. Some interpreted that the situation incident to bees can be stand for other animals. Students' statements showed that they made deductions by reasoning about the issue. Prominently, students noted that they would try to be more careful in their daily lives by taking lessons from stories.

CONCLUSIONS AND RECOMMENDATION

Although the data of this study were obtained from different settlements having different features they did not compared to each other since the researchers could not determine big differences between the students' ideas. The results indicated that approximately half of the students participated to the study had knowledge about ecological cycle. On the other hand, almost one third of the students made inferences about environmental pollution and human behaviours resulted in global warming and global warming caused the deterioration of the natural balance and as a result bees become extinct.

The reasons of why students who did not have knowledge about these issues were unable to analyze stories were considered as lack of critical thinking skills and inability of establish cause and effect relationship. Individuals who lack the ability of establishing cause and effect relationship of the issue could not make dispositions even if they were knowledgeable about the issue. Therefore, these socio-scientific issues should be addressed in the education period with effective methods and strategies to develop both cognitive and emotional awareness of the students. Thus, individuals with emotional awareness will be more willing to take action for environment.

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