

High School Students' Ideas About Endangered Animals

Musa Dikmenli¹ Osman Cardak²

1. Department of Biology Education, Necmettin Erbakan University, Konya, Turkey

2. Department of Science Education, Necmettin Erbakan University, Konya, Turkey

Abstract

Students' ideas about endangered animals are of great importance both in biology and environmental education. The main reason of this is increasing human effect on biodiversity and natural environment. Respecting nature, enhancing life quality and protecting biodiversity on the earth are among the principles of a sustainable society. The purpose of this study is to reveal high school students' ideas about endangered animals. In line with this purpose, 404 high school students were given a measurement tool consisting of open ended questions. Data collected were evaluated according to the content analysis method. According to the students' ideas the endangered animals were mainly mammals. The students offered rather local than global examples on the endangered animals. The students associated the main reason of endangerment of the animals to the environmental issues, specifically to the environmental pollution. It was revealed that the knowledge resources of the students on the endangered animals were mainly the visual-audio media. The results were discussed with literature and suggestions were developed.

Keywords: student ideas, endangered animals, biodiversity education.

1. Introduction

Biodiversity has received a great deal of attention worldwide since the Rio Earth Summit in 1992. One of the main reasons of this attention is the endangerment and extinction of the species. Thus, the preservation of the species would be one of the primary approaches toward the sustainability. On the other hand, on a global scale, the threats faced by species are gradually increased. This dramatic decrease in the species, which is one of the most significant outcomes of this global environmental crisis, is acknowledged as one of the most fundamental issues of our time (Gayford, 2000).

Previous research on the endangered species focused on the educational programs, loss of biodiversity, knowledge and awareness of the students on biodiversity (Cardak & Dikmenli, 2009; Cardak, & Dikmenli, 2016; Dikmenli, 2010; Erdogan, Erentay, Barss & Nechita, 2008; Kim & Byrne, 2006; Lindemann-Matthies, 2002; Menzel & Bögeholz, 2009; Torkar, & Bajd, 2006). The studies revealed scientific concepts which were either fairly or poorly understood by the participants. Also, it was reported that the participants had some incomplete concepts and misconceptions on this subject. Moreover, it was stated that good subject knowledge is necessary for the best teaching. Torkar and Bajd (2006) researched the conceptions and ideas on the endangered bird species and their preservation of 191 prospective teachers from an education faculty in Slovenia. The results indicated that the participants sought the human intervention in order to preserve the endangered bird species. Only a few participants indicated the significance of the education in the preservation of the endangered bird species. Erdogan, Erentay, Barss and Nechita (2008) studied the awareness of elementary school students from four different countries about the endangered species and threatened environments. During the study the students participated to the field trips. The findings indicated that the field trips helped the students to develop a global awareness regarding the endangered species and environments and to become motivated on this subject. Cardak and Dikmenli (2009) studied the ideas of 173 prospective teachers from an education faculty about the endangered bird species. The results indicated that the majority of the participants considered that the environmental pollution shall be prevented and the hunting shall be completely banned in order to preserve the endangered bird species. Menzel and Bögeholz (2009) studied the perceptions and cognitive frameworks on the biodiversity loss by means of interviews held with students of group of age of 16-18. The results of study indicated that the majority of the students focused on the ecologic or economic aspects regarding the loss of biodiversity. The students who focused on the ecologic aspects referred in generally the wrong ecologic facts. Moreover most of the students were not aware about the biodiversity loss. Dikmenli (2010) studied the conceptual structures of the prospective biology teachers about the biodiversity by means of free word association test. Although the participants know the meaning of the biodiversity, they were not quite aware about the complex concepts within this term and especially about the sustainable use of biodiversity. The participants considered the ecosystem and diversity of species rather than the genetic diversity in terms of components of the biodiversity and the effects of human activities on biodiversity loss was not fairly represented by the participants in the categories.

There are about 7 billion people on the earth and the human population is increasing continuously. However many animals were listed as endangered species. The history of biology is abundant in extinct species and endangered species. Today the scientific public opinion undisputedly acknowledges the significance of the

endangered or almost extinct animals. However this issue is abstract and complex, at least in terms of educational conditions. It is quite difficult for the students to be able to easily understand and learn the processes of endangerment or extinction of the species. Thus it is important to reveal the ideas of the high school students about this issue. It could be possible to comprehend the future by assessing the ideas of the students about the endangered animals. These students will be the future decision makers. The learning-teaching is very important in terms of preserving the nature. In order to be able to structure the educational programs, a good understanding of the students' attitudes, ideas on the endangered animals and the sources of these ideas shall be achieved. It is therefore necessary to orientate the students to the current status of the endangered animal species and to help them to build a meaning and perspective on the human issues which threaten the species and the global environment.

1.1.Purpose

The aim of this study was to analyze the ideas of the high school students about the endangered animals. Accordingly responses were sought for the following questions:

- 1-What are the endangered animal groups according to the ideas of the high school students?
- 2-What are the reasons of the endangerment of the animals according to the ideas of the students?
- 3-What are the sources of the ideas of the students on the endangerment of the animals?

2. Methodology

2.1.Participants

This research was carried out during the 2016/17 school year in Konya, with the participation of a total of 404 senior students from six different high schools. Of these participants, 215 (53.2%) were female and 189 (46.8%) were male. The average age of the students was 18.1 years (range 17–19). A random sampling method was used in determining the participants.

2.2.Data Collection

In order to reveal the ideas of the participating students about the endangered animals the students were asked to respond to a written questionnaire which included three open ended questions: (1) Do you think which are the current endangered animals? (2) Do you think what are the reason of the endangerment of the animals? (3) From which resources have you obtained your ideas about the endangered animals? The students were allowed 20 minutes to respond the questions. As the intent was to benefit from the first ideas to come to the minds of the students, this time was considered sufficient. The open ended questions given above were the basic data source for this study.

2.3.Data Analysis

Data obtained from the open-ended questions were analysed. Response words and sentences with the same meaning were classified under the most often repeated word and sentence. Words and sentences repeated less than three times and those irrelevant words and sentences that could not be associated with the others were excluded. The words and sentences were categorized using a criterion of semantic relationship, and the frequencies of the words and sentences in each category were calculated. Many studies have shown that this type of data analysis technique provides reliable results (Cardak & Dikmenli, 2009; Dikmenli, 2010; Torkar & Bajd, 2006).

3. Results and Discussion

3.1.Endangered animals according to the ideas of the students

According to the result of the data analysis, the endangered animals in line with the ideas of the students were collected in six main categories. These categories and the animals from each category were indicated in the Table 1. The students represented the endangered animals with 1250 total frequency. According to the results the dominant category in which the endangered animals were represented was the mammalians (664 response words, 53.12% of the total number of response words). This was followed by birds (371 response words, 29.68% of the total number of response words), reptilians (114 response words, 11.52% of the total number of response words), fish (27 response words, 2.16% of the total number of response words), amphibians (23 response words, 1.84% of the total number of response words) and invertebrates respectively (21 response words, 1.68% of the total number of response words). It was observed that in these categories the student focused mostly on Mediterranean monk seal in the mammalian category; Northern Bald Ibis in the birds category and Loggerhead Turtle in the reptilians category. The students presented rather local than global responses to the endangered animals. Interestingly the students represented the extinct animals such as mammoth, Tasmania tiger, moa and dinosaur as endangered animals.

Table 1. Endangered animals according to the students' ideas

Categories	Representations included in categories and their frequencies	Total frequency of representations in this category	%
1.Mammals	Mediterranean Monk Seal (93), Vancat (56), Panda (52), Fallow Deer (52), Polar bear (47), Grizzly Bear (47), Wildcat (35), Anatolian Leopard (32), Anatolian Tiger (26), Deer (20), Whale (15), Dolphin (15), Ankara Angora Goat (15), Striped Hyena (14), Wildcat (13), Tiger (12), Mouflon (11), Elephant (9), Roe Deer (8), Fox (8), Leopard (7), Kangaroo (7), Kangal Dog (7), Mammoth (7), Antilope (6), Chamois (5), Koala (5), Beaver (5), Tasmania Tiger (5), Zebra (4), Hazel Dormouse (4), Rhino (4), Grey wolf (3), Giraffe (3), Monkey (3), Lion (3), Parrot (3), Otter (3).	664	53.12
2.Birds	Northern Bald Ibis (173), Penguin (33), Cinereous Vulture (22), Flamingo (20), Partridge (20), Demoiselle Crane (19), Great Bustard (17), Eagle (14), Bird (13), Stork (13), Hawk (7), Moa (7), European Goldfinch (4), Peacock (3), Pelican (3), Parrot (3).	371	29.68
3.Reptiles	Loggerhead Turtle (120), Crocodile (7), Turtle (5), Dinosaur (5), Snake (4), Danford's Lizard (3).	144	11.52
4.Fishes	Fish (17), Shark (7), Barbus Plebejus Ercisianus (3).	27	2.16
5.Amphibians	Taurus Frog (18), Frog (5).	23	1.84
6.Invertebrates	Bee (5), Butterfly (4), Ant (3), Cicada (3), Millepede (3), Apollo (3).	21	1.68
Total		1250	100

3.2.Reasons of endangerment of the animals according to the students' ideas

According to the result of the data analysis the reasons of endangerment of the animals according to the students' ideas were collected in five main categories. These categories and the representations in each category were indicated in Table 2. The students represented the reasons of endangerment of the animals with 971 total frequency. According to the results the dominant category in which the reasons of endangerment of the animals were represented was the environmental issues (568 response words, 58.5% of the total number of response words). This was followed by hobby (252 response words, 25.95% of the total number of response words), education (58 response words, 5.97% of the total number of response words), natural events (51 response words, 5.25% of the total number of response words), and human needs respectively (42 response words, 4.33% of the total number of response words). It was seen that in these categories the students focused mostly on the environmental pollution in the environmental issues; hunting in the hobby; myths in the education; acts of god in the natural events and nutrition in the human needs. The students associated the main reason of endangerment of the animals to the environmental issues. However, it was observed that they emphasized the environmental pollution within the environmental issues more than the destruction of the habitats. Whereas it was commonly known that the main factor of the endangerment of the animals is the destruction of their habitats rather than the environmental pollution. According to the students' ideas the education took a backseat within the reasons of endangerment of the animals.

Table 2. Reasons of endangerment of the animals according to the students' ideas

Categories	Representations included in categories and their frequencies	Total frequency of representations in this category	%
1.Environment	Environmental pollution (176), destruction of the habitat (151), climate change (86), global warming (84), industrialization (28), pesticides (16), greenhouse effect (10), radiation (8), wastes (5), ozone depletion (4).	568	58.5
2.Hobby	Hunting (212), fashion accessories (26), game-entertainment (14).	252	25.95
3.Education	Myths (25), attitude (17), ignorance (16).	58	5.97
4.Natural events	Natural disasters (18), interspecies competition (14), population increase (8), starvation-famine (5), natural selection (3), mutation (3).	51	5.25
5.Human needs	Nutrition (19), protection (12), trade (8), scientific experiments (3).	42	4.33
Total		971	100

3.3.Sources of the students' ideas on the endangered animals

According to the result of the data analysis the sources of the students' ideas about the endangerment of the animals were collected in six main categories. These categories and the representations in each category were indicated in Table 3. The students represented their ideas about sources of the endangered animals with 871 total frequency. According to the results, the dominant category in which the students' ideas on the endangered animals were represented was visual-audio media (235 response words, 26.98% of the total number of response words). This was followed by the formal education (228 response words, 26.98% of the total number of response words), online media (182 response words, 20.9% of the total number of response words), written media (97 response words, 11.13% of the total number of response words), family-society (81 response words, 9.3% of the total number of response words) and social activities respectively (48 response words, 5.51% of the total number of response words). It was seen that in these categories the students focused mostly on the television in the visual-audio media; school in the formal education; internet in the online media; popular science magazines in the written media; society individuals in the family-society and nature trip-observation in the social activities. The significance of the visual-audio media on the students' ideas about the endangered animals was interesting.

Table 3. Sources of the students' ideas on the endangered animals

Categories	Representations included in categories and their frequencies	Total frequency of representations in this category	%
1.Visual-audio media	Television (160), documentary (64), radio (7), cartoons (4).	235	26.98
2.Formal education	School (74), biology class (54), school books (34), teacher (20), project-homework (16), biology teacher (16), science class (8), social studies class (3), school newspaper (3).	228	26.18
3.Online media	Internet (155), facebook (7), internet newspaper (6), wikipedia (6), tweet (5), instagram (3).	182	20.9
4.Written media	Popular science magazine (48), newspaper (28), popular science book (17), billboard-bans(4).	97	11.13
5.Family Society	Society individuals (50), friends (14), mother (8), father (6), sister (3).	81	9.3
6.Social activities	Nature trip-observation (25), zoological garden (6), animal protection foundations (6), workshop (4), scientists (4), conference (3).	48	5.51
Total		871	100

According to the students' ideas, the endangerment of the animals was associated to the environmental pollution, destruction of the habitats, global climate change, global warming and hunting. It was very important for the students to be aware about the endangered animals. However, a simple increasing awareness would not be enough. Thus it is considered that the biology education, alone, may achieve much more. It is stated that the education assumes a different aim and that the different methodologies are necessary in general in order to associate the behaviours and attitudes (Gayford, 2000). The outdoor nature activities which include the

fieldworks may be emphasized in the high schools. These activities are important at the schools as well as in the other places in terms of helping the students to relate with the natural elements such animals, plants, species, environments and ecosystems. Such kind of activities encourages the students to establish emotional relations with the nature and helps with the developments of the environmental ethical awareness of the students (Kassas, 2002).

The dominant category in which the students' ideas about the endangered animals were represented was the visual-audio media. It is widely observed that the extracurricular activities in terms of informal learning and besides the formal learning, are affecting the learning about the animal species. Such kind of informal education may be realized at the zoos, museums, parks and aquariums (Falk, 2005). Watching TV shows about the animals and nature for example, when compared with the formal learning, it is taken at an almost similar rate (Bjerke, Kaltenborn & Ødegardstuen, 2001). The learning is not only achieved in the real world of the school but also in the natural environments, at the museums, at the science centres, in the visual-audio media, on the internet and social media (Braund & Reiss, 2007).

The issue of the loss of species has gained an increasing importance and meaning in terms of conservation of the ecological sustainability and improvement of the life quality. The interdisciplinary and complex nature of this issue, requires the skills and strategies beyond the conventional educational models based on the transfer of knowledge (Andreev, 2006) because the students are not the passive receivers of the meaningless names and knowledge as it is with the traditional education (Lindemann-Matthies, 2002). In biodiversity education, active strategies such as cooperative learning which provides a significant improvement for conceptual change and knowledge enrichment (Andreev, 2006), project-based learning (Baumgartner & Zabin, 2008) and outdoor nature activities (Lindemann-Matthies, Constantinou, Junge, Köhler, Mayer, Nagel, Raper, Schüle. & Kadji-Beltran, 2009) can be applied. Such activities encourage the students to get emotionally connected with the nature and helps with the development of an environmental ethical awareness of the students (Erten, 2004; Kassas, 2002).

4. Conclusions and Implications

This study revealed the ideas of the students about the endangered animal species, the reason of endangerment of the animals and the knowledge sources regarding these issues. The analysis of the data indicated that:

The endangered animals according to the ideas of the students were mainly the mammalians. The students presented local rather than global examples regarding the endangered animals. The students represented surprisingly, the extinct animals such as mammoth, Tasmanian tiger, moa and dinosaur as endangered animals. The students connect the main reason of endangerment of the animals to the environmental issues, specifically to the environmental pollution. Whereas it is widely known that the main reason of endangered animals is the destruction of their habitats rather than the environmental pollution. It has been revealed that the main knowledge sources of the student about the endangered animals were basically the visual-audio media. Interestingly, it has been indicated that the visual-audio media precludes the formal education.

It is important to include to the high school biology education program and to the teacher education the relationships between the loss of species and the socio-economic factors. Moreover, different courses need to be interconnected for a successful environmental education. The interdisciplinary integration is therefore a must for the goals expected in the environmental education. The education in the schools shall offer opportunities for learning the different meanings and interpretations about the endangered animals and for critically inquiring the biology concepts in the environmental discussion. Additionally, an efficient strategy would be the development of critical thinking and problem solving skills to be able to raise individuals who value the natural environment. The results of this study should be taken into consideration in the elaboration of the new education strategies in order to achieve the goals of preserving the endangered animals and their habitats.

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