Developing Environmental Sensitivity for Children Scale:
Reliability and Validity Studies

Handan Asude Başal[*] , **Yadigar Doğan and Emin Atasoy**
Uludag University Education Faculty Department of Elementary Education

ABSTRACT

This study a This study aims to develop an Environmental Sensitivity Scale for pupils aged between 9-15 who attend primary School. In an attempt to develop questionnaire items, the relevant literature has been reviewed, and the studies of the researchers of Environmental Science and Education have been investigated. In order to ensure the reliability of 90-item-Likert scale which has been administered to an experimental group consisting of 4th and 5th grade students in primary school twice with one-week intervals through the method of Scale Test-Retest. Both subject scoresobtained from the two different administrations of environmental sensitivity scale were tested by means of Pearson-moment correlation technique and a correlation coefficient of .72 has been found. In addition, students' environmental sensitivity was measured by both Children's Environmental Attitude and Knowledge Scale which was developed by Leeming and Dwyer (1995) and the Environmental Sensitivity Scale for Children. The data were analysed by Pearson-moment correlation technique with a correlation coefficient of .64. These two findings indicate that the reliability and validity coefficients of the scale developed by the researcher are quite high.

Key Words: Environmental education, environmental sensitivity, the scale of environmental sensitivity.

INTRODUCTION

Environment can be defined as an external world in which all the livings continue their relationships throughout their lives (Ertürk 1996). Environment is the whole of universal values. Plants and animals groups, non-living things, civilizations and productions man formed throughout the history are the wealth of all human beings (Keleş and Hamamcı 1998).

An environment of the livings is the place where the living pursues all kinds of biological, social, cultural and economical activities and meets the basic needs for life such as nutrition, sheltering and reproduction. In short, an environment is the surroundings that are lived. According to environment psychology, an environment is defined as "everything except for individual" and it is emphasized that an environment involves everything including the place individual lives and his/her social relationships. This definition includes both natural and artificial environment and social environment (Yıldız, et al 2000).

Biologists, sociologists, geographer, educationist, ecologists and economists express different approaches considering environment from different point of views and define environment in various ways. However, physical environment and social environment are two concepts complementing each other. Physical environment is divided into two groups as natural environment and artificial environment in terms of its formation. Moreover, environment can be examined on local, regional, national and international scale based on geographical boundaries. Thus, environmental issues can be dealt with in local, national or universal context.

Although the concepts such as environmental rights, environmental ethics, environmental sensitivity and environmental education were the concepts which were not put into agenda, discussed, had vague definition thirty or forty years ago, industrialization having destroyed the nature in the last quarter of the twentieth century, unplanned and ugly urbanization, uncontrolled population increase and fast production-consumption madness caused people to discuss the concepts regarding environment and to be interested in environmental issues. Because, the increase in high population, rapid industrialization and urbanization cause very serious environmental issues.

Despite limited natural sources, they have been decreasing and natural environment has becoming polluted due to rapid increase in the world population. Today, those who are struggling for people to have healthy future, agree that environment is a common value. Environmental sensitivity throughout production and consumption phases, being sensitive and rationalistic at using limited sources will provide innumerable advantages for human beings. Therefore, the main aim of environmental education is to make an individual perceive his/ her environment as the whole, to develop a critical view on his/ her interaction with environment and to educate him/her as a citizen who is sensitive, conscious, initiate at environmental issues (Geray 1977).

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[*] Corresponding author: asubasal@uludag.edu.tr

Regarding the individual social environment, taking the initiative consciously in an organized way to defend and realize the environmental rights, involving in the decision making processes as to environment, having influence on them, observing, evaluating and controlling the results; making every political, legal, social and managerial attempt which is the requirement for protecting environment and taking the advantages of the environment without destroying it; and gaining the habit of developing civil social organizations are among the main aims of education for environment (Geray 1977).

Environmental education is an education process. Education should enable an individual to know himself/herself and to be more productive by revealing the potential powers of his/her. After education, there must be a desired behavioural change in individual. In brief, if the information taught throughout the education process is used in real life, education will achieve its goal. According to Ayvaz (1998), the aim of environmental education is to educate a citizen who has the awareness of the environmental responsibility. Thus, environmental education process causes people to acquire sensitive behaviours for environment.

North America Association Environmental Education expresses environmental education phases as follows;
1. To be interested in and sensitive to environment.
2. To obtain information about natural system.
3. To form value judgement and priorities providing positive views about environment.
4. To acquire the abilities to contribute environment by active involvement.
5. To have experience in preventing and solving environmental problems (Ayvaz 1998).

The main reason for the formation of environment awareness and sensitivity is environmental education. The aim of environmental education is to teach the methods of protecting the existence and nature of the ecologic system in the best way and living with the system in harmony. It also aims to provide individuals for taking active roles in protecting environment in which they live by teaching the adverse effects of environment pollution on ecosystem (Pazarlıoğlu 1998).

One of the aims stated in the Ministry of Education Primary School Social Information Lesson Draft Education Programme is to teach children to love, respect and protect everything including both the livings and non-living things around them. Thus, to form the behaviour of loving and respecting environment in children, we should educate individuals who can recognize their environment from different aspects and comprehend their needs and problems.

As Pazarlıoğlu (1998) states, environment awareness and sensitivity are the issues that everybody should give importance. For instance, as the difference between smokers and non-smokers, there is a difference between people who protect environment and those who do not. As non-smokers become passive smokers right beside smokers, people who protect environment are also affected by negative events occurred in the environment as those who do not. Therefore, environmental sensitivity must be the responsibility of any part of the society.

In this study, with the purpose of measuring the primary school students' sensitivity to environment, "Environmental Sensitivity Scale for Children" was tried to develop. When we examine the scientific studies conducted both in Turkey and abroad, the studies concerning environment protection developed for children and scale development related to the measurement of environment awareness and sensitivity are rarely seen. A questionnaire including 37 items which was applied to the adults participated in III. Ecology Summer School was developed by Pazarlıoğlu (1998).

Education has a very important role in environment protection. The main purpose of environmental education is to enable an individual at an informative level to gain an ability to set a healthy communication including behaviours which do not give harm to the environment based on mutual respect between human beings and nature. That is, the aim is not only being informed about environment but also causing the individual to acquire the attitudes and behaviours that protect and develop environment, and the ability to be able to solve problems about environment (Ministry of Education Primary School Social Information Lesson Draft Education Programme, 2001).

While "Environmental Sensitivity Scale for Children" was aimed to be developed, it was aimed to find out the behaviours and attitudes of primary school children towards protecting and developing environment in addition to identify their knowledge of environment. Thus, it will become important for primary school teachers to know the students' awareness and sensitivity regarding environment in their classes and to identify the students whose sensitivity is low and high. It was aimed to develop "Environmental Sensitivity Scale for Children" to conduct studies on increasing environment protection sensitivity of the students who have low environmental sensitivity and also for researchers to investigate the relationship between the level of the children's environmental sensitivity and the other variables.

The Characteristics of the Environment Sensitivity Scale for Children
"Environmental Sensitivity Scale For Children" developed considering our countries conditions was developed by researchers to determine the environmental sensitivity level of the children (9-15 years old) who attend in primary schools from third grades to eight grades. "Environmental Sensitivity Scale for Children" consists of 90 items. While forming the items, related literature was extensively reviewed and the items were tried to be formed considering the behaviours of children regarding environment awareness and sensitivity at further universal dimension in the children's awareness of environment concerning the nearest environment of the children and the behaviours for protecting the environment.

The scale is a 1-3 point Likert Scale and the child who answers the questionnaire chooses one of the alternatives such as "yes = 3, sometimes = 2, no = 1" considering the demonstration level of the behaviour that each item expresses. Therefore, by adding the total scores obtained, only one score is reached related to children's environmental sensitivity. Thus, when all the questions are answered, the possible scores that a child can get from the questionnaire ranges from 90 (the lowest) to 270 (the highest). While the high score obtained from the application indicates that the level of the child's environmental sensitivity is high and that child is sensitive to environment, the low score indicates that the level of the child's environmental sensitivity is low and the environmental sensitivity of the child is not adequate.

There is no time limitation in the application of "Environmental Sensitivity Scale for Children". However, in the application of the scale, 25-30 minutes can be enough. The scale can be applied both individually and in groups.

MATERIALS AND METHODS

Procedures
First Stage
While forming the items of "Environmental Sensitivity Scale for Children", firstly a related literature was extensively reviewed. Later, the behaviours of environmental sensitivity that a child could demonstrate from his /her nearest environment to the furthest one were identified with specific items by the researchers. Afterwards, the final version of the questionnaire was formed by combining the items together and examining them several times.

Second Stage
The Subjects for Reliability Study
The reliability study of the scale was carried out over 100 students including 52 boys and 48 girls in the fourth and fifth grades of a primary school where the middle and upper class parents' children were attending in Nilüfer district in Bursa. The participants were chosen randomly.

Third Stage
The Subjects for Validity Study
 The validity study of the scale was conducted over 140 students including 69 boys and 71 girls in fifth and seventh grades of a primary school where the middle and upper class parents' children were attending in Nilüfer district in Bursa. The participants were chosen randomly.

RESULTS AND DISCUSSION

The Reliability Study of Environmental Sensitivity Scale for Children
The reliability study of "Environmental Sensitivity Scale for Children" was conducted by examining the score stability. With the aim of examining the score stability of scale, "Environmental Sensitivity Scale for Children" was applied twice to the students of the subject group who were attending the fourth and fifth grades of a primary school by using Test-Revision-Test Method every other week. The scores that subjects obtained at the two applications of the scale were tested through Pearson-Moments Multiplication Correlation Technique.

In Table I, the Correlation Coefficients among scores obtained from the first and second applications of the scale were given to the research group of Environmental Sensitivity Scale for Students.

Table 1. The Pre-Test - Post-Test Correlation Coefficients of Environmental Sensitivity Scale for Children

Sex	Number(n)	Correlation Coefficient ®
Boy	52	0.70*
Girl	48	0.71*
Total	100	0.72*

*p<0.01

As it is seen in Table 1, between the scores obtained from the first and second application of the scale, correlation coefficient calculated by Pearson Momentary Multiplication Coordination Technique was r = 0.70 for boys, r = 0.71 for girls and r = 0.72 for total students. The correlation co-efficient obtained was high. That is, it was found that there was a parallel and a high-level relation between the answers given in the first application and those in the second application. The results obtained indicated that "Environmental Sensitivity Scale for Children" was reliable. Reliability in terms of the score stability was acceptable. Moreover, the pre-test scores and the post-test scores of 100 students were evaluated by using "t" test which assessed the difference between dependent sample groups.

In Table 2, the arithmetical mean, standard deviation, "t" value of the pre-test and post-test scores are presented.

Table 2. Arithmetical Mean, Standard Deviation and "t" values of the pre-test and post-test scores of the Environmental Sensitivity Scale for Children.

	Arithmetical Mean (x)	Standard Deviation (ss)	t
Pre-test	224.12	19.54	-0.09*
Post-test	224.27	24.21	-0.09*

As it is indicated in Table 2, the arithmetical mean of pre-test scores was 224.12 and its standard deviation was 19.54, the arithmetical mean of post-test scores was 224.27 and its standard deviation was 24.21. Calculated "t" value was -0.09 and it was not significant at .05 level. Thus, there was no significant difference between the arithmetical means of the pre-test and post-test scores. The result showed that the scale was appropriate for its aim. It can be said that the reliability of "Environmental Sensitivity Scale for Children" is quite high in terms of the score stability.

The Validity Study of Environmental Sensitivity Scale for Children
Validity study should be carried out to be able use a scale in scientific research. To do this, the correlation between the scores obtained from two different scales can be examined by applying a similar scale developed for the same purpose to the similar sample group or the homogeneity of the scale can be measured by calculating the validity coefficient of the scale by means of Alpha Coefficient which is a mean of the scale homogeneity. Therefore, the validity of the scale can be evaluated by the homogeneity method. It is pointed out that the homogeneity of a scale is a sign of homogeneity and the homogeneity level of a scale is a sign of its validity (Voltan-Acar 1991).

The validity study of "Environmental Sensitivity Scale for Children" was conducted through criterion-dependent validity study. For this, the relations between "Environmental Sensitivity Scale" and "Children's Environmental Attitude and Knowledge Scale" (Leeming and Dwyer 1995), which were developed and whose reliability study was done beforehand by the researchers, were found. As a result of the application of both scales, among the scores obtained, Pearson- Moments Multiplication Correlation coefficient and calculated correlation coefficient were determined as r = .64 for all the students who were included in the research. It was observed that there was a parallel and fairly high level relation between the correlation coefficient calculated for validity and two scales. In this study, "Children's Environmental Attitudes and Knowledge Scale", which was used for determining the validity of "Environmental Sensitivity Scale for Children" and developed by Leeming and Dwyer (1995), consists of two sub-scales which are called Environmental Attitude Sub-Scale with 42 items that measures children's attitudes towards environmental issues and Environmental Knowledge Sub-Scale with 28 items that measures children's knowledge about environment. In this study, only the sub-scale of the scale regarding environmental attitude was used. The reason for using only environmental attitude sub-scale was that children's attitudes and behaviours towards

environment which was tried to be measured by "Environmental Sensitivity Scale for Children" whose validity was tried to be determined could only be measured under this sub- scale.

Environmental Attitude and Information Scale is a 1-5 point Likert kind. To answer the scale, it is required to mark one of the alternatives such as "Certainly Agree=5", "Usually Agree=4", "Hesitant=3", "Usually Disagree=2", "Certainly Disagree=1" considering the demonstration level of the behaviour that each item expresses. On the scale, while 5 points express the highest positive attitudes towards environment, 1 point expresses the lowest. The total score values are ranging from at least 12 to 210. Low scores indicate negative attitudes towards environment and high scores indicate positive attitudes of the students towards environment.

To be able to use Environmental Attitudes and Information Scale in the present study, firstly translation validity (language equivalence) study was carried out by the researchers. The scale translated from English-to-Turkish retranslated in English. After proof-reading and revision had been made on some expressions that do not give the exact meaning, the work-out of translation was taken. The English version of translation known as experimental Turkish Form and linguistic equivalence were done according to intercultural scale adaptation model developed by Öner (1987).

According to Morgan (1977), the correlation coefficients calculated for validity are never as high as for those for reliability. For the scales in the field of education and psychology, the validity score of .50 or .60 is quite adequate. Thus, the correlation coefficient r =.64 obtained from the scores of "Environmental Sensitivity Scale for Children" and "Children's Environmental Attitudes and Knowledge Scale" indicated that the validity of the Environmental Sensitivity Scale for Children was significantly high. Moreover, the scores of two different scales applied to 140 students in the present study were analysed by t-test. The arithmetical mean, standard deviation and "t" value of the scales used in the present study were presented in Table 3.

Table 3. Arithmetical Mean, Standard Deviation and "t" value of the scores obtained from "Environmental Sensitivity Scale for Children" and "Children's Environmental Attitudes and Knowledge Scale"

SCALES	Students' numbers	Arithmetical Mean(x)	Standard Deviation (ss)	t
Environmental Sensitivity Scale for Children	140	227.64	20.69	61
Children's Environmental Attitudes and Knowledge Scale	140	139.59	17.75	61

In conclusion, the results showed that the criterion dependent validity of "Environmental Sensitivity Scale for Children" is significantly high. As "Environmental Sensitivity Scale for Children" has adequate reliability coefficient, it can be accepted as a scale that has very high level validity**.** Thus, the scale can be used in the research which aims at investigating environment awareness and sensitivity of the children ranging in age from 9 to 15 years and in the studies that provide environmental education. Moreover, the scale can be applied not only to the students in primary school but also to those who continue upper education since the items in the scale were formed to investigate firstly children's awareness and sensitivity of the nearest environment and then of further universal dimension. Considering this, the relationship between children's environmental sensitivity level evaluated by "Environmental Sensitivity Scale for Children" and their success in the courses especially as to the Science and Social Science Field can be examined. The relationship between the characteristics of the children and their environmental sensitivity levels can also be examined. Furthermore, it can be used to determine whether an environmental education lesson given to students, course, seminar or the camp process affect children's environmental sensitivity level.

REFERENCES

Anonymous (2001). Ministry of Education Primary School Social Information Lesson Draft Education Program. Milli Eğitim Bakanlığı. Eğitim Araştırma ve Geliştirme Başkanlığı Yayınları, No: 104.
Ayvaz Z. (1998). Çevre Eğitiminde Amaç ve Fonksiyonlar. Çevre Eğitimi: Metot ve Özel Konular. İzmir, 29-32,.
Ertürk H. (1996). Çevre Bilimlerine Giriş. Uludağ Üniversitesi Güçlendirme Vakfı Yayınları, No:10, Bursa.
Geray C. (1997). Çevre İçin Eğitim. İnsan Çevre Toplum. Ankara: İmge Yayınevi, 323-343.
Morgan C. T. (1981). Psikolojiye Giriş. Çeviren: S. Topçu. Ankara: Hacettepe Üniversitesi, 282-309.
İleri R. (1998) Çevre Eğitim Metotlarında Yeni Perspektifler. Çevre Eğitimi: Metot ve Özel Konular. İzmir, 4-23.
Öner N. (1987). Kültürlerarası Ölçek Uyarlamasında Bir Yöntembilim Modeli, Psikoloji Dergisi. 6 (21): 80-83

Pazarlıoğlu V. (1998). Çevre Bilinci ve Duyarlılığının İstatistik Metodlar ile Ölçülmesi. Çevre Eğitimi: Metot ve Özel Konular. İzmir; 207-232

Keleş R., and Hamamcı C. (1998). Çevrebilim. İmge Kitabevi Yayınları, Ankara.

Voltan-Acar N. (1991). Grup Lideri Değerlendirme Ölçeğinin Geliştirmesi-Ölçeğin Geçerlik ve Güvenirlik Çalışması. Marmara Üniversitesi Eğitim Bilimleri Dergisi, İstanbul, 345-350.

Leeming F.C., and Dwyer W. O. (1995). Children's Environmental Attitude and Knowledge Scale: Construction and Validation. Journal of Environmental Education, 26 (3).

Yıldız K., Sipahioğlu Ş., and Yılmaz M. (2000). Çevre Bilimi. Gündüz Eğitim ve Yayıncılık, Ankara.