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Efficacy of Recycling Education Integrated with Ecology Course Prepared within the Context of Enrichment among Gifted Students

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ABSTRACT The aim of this study was to investigate the efficiency of the recycling education integrated with ecology course in terms of gifted students' environmental attitudes, recycling knowledge and conceptual understanding about ecology. In the study, weak experimental design was used. Recycling Education Program (REP) was prepared which is integrated into the subject of Ecosystem Ecology. Data collection tools were applied before and after the REP application. The content analysis method was used in order to analyse the data obtained through Ecosystem Ecology Conceptual Understanding Test (EECUT) in the framework of the research. Wilcoxon Signed Rank Test was used to determine whether there was a statistical difference ($p<0.05$) between the pre-test and post-test scores of the Recycling Knowledge Test (RKT) and Environmental Attitude Scale (EAS). The answers of the students to EECUT showed that there is an improvement in the level of conceptual understanding after the applications. The differences between the pre-test and post-test scores of RKT and EAS were found to be statistically significant. This situation showed that there is an advancement of students' knowledge about recycling and attitudes towards the environment.

INTRODUCTION

Despite the fact that the uncontrolled development of industrialization and a rapid movement towards the consumer society as of the 19th century appeared to increase the quality of life and convenience for the benefit of people, the actual consequences came into play in the ensuing years (Marshall and Toffel 2005; Khan et al. 2019a, b). The bottom line of this process were the unconscious use of resources and the industrial wastes inconsiderately discharged in the nature as well as many other environmental problems from ecological pollution to decline in biodiversity (Ahmad et al. 2019). Today's developed societies have tolerated the damage to the environment and natural resources over the years, for the sake of economic development (Ahmad et al. 2018; Nadeem et al. 2019). Due to the scarcity of resources used as if they were inexhaustible, industrial companies have suffered from shortages of raw materials and began to foresee the possibility of creating new resources despite higher costs (Khan et al. 2018a, b; Ugulu et al. 2019).

In this context, a failure on the part of the individuals causing the emergence of environmental problems to fulfil their responsibilities in eliminating such problems would lead to an incremental increase in the destruction of the environment (Khan et al. 2019c, d). As a matter of course, raising environmentally conscious individuals becomes a necessity to ensure that the next generations live in a healthier and safer environment (Ugulu 2009). In this context, it is only possible to educate individuals by providing efficient environmental education (Erkol and Ugulu 2014). Environmental education has gained structural and target-oriented qualities at the Tbilisi Declaration (1977) on a global level. The declaration and guidelines of the Tbilisi Declaration represent a milestone for environmental education. The Tbilisi Declaration provides the framework and guidelines for environmental education for all age groups, from local to international, at all geographical levels (Wisconsin DPI 1994).

As the view that providing an overload of ecological knowledge based on the traditional approach is insufficient for environmental education gains wider acceptance, the question of which factors are correlated with individuals' behaviours associated with environment comes into prominence. Based on the studies carried out to determine whether and why individuals engage in recycling, it was concluded that indi-

viduals' behaviours associated with recycling are influenced by such causes as economic factors, recycling availability, the fact that recycling makes an individual feel beneficial to the society, level of knowledge about recycling, indifference to recycling, lack of time, and poor physical conditions (Smeesters et al. 2001). Other factors having a positive effect on recycling are such concepts as the implications of recycling on the protection of energy resources and its contribution to prevent environmental pollution (Brody 1997). The attitudes and behaviours of the individuals concerning to the matter underlie all such factors having positive and negative effects on recycling (Smeesters et al. 2001). Consequently, certain theories have been put forward essentially to determine the factors having an effect on the attitudes and behaviours of the individuals on the subject in an attempt to research into environmental education and activities associated with recycling.

Attitudes, values and beliefs are characteristic features of each individual and thus, appear to be relatively stable once they appear in an individual (Ugulu 2013). As a result, these characteristics were qualified as central factors in a large number of studies aimed at explaining and anticipating individuals' behaviours associated with recycling (Smeesters et al. 2001). On the other hand, some researches merely evaluated the data on recycling (McCarthy and Schrum 1993). Other models such as The Theory of Reasoned Action, The Theory of Planned Behaviour and Schwartz's Model of Altruism proposed more comprehensive theories as well as evaluating data on recycling in the behavioural sciences.

Based on the analysis of the methods and the levels of education in which environmental education are provided, it is seen that the scope of environmental education about recycling remains unsatisfactory. A comprehensive analysis of the school curriculum providing environmental education shows that there are just a few paragraphs of information on recycling which can only be found in the first grade of high school (Ugulu 2015a). Moreover, it has been observed that academic studies to determine recycling attitudes and behaviours are inadequate. Also, there are almost no studies on the involvement of gifted students, which have significant development potential for societies in many respects, in environmental activities and awareness of environmental problems.

Almost all young people have an innate enthusiasm to study natural systems. However, environmental education is especially important for talented students in secondary education programs. These students have more potential than the global population in terms of greater commitment and solutions to global concerns (Ugulu et al. 2013). In addition, environmental education allows students to use advanced critical thinking skills by presenting point/counterpoint elements. Furthermore, it has been thought that gifted secondary students who have greater proficiency in mathematics and probability, and their other skills are a convenient tool for further understanding of environmental problems. Gifted students are good futuristic thinkers and are therefore aware of the negative environmental change in their own future and the negativity in the lives of their predecessors. Environmental education provides these students with an outlet for their intensified perceptions and trends in different thinking styles (Hartsell 2006). As a result, these students often develop a strong sense of moral responsibility to correct mistakes and correct injustices for all citizens of the planet. In this direction, ensuring active participation of the gifted individuals defined as the most significant human resources of a country in environmental issues included amongst the most crucial items of the agenda today, as well as in the future, is of great importance (Ugulu 2015b).

Enrichment is one of the important educational models for gifted students. Enrichment means adding disciplines or learning areas not normally found in the regular curriculum, using more difficult or deeper material to develop the core curriculum, expanding teaching strategies used to provide instructions for gifted students, or providing in-depth learning experiences (Clark 2002). In this study, the recycling education program was created by enriching the subject of ecosystem ecology in the high school curriculum with the concepts related to recycling within the scope of enrichment the curricula for gifted students.

Gifted Education in Turkey

Educational models that have gifted education in Turkey can be divided into three groups, including private schools, special classes and after-school programs. Science high schools, conservatories and sports high schools can be given as an example for private schools, Gifted Education Programs, and Science and Art Centres (SACs) can be given as examples for after-school programs. Private classes take place only in private sector schools (Sak et al. 2015).

One of the important problems existing in the education of gifted students in Turkey is the flexibility problem in the national education system. For example, according to the National Education legislation, gifted students can only skip a class in primary school years during their entire education. In addition, the education system does not provide opportunities for gifted students to take courses from universities or upper classes (Sak 2013). Therefore, it is not enough to create new opportunities for gifted students who attend regular classes for their development. For this reason, after-school programs and especially SACs have an important place in the education of gifted students (Ugulu 2015b).

After-school programs are educational programs for gifted students in school or outside school hours, in addition to their school schedule. The SACs, which are run by the Ministry of National Education and widely used throughout the country, the research and education centres on university campuses, and the centres run by the private sector, are the leading after-school programs for gifted students in Turkey (Sak et al. 2015).

Science and Art Centres (SACs)

Science and Art Centres, which are widespread throughout the country, are an after-school program model and started to be established in 1995 to develop their potential by educating primary, secondary and high school gifted students in the time remaining from normal education programs. As of 2019, there are 139 SACs in various provinces and districts (MEB 2019). The SAC model aims to provide enriched education at extracurricular hours without separating gifted students from their normal peers. In SACs, students are educated on certain days of the week except for formal education (Karabulut 2010). Students mostly work on social and scientific projects and produce solutions to real-life problems (Orbay et al. 2010). The Ministry of National Education conducts a central diagnostic examination to identify gifted students who are planned to study in science and art centres. According to the results of this exam, students are placed in 139 science and art centres throughout the country.

Objectives

Due to its potential to improve environmental conditions, there has been a significant improvement in recycling and its applications. Employment and education of the gifted individuals in terms of environmental issues like recycling as in other spheres of social issues would significantly contribute to the development and progression of a country. The aim of this study was to investigate the efficiency of the recycling education integrated with ecosystem ecology course in terms of gifted students' environmental attitudes, recycling knowledge and conceptual understanding about ecology.

MATERIAL AND METHODS

Research Design

In the study, to determine the effectiveness of the recycling education program, it is planned to use one group pre-test post-test model from the pre-experimental models and to evaluate the measurements by taking the pre-test and post-test scores (Cohen et al. 2005). This design is defined as pre-experimental models or weak experimental design. Since there are no special classes for gifted students in Turkey and these students take the scattered after-school enrichment programs in Science and Art Centres (SACs), this model was preferred.

In this design, the effect of the experimental process on the group is tested with a single group study and the measurements of the dependent variable of the subjects are obtained before and after the application by using the same subjects and the same data collection tools (Christensen 2004).

Sampling

The study was conducted through the study group without selecting the universe and sample as a requirement of the weak experimental design. The research was conducted with the students of Izmir Science and Art Centre in the 2015-2016 academic year. The study was conducted with 12 students, 5 girls and 7 boys. These students are studying in various secondary schools in Izmir as 8th-grade students and participate in after-school programs for gifted students in Izmir Science and Arts Centre. This study, which includes experimental applications, was conducted with a relatively small group consists of 12 students. Because gifted students are lasting the formal school programs and SAC program together, performing experimental studies with a large number of these students involves great difficulties in the conditions of Turkey.

Data Collection Tools

Ecosystem Ecology Conceptual Understanding Test (EECUT)

Ecosystem Ecology Conceptual Understanding Test (EECUT) was designed to understand how gifted students construct ecological concepts. It includes open-ended questions to assess students' misconceptions about these issues. For the content validity of the conceptual understanding test, a concept analysis was prepared on the subject of Ecosystem Ecology in the 10th-grade curriculum of high school. In order to determine the comprehensibility of the questions, the duration of the solution and to check the content validity, the questions in the test were examined and answered by 3 faculty members and 1 lecturer in Biology Education Department. Corrections and additions were made in the test in accordance with the opinions received.

Recycling Knowledge Test (RKT)

Recycling Knowledge Test was prepared to measure students' knowledge about the characteristics of recycling and its importance for the world. In the process of preparing the test, a concept analysis including the concepts that are planned to be gained with the subject has been created based on the basic information revealing the importance and characteristics of recycling. The concept analysis has been guided in the preparation of the questions in the RKT in parallel with the subjects and concepts and in ensuring the validity of the scope of the test. The test consists of 10 five-choice questions. In order to determine the comprehensibility of the questions, the duration of the solution and to check the content validity, the questions in the test were examined and answered by 3 faculty members and 1 lecturer in Biology Education Department. Corrections and additions were made in the test in accordance with the opinions received. In order to determine the internal consistency of the test, KR21 formula, which accepts substance difficulty levels as the same or similar, was used and the internal consistency coefficient was found to be 0.76.

Environmental Attitude Scale (EAS)

Environmental Attitude Scale (EAS) developed by Ugulu et al. (2013) was used to assess students' attitudes toward environment. The EAS consisted of four subscales and 35 items with responses recorded on a 4-point Likert scale, options ranging from strongly agree to strongly disagree. Cronbach's alpha reliability coefficient (α) of first factor with fifteen items (Environmental awareness) was found to be 0.84, reliability (α) of second factor with eight items (Recycling attitude) was found to be 0.78, reliability (α) of third factor with five items (Attitudes toward recycle) was found to be 0.70, reliability (α) of fourth factor with seven items (Environmental consciousness and behaviour) was found to be 0.70 and reliability (α) of the whole scale with 35 items was found to be 0.82 for this study.

Implementation

Ecosystem Ecology Conceptual Understanding Test (EECUT), Recycling Knowledge Test (RKT), and Environmental Attitude Scale (EAS) were used as a pre-test and post-test before and after the application. The REP implementation time was limited to 10 hours for "Ecosystem Ecology" course in accordance with the teaching

curriculum. The REP was prepared in a way that it constitutes a whole with the subject "Ecosystem Ecology" included in the curriculum of the 10th grade in the context of the REP high school biology teaching program adopted with the decision No. 137 of 03.06.2008 of Turkish Education Board affiliated to Ministry of Education. The implementation of the REP lasted for 5 weeks, two hours per week, in line with the education programs of gifted students in Izmir SAC.

Recycling Education Program (REP)

The recycling education program was created by enriching the subject of ecosystem ecology in the high school curriculum with the concepts related to recycling within the scope of enrichment the curricula for gifted students. In the process of the design of REP, firstly, the concepts intended to be gained to students within the scope of the program were analysed according to the 3R (Reduce, Reuse, Recycle) model. After the concept analysis, target concepts were added to the subject without disturbing the integrity of ecosystem ecology. In the second stage, recycling activities were prepared to ensure that the concepts related to recycling are conceptually structured and understood by the students in a way that changes their behaviour. These activities were also placed in a way that would not disrupt the integrity of the subject. As a result, a "Recycling Education Program" was prepared which is integrated into the subject of Ecosystem Ecology.

Data Analysis

The content analysis method was used in the analysis of the data obtained with EECUT. The process carried out in the content analysis method, which provides a detailed examination of the data, is to bring together similar data within the framework of certain concepts and themes and to organize and interpret them in a way that the reader can understand (Yorek et al. 2010; 2016). The data obtained from the data collection tool was coded separately by a researcher and another experienced faculty member. Coding by both researchers was compared for reliability and the percentage of concordance required was considered sufficient at 70 percent and above (Ugulu et al. 2015).

In the study, a data set was created with the help of SPSS for the data obtained with the RKT and EAS used for the collection of quantitative data. Recycling knowledge and environmental attitude scores were defined as dependent variables and pre-test and post-test scores were calculated for each dependent variable. Wilcoxon Signed Rank Test was used to determine whether there was a statistical difference ($p<0.05$) between the pre-test and post-test scores of the RKT and EAS. The number of items, total scores and reliability coefficients of quantitative data collection tools are given in Table 1.

RESULTS

How did the REP Affect Gifted Students' Conceptual Understanding?

In order to evaluate the effect of the REP on the students' conceptual understanding of ecology, EECUT was applied to the experimental group as pre-test and post-test and the development in the group was examined. The answers of the students showed that there is an improvement in the level of conceptual understanding after the applications (Table 2). This shows that recycling education program integrated with ecological concepts in the context

Table 1: Quantitative data collection tools

Data collection tool		*Item number*	*Min.-Max. score*	*Reliability coefficient*
	Recycling Knowledge Test	10	0-10	KR21= 0.76
	Environmental Attitude Scale	35	35-140	α = 0.82
Subdimensions	Environmental awareness	15	15-60	α = 0.84
	Recycling attitude	8	8-32	α = 0.78
	Attitudes toward recycle	5	5-20	α = 0.70
	Environmental consciousness and behaviour	7	7-28	α = 0.70

Table 2: Students' achievement levels in EECUT

Question	*Scope*	*Pre-test*		*Post-test*	
		f	*%*	*f*	*%*
1	Basic ecological concepts	8	66.7	12	100
2	Species concept	6	50	11	91.7
3	Population concept	7	58.3	11	91.7
4	Community concept	6	50	12	100
5	Ecosystem concept	10	83.3	12	100
6	Ecosystem and energy relations	10	83.3	12	100
7	Food chain	11	91.7	12	100
8	Food web	9	75	11	91.7
9	Food pyramid	9	75	12	100
10	Water cycle	12	100	12	100
11	Carbon cycle	10	83.3	12	100
12	Nitrogen cycle	7	58.3	10	83.3

of enrichment supports gifted students' conceptual understanding.

When the students' answers to questions in the EECUT are examined, it can be said that the students have knowledge about some subjects and concepts about ecology before they start to the REP practice. According to the pre-test results, it was seen that the students gave correct conceptual explanations to the questions related to Ecosystem concept (83.3%), Ecosystem and energy relations (83.3%), Food chain (91.7%), Water cycle (100%) and Carbon cycle (83.3%) with a percentage of 80 percent and above. This finding can be explained by the fact that the students participating in the study are gifted students and can make inferences on the correct answers of the questions based on their past knowledge. On the other hand, at the end of the REP application, this ratio was determined as 90 percent and above except for the Nitrogen cycle (83.3%) question. The Nitrogen cycle is described by experts as one of the most difficult issues to understand in ecosystem ecology and requires more knowledge of biology. The reason why gifted students reach a relatively low level of conceptual understanding in the nitrogen cycle question related to this subject in the post-test application may depend on these reasons.

How Did the REP Affect Gifted Students' Attitudes towards the Environment?

The mean pre-test scores of gifted students were found to be 49.56 (82.6%) for the first subdimension (environmental awareness) of the EAS. The mean post-test scores evaluated after the implementation of the REP was found to be 57.53 (95.9%). The pre-test mean attitude scores of the students for the second (Recycling attitude), third (Attitudes toward recycle) and fourth (Environmental consciousness and behavior) sub-factors of the scale were 26.07 (81.5%), 16.07 (80.3%) and 22.03 (78.7%), respectively; and post-test scores were 31.09 (97.2%), 19.26 (96.3%) and 26.89 (96.3%), respectively. These findings showed that there is an increase in students' scores and an advancement of their attitudes towards the environment. On the other hand, Wilcoxon Signed Rank Test was used to determine whether there was a statistical difference between the pre-test and post-test scores of the subdimensions of the EAS. The difference between the pre-test and post-test scores of the students was found to be statistically significant ($p<0.05$) (Table 3).

How Did the REP Affect Gifted Students' Knowledge of Recycling?

The mean pre-test scores of gifted students were found to be 8.25 (82.5%) for the recycling

Table 3: Wilcoxon signed rank test analysis of pre and post-test scores on EAS and subdimensions

Dimension	*Test*	*n*	*Mean*	*%*	*Std. deviation*	*t*	*P*
Environmental awareness	Pre	12	49.56	82.6	4.130	-5.695	0.000
	Post		57.53	95.9	5.205		
Recycling attitude	Pre	12	26.07	81.5	2.258	-9.125	0.000
	Post		31.09	97.2	2.837		
Attitudes toward recycle	Pre	12	16.07	80.3	2.591	-7.358	0.000
	Post		19.26	96.3	2.358		
Environmental consciousness and behaviour	Pre	12	22.03	78.7	2.406	-7.389	0.000
	Post		26.89	96.3	2.596		

knowledge test (RKT). The mean post-test scores evaluated after the implementation of the REP was found to be 9.3 (93%). These findings showed that there is an increase in students' scores and an advancement of their knowledge about recycling. On the other hand, Wilcoxon Signed Rank Test was used to determine whether there was a statistical difference between the pre-test and post-test scores of the subdimensions of the RKT. The difference between the pre-test and post-test scores of the students was found to be statistically significant ($p<0.05$) (Table 4).

DISCUSSION

Recycling has been one of the strategies that come to mind primarily when people and institutions want to achieve a positive behaviour towards the environment, but when it comes to implementation, it has not achieved sufficient stability except for a few examples in Turkey. Apart from the activities of some private institutions and foundations, there is almost no comprehensive example of the recycling education within the curriculum in institutions or universities affiliated to the Ministry of National Education (Ugulu 2013). When the place of recycling education in the international field is examined, a multi-faceted development is observed in parallel with the development of environmental education. Parallel to the development process of environmental education, demographic and sociological factors affecting the recycling and its education have been the subjects that have been investigated for many years (Thøgersen 1994). In this direction, the main purpose of this study is to investigate how students' attitudes toward the environment as well as their conceptual understanding of ecology will be affected by the Recycling Education Program, which includes the basic concepts of recycling and international examples.

As in environmental education, how students construct environmental concepts and their conceptual understanding of these issues is very important in recycling education (Ugulu et al. 2015). Shepardson (2005) stated that students construct the concept of the environment from a limited ecological point of view. For them, the environment makes sense as an area where animals live or allow them to live. However, it was seen that most of the students did not mention about energy flow, matter cycle and nutritional relations or could not fully understand the subject, and they could not reveal the relationships between biotic and abiotic factors and their dependence on each other. In this study, the low values of students' conceptual understanding of questions about basic ecological concepts, species, population and community concepts, food web and food pyramid support this view. Shepardson (2005) states that the basis of this situation is that many individuals perceive people separately from nature, not as part of nature.

Munson (1994), searching the researches done in the direction of constructivist learning theory about the environment, has dealt with the subject of conceptual change and made researches on how to deal with the misconceptions of students about ecology. Munson (1994) concluded that students' learning new concepts about ecology is related to their previous knowledge. For this reason, he mentioned the importance of misconceptions in the structuring of new information and stated that misconceptions are very important for environmental education and educators. In his study, it was seen that high school students have many misconceptions about basic ecological concepts. In this study, when the students' answers to the question of the EECUT about the food network are examined, it was seen that some students have a misconception as "The change in the number of organisms at a trophic level affects only those organisms directly related to this level".

Table 4: Wilcoxon signed rank test analysis of pre and post-test scores on RKT

Student	*Test*	*n*	*Mean*	*%*	*Std. deviation*	*t*	*P*
Gifted	Pre	12	8.25	82.5	0.918	-6.521	0.000
	Post		9.30	93	0.955		

Many of the common misconceptions about ecosystem ecology seem to be related to the concepts of the food chain and food pyramid and their properties. Adeniyi (1985) stated that some students had the misconception that "Energy increases at higher trophic levels in the food pyramid." On the other hand, Brehm et al. (1986) presented that some students had the misconception that "Biomass increases at higher trophic levels in the food pyramid." In this study, when students' answers to the question of conceptual understanding test about food pyramid are examined, it was seen that some students developed a misconception that biomass and number of individuals increase at higher trophic levels in the food pyramid. This finding showed that misconceptions determined by Adeniyi (1985) and Brehm et al. (1986) also occurred in the students participated in this research.

In the seventies, the insufficient impact of environmental education on society attracted the attention of many researchers and environmental educators began to question their methods (Gigliotti 1993). On this failure in environmental education, some other environmental educators have emphasized the value judgments and attitudes of individuals (Hornik et al. 1995). In this respect, it was concluded that correctly designed programs are more useful in developing environmental attitudes in studies examining the effects of environmental education programs on individuals' attitudes (Di Enno and Hilton 2005). In this study, the increase of attitudes towards the environment of students' that attended to the recycling education program supports these studies.

Wang et al. (2006) performed an ecology enrichment summer program for gifted students to investigate the learning effects of this enrichment program. In this study, the 3-day enrichment program focused on social interaction, brainstorming and adding multi-sensory learning of ecology that could expand the regular curriculum in school. The results indicated that overall students' knowledge on ecology improved significantly after the ecology enrichment activities. Likewise, there were significant knowledge differences between pre-test and post-test scores for the students. As a result of this study, which has similar goals for gifted students, the improvement of ecological knowledge of gifted students was observed and the difference between pre-tests and post-tests was statistically significant.

In the other studies investigating the importance of knowledge in environmental and recycling education; Simmons and Widmar (1990) stated that lack of information is an obstacle to recycling, while Lansana (1992) stated that awareness among individuals who received recycling program was higher than those who did not participate in the program. De Young (1989), as a result of his study with individuals living in urban settlements, revealed that the recycling knowledge of individuals who do not recycle is not sufficient. In other relevant studies, Corral-Verdugo (1996) found that information on reusable and recyclable substances had a positive effect on the behavioural development process for recycling; Iyer and Kashyap (2007) stated that the transfer of information about recycling to individuals creates a longer behaviour change than the incentives in this direction. In this study, it was seen that recycling knowledge increased in gifted students. The positive development of these students in terms of attitudes towards the environment shows that the recycling education program can be effective in the process of developing behaviour towards the environment.

CONCLUSION

As a result, it can be said that REP, which includes the concepts and activities related to recycling and which includes all the concepts of ecosystem ecology, is an effective and useful tool in line with the objectives of environmental education. The success of gifted students in structuring the concepts and higher attitude and knowledge level related to the environment and recycling shows that these students have an important potential in the field of environment as in other fields of science. By offering these students the opportunity to serve in a meaningful way, teachers can be very helpful in improving their students' active participation in key issues of the day and in developing strong skills. In order to maintain the intrinsic motivation of gifted students in a regular classroom, instructional strategies need to be diversified to meet the challenges of high levels of knowledge and skills.

RECOMMENDATIONS

Based on the results of the research, in formal education institutions, the course contents related to environmental education should be revised to include recycling education, otherwise, the curricula containing this education should be developed. However, activities and studies related to environmental education should be added to enrichment programs prepared for gifted students. It should not be forgotten that recycling is a responsibility that should concern all members of the society and that each individual should perform, and national recycling campaigns and programs should be established with the support of the media. Recycling activities should be prepared in order to increase the knowledge and willingness of students in pre-school and school period. Considering that recycling is an effective strategy for achieving sustainable development, large industrial organizations should be informed, and human resources units should be trained in this direction.

LIMITATIONS

This study was carried out with 12 students due to the difficulty of accessing a large number of gifted students at the same time for one application and therefore non-parametric tests were applied to the data obtained. In addition, as a result of the literature surveys, no data collection tools were found to measure the students' behaviours towards recycling and therefore, the change in behaviour created by the recycling education program could not be investigated.

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