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A Model in Environmental Training – The University / Elementary School / Municipality Cooperation

Bilge Hapçioğlu[1], Selma Karabey[1], Nurhan İnce[1] and Haluk İnce[2]

[1] Public Health Department, Istanbul Faculty of Medicine, Istanbul University, Çapa-İstanbul, Turkey
[2] Department of Forensics, Istanbul Faculty of Medicine, Istanbul University, Çapa-İstanbul, Turkey

A B S T R A C T

This study targets development of an effective training scheme model that can be implemented at elementary school level with focus on recovery and recycling of wasted papers in Turkey. For this purpose, three schools were chosen from a district within Istanbul. They were separated from one another as full intervention (FI), semi-intervention (SI) and control (C) schools. Different levels of educational activities carried out in the schools, mostly in the FI school, were directed toward being informative as regards recycling and the development of a positive attitude. Afterwards, in order to evaluate the effects of the training, paper wastes were collected in recycle bins placed at appropriate points in schools and weighed on a weekly basis. Quite a significant result was found ($p = 0.0001$), when the difference was calculated through the Kruskal Wallis Variance Analysis method, regarding the weekly average amount of paper in each of the three schools against per person. Furthermore, when the results were evaluated and compared as to the ones before the 2.5 months summer vacation and the ones after it, the seven measurements taken before ($p = 0.001$) and the eight taken afterwards ($p = 0.0001$), were found to have valid differences, once again, as against schools. The results show that the approach we provided to education is an effective method not only for the collection of paper wastes but also for applications in various areas of health education.

Key words: *child education, environmental education, paper wastes, intervention, elementary school, recycling*

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Introduction

Rapid developments in technology and industrialization have brought together the problems of demolition of environment and environmental contamination. Since the 1970's, in order to prevent these problems and to find relevant solutions in the area of politics, science and education, the concept of environmental education has been accepted and thus environmental education programs have been developed. The Tbilisi Declaration has been a turning point in the field of environmental education. The Declaration emphasizes the large framework of environmental education alongside with it's nature, goals and the principles of pedagogy on a national and international level[1]. We encounter various articles on educational schemes implemented by developed countries in the relevant literature. It is stated that the target population in environmental education should be the whole of society[2]. It has been also emphasized that knowledge and attitudes are the two major components for environmental literacy. Experts also address to the need for association of knowledge on environment with personal beliefs and decision-making and problem solving skills, insofar as a rational change in personal is sought[3].

In order to possibly reach its goal, environmental education should be included in the standard school curriculum[4]. The underlying principle behind environmental education is the protection of nature and natural resources. However, in the framework of understanding how air, earth, water, plants and animals can be protected, firstly, it must be understood that the whole environment must be perceived very well. Accordingly, to help develop the use of the senses in children, different activities must be created by providing various materials and environments and the relevant feedbacks must be analyzed. Furthermore, the main goal behind environmental education in elementary schools should not be to load children with theoretical knowledge but to provide environmental awareness and to enhance the perception of environmental problems[2].

Another aim in environmental education is for the children to educate families as well as the vice versa. Results of various studies have shown that the environmental education implemented for young people produces significant outputs in terms of developing a positive environmental attitude both in the students receiving the education and in their family households[5–7]. New South Wales Survey indicated that children were an influence on changes in their mothers'[8]. This point may become of vast importance especially for impoverished groups in community where women have more limited opportunities for accessing education.

In spite of the fact that there are different views in regards children receiving optimum gains in the framework of environmental education in the secondary school, this issue is different in Turkey where children are unable to continue their secondary schooling in order to earn a living, and thus compelling that environmental education should be given in the elementary school in this country[9]. Although it is a fact that Turkey has a population of 70 million people with 40% of its population being under the age of 18[10] making it a young country, the present educational system is quite insufficient in terms of the development of a serious environmental education program[11].

On the other hand, unavailability of utilities capable of separating those among other wastes of recyclable quality running properly, which tolls to a daily volume of wasted paper as huge as 1,300

tones in the city of Istanbul only[12]. The Municipality of Istanbul City has initiated a campaign with the slogan »Give your Paper Wastes and Take a Tree« in January 2000 with focus on including all the recyclable wastes, in particular. This attempt bears the core intention to seed in the target community groups the habitual attitude of stacking solid wastes separate from others in their sources but more intimately, to procure for the accumulation, collection and revaluation of paper wastes in community lots, public and private work places, hospitals and schools. In return for the paper bulks so collected, the supporters of the campaign receive seedlings in addition to a wide variety of garden and decorative in-house plants with a view to foster their contribution to the nature.

In Turkey, the standard term for the compulsory elementary education has been set to eight years. There are an approximate total of ten million elementary school students throughout Turkey. This number clearly shows the need for the implementation of a systematic environmental education for elementary school students. Therefore, this study aimed at developing an effective training scheme model that can be implemented at elementary school level with focus on recovery and recycling of wasted papers in Turkey. For this purpose, we, believing to the importance of inter-industrial cooperation in environmental education and the major potential roles that academicians of »Public Health« field are more than likely to play in development thereof as »mediators«, have planned to develop an educational model. We have developed an educational program addressing to the importance of separate collection of paper wastes from other categories of waste in protection of nature and prevention of environmental pollution to children of elementary school age, utilizing the campaign run by the Municipal Authority. We have established and maintained close contacts with officials from the Municipality of Istanbul City and the managerial staff of schools where the education is intended for implementation. We applied different educational methods at different schools and performed comparative evaluations on the results obtained. We targeted to develop a proposal for an effective educational model that is practicable by all elementary schools. We attempted to measure the achievements of our educational program using an unusual method »basing on kilograms of weight«.

Materials and Methods

For the purpose of study, three schools were chosen of 65 elementary schools in Fatih District in which 55,000 students receive education. The reason that underlies this selection of three schools all from the same locality is that their socio – economic status were similar to one another and all were in close neighborhood of the university building where researchers of this study were rendering efforts. The so selected schools were separated as the full intervention (FI), semi-intervention (SI) and control school (C) randomly by draw. Performed during the period between April and November of 2001, the study utilized much from a recent campaign for the collection of paper bulk based wastes from other sorts of wastes initiated by the Municipality of Istanbul City with the slogan »Give your Paper Wastes and Take a Tree« to ensure weighing and collection of paper bulks at weekly intervals. Also, the Municipality provided us paper recycle bins and some educational materials such as brochures, posters, and etc.

A short questionnaire was carried out to find out the approximate socio-economic levels of the families of children. The questions pertained to the educational

level of parents, whether the house they were living in belonged to them or was rented, and the family's total monthly income. From the three schools involved, by way of random example method, 432 students (FI = 162, SI = 119, C = 151) were chosen from student lists of grades 4, 5, 6, 7 and 8. Despite the original plan that 150 students were to be chosen from each school, in the SI school due to the fact that a part of those chosen for questionnaires had to attend their classes and could not participate, less students were reached as a result. On the contrary, in the FI school, due to the teachers' interest and support, more numbers of students than planned were able to take part. As a result, out of 4779 students, 432 (9%) were chosen from grades 4–8 as an example group to be involved in the implementation of the questionnaire. The reason behind choosing students from higher grades was to be able to receive more reliable answers to questions. Likewise, in order to prevent unreliability in terms of any misunderstanding, the questionnaires were filled out with the aid of researchers. The age range of students was from 9 to 14 years.

The example group was only created for the implementation of the questionnaire. All the other activities involved all grades (from 1st to 8th) and all students from the three schools. The aim of the activities was to educate students in terms of recycling paper-waste, and to acquiring a positive attitude and al change. The activities carried out beside the questionnaire are described below:

At the FI school;

1. Paper recycle bins were located at suitable locations within the school.
2. Various posters supplied from the archives of the Municipality of Istanbul City that describes the contributions of recycled paper to the environment and national economy were installed at main entrance gates, corridors and inside classes within the school building.
3. Brochures were also handed out among student incorporating similar information.
4. Each and every classroom located inside the school building was personally attended by the researchers to hold group discussions addressing to the importance of recycling of paper for approximately 20 minutes under guidance of a standardized text.
5. Cooperation was established with the school administration and the teaching staff to set up and organize the competitions of poetry, literal composition and the art of drawing, whereupon the winners were awarded with symbolic prizes.

At the SI school activities specified under paragraph 1 and 2 above were accomplished.

Only the activities described under paragraph 1 were realized in the C school.

The wasted paper recycle bins were placed inside the school buildings on April 24th 2001. The first measurement was taken one week later, which was followed by weighing of wasted paper bulks seven times at weekly intervals within the time extending thereon, and records of weighing were taken as separate for each school facility, whereby officials of the Municipality of Istanbul City arrived on call to take the same for recycling purposes. With a delay of 2.5 months due to summer vacancy the schools were monitored again. However, in this second phase of the study, quantities of wasted papers *accumulated* in recycle bins without any additional interventions were weighed and the results were recorded accordingly eight times at weekly intervals. To summarize, wasted papers that were collected were weighed for seven weeks before and for eight weeks following the summer holiday.

Measurements taken have been assessed according to the topics defined below:

Total number of individuals at the school: The total number of students, teaching and other operational staff in the schools.

Per capita quantities of wasted paper: the ratio of paper collected in any given week in kg of weight to the entire population of a given school. (Even though the educational activities were originally directed towards students, due to the additional participation of teachers and other staff, the amount of paper per participant was calculated as to take the whole school population into account.)

First phase of the study: The period of time during which interventions made until the summer vacation, including the seven rounds of measurement.

Second phase of the study: The period of time extending after summer vacation during which no interventions made but the eight measurements.

Data were assessed by the software of SPSS 7.0 utilizing the ratio in percentage, the χ^2-test for categorical variables such as educational level of parents and the status of house belonging and one-way ANOVA and Kruskal-Wallis non-parametric ANOVA for continuous variables such as the amount of wasted paper collected in the schools.

Results

The total paper quantities collected at weekly intervals at schools are given in Table 1. The per capita quantities of paper waste collected weekly were found to be 0.322 ± 0.084 kg for the FI school, 0.122 ± 0.035 kg for the SI school and

TABLE 1
AMOUNT OF WASTED PAPER COLLECTED WEEKLY IN SCHOOLS PER CAPITA (IN KG)

Measurements	FI	SI	C
First phase (Before summer vacation) Average ± SS	0.119	0.122	0.083
	0.169	0.111	0.082
	0.264	0.112	0.084
	0.353	0.195	0.116
	0.363	0.164	0.076
	0.385	0.170	0.083
	0.395	0.162	0.089
	0.293±0.110	0.148±0.032	0.088±0.013
Second phase (After summer vacation) Average ± SS	0.421	0.115	0.074
	0.333	0.060	0.079
	0.350	0.085	0.066
	0.331	0.093	0.075
	0.313	0.101	0.045
	0.279	0.108	0.049
	0.372	0.114	0.064
	0.386	0.119	0.060
	0.348±0.044	0.099±0.019	0.064±0.012
General average	0.322±0.084	0.122±0.035	0.075±0.017

0.075 ± 0.017 kg for the C school. The difference between these averaged values was found to be highly significant in Kruskall-Wallis analysis of variance (χ^2 = 34.37, df = 2, p = 0.0001). Given this significant difference observed between the schools, when evaluations were held separately for measurements before and after summer vacation, both the seven measurements held before summer vacation (χ^2 = 14.84, df = 2, p = 0.001) and the eight measurements held following a vacation of 2.5 months (χ^2 = 18.08, df = 2, p = 0.000) were found significantly different.

Table 2 shows the distribution of the total number of the individuals to the schools. Interviews were held with totally 432 students selected among 4th, 5th, 6th, 7th and 8th classes of these three schools. As seen, the highest number of individuals belongs to school C (N = 2382) and the lowest number belongs to school FI (N = 809).

The results of the questionnaire applied to a sample group of 432 individuals are presented in Table 3. The highest levels with respect to an educational history of less than five years in parents of students were revealed to be attained at the

TABLE 2
THE NUMBER OF INDIVIDUALS PRESENT IN THE SCHOOLS

Schools	Personnel* N	%**	Student N	%**	Total N	%**
Full intervention (FI)	30	14.9	779	16.3	809	16.3
Semi intervention (SI)	89	44.3	1700	35.6	1789	35.9
Control (C)	82	40.8	2300	48.1	2382	47.8
Total	201	100.0	4779	100.0	4980	100.0

* Executives, teaching staff and servants
** Percentage of column

TABLE 3
THE DISTRIBUTION OF STUDENTS' FAMILIES BY SOCIO-ECONOMIC STATUS

	FI (N=162)		SI (N=119)		C (N=151)		p-value	Total (N=432)	
	N	%	N	%	N	%	two-way	N	%
Educational level of mother									
≤ 5 year	142	87.6	60	50.4	58	38.4	$<10^{(-6)}$	260	60.2
≥ 5 year	20	12.4	59	49.6	93	61.6		172	39.8
Educational level of father									
≤ 5 year	129	79.6	46	38.6	46	30.5	$<10^{(-6)}$	221	51.2
≥ 5 year	33	20.4	73	61.4	105	69.5		211	48.8
House									
Self belonging	106	65.4	81	68.1	114	75.5	0.138	301	69.7
Leased property	56	34.6	38	31.9	37	24.5		131	30.3
Monthly average income (TL)*	290,000.000		439,000.000		582,000.000		$<10^{(-3)}$	407,000.000	

* In April 2001, 1 USD = 1.232.000 Turkish Liras (TL)

FI school. The monthly average income expressed by the students on the other hand was revealed to be at the lowest level in this school. The C school gave the ratio of highest levels with respect to the educational history of more than five years in parents of students to the monthly average income earned by the family households. While for the SI schools the indicators of education and income maintained to fall within the range between those attained at C and FI schools.

Discussion

Environmental sensitiveness is commonly adopted as one of the most major factors that back a responsible environmental behavior. It is defined as ability vital for adopting the feelings and stimulants of environment. This factor incorporates different characteristics outsourced from knowledge, skill and values. It is commonly indicated that there is a requirement for a special strategy that would develop environmental sensitiveness to form up a responsible environmental[13].

Apart from these, it is reported that the learning skills are higher in the first 20 years of life, especially during the childhood and adolescence[14]. There is a consensus in theory in relevant circles that environmental education for children should therefore be initialized at earlier ages. However, hot discussions still continue on whether this education should be given in a stand-alone separate class program or be distributed among the lectures formally recognized in the current curricula[15]. Scientists point out that an educational scheme with full coverage of daily needs and problems personally encountered by the child that it targets would best suit the goal of attaining the targets sought with the education, rather than implementing a formal, conceptual education, based on the experiences so far gained with the »environmental education« implemented in Germany. Moreover, emphasis is brought on the requirement for transformation of both the school facility and it's surrounding into an ecological area for environmental education[16].

In fact, Pooley and O'Conner[17] have compared the data of the standard curriculum in regards the 92 people they had chosen, from a group of people whose ages ranged from 18–55, who were delivered trainings on the environment and were applied the environmental attitude measurement test. The results were that, primarily, theoretical knowledge was underlined when it came to curriculum programs as compared to an emphasis on attitude. In consequence, they outlined that the emphasis of educational programs should be placed on the al aspect rather than on a theoretical one.

The results of our study initiated in the form of a campaign introduced with the slogan »Give your Paper Wastes and Take a Tree« by the Municipality of Istanbul City clearly show that an education implemented using well selected techniques affects positively the behaviors in elementary school children in collection paper wastes. Despite the fact that the levels of education and income attained by parents of students attending the elementary school facility chosen for the purposes of this study as the FI school were lower considered to those of the remaining two, the students of this school have collected significantly more paper wastes considered to those of the other schools. A pleasing point is that the students tended to maintain their positive behaviors with regard to collection of paper wastes as instructed although a summer holiday lapsed over the time during which they were educated. Results all show that these children have, on learning that paper wastes ought to be disposed off into recycle bins provided ad hoc

for the purpose, gained a skill toward environmental protection, which is eminent and permanent.

It is doubtless that the methods of choice have a major role on successful accomplishment of the intervention being made. We, as the researchers, firstly persuaded the school management and teaching staff on the study objectives. Then, we established close cooperation and communication with them, thereby gaining full support of those people throughout the entire course of the study. Additionally, the researchers have defined the basic messages to be given and methods of educations to be implemented at FI school. Followed is a set of personal visits to and attendance in class by the researchers in order to emphasize systemically the importance of collecting paper wastes from our close surroundings giving information at a simplified level designed to ensure understanding of the concept by elementary school students, whereupon, the researchers personally allocated a time for explaining what would the gains of humanity should they act just in the instructed manner. Spaces were also left during the course of these educational efforts for children to ask and freely state their own opinions. Also the students were consulted through one to one contacts on their possible suggestions in the meantime when the paper recycle bins are being placed in corridors, whereby their active involvement and participation in the study was ensured, leading to self-possession of causes and objectives of the study. Furthermore a series of competitions on poetry, article writing and picture drawing and the prizes awarded to winners in the end in particular though symbolic, helped motivation of students.

According to Schall[18] knowing the facts and concepts about the environment helps a child to acquire understanding and to develop social awareness (positive attitudes) which will affect behavior (necessary actions) toward the environment as whole. Schall also emphasizes the importance of transdisciplinarity and the enhancement of participatory education in terms of environmental education. We believe that the successful result achieved from our study was due to the fact that it was dependent on an intersectoral collaboration and, as well as activating the participation of students, the school administration and the teachers were also actively involved, bringing forth the fact that the technique carried out was very successful to begin with.

In the way to forming an environmental attitude and the individual's social identity and values were studied and, social acceptance and the interest given to group norms were found to affect an individual's perception of environmental problems [19] Additionally, another study Sama[20] shows that a family's educational and economic level considerably affects the development of a positive environmental attitude. In contrast, even though our research results did not particularly aim to study an attitude concept, in the case where the proper techniques are used, a family's educational and economic level did not seem to create a disadvantage in terms of environmental education.

It was not among our preemptive goals to measure the effects of education given to children through instructions and other means on their parents. However, it is not hard to predict that the instructions given to the students would be reflected also to their family households thus an education given in the style as we practically performed in this study would have a multiplying effect. This approach is not limited to collection of paper wastes of course; it appears to be adapted and implemented in different areas of environmental education, as effectively as in our case. The education we put into practice may further be enhanced with inclusion of different methods in the future.

For instance, that how many trees may be survived with how much paper that may be made available through the daily collection efforts may materially and efficiently be demonstrated to the children through planned visits to nature, whereby students are given the opportunity to personally testify the cause-action interrelation. They may be taken to a factory to personally attend the recycling process of the paper. Essentially, any study concentrated on the same cause with the current one have been shown to be a practice that leverage up the efficiency of education when combined with monitoring water quality and measuring air pollution together with children[21].

Conclusion

According to the research undertaken in the FI school, the results can be shown step by step as follows:

Informative knowledge: Given the fact that though for a short span of time, class visits and the use of participatory techniques carried out face to face with students, resulted in the emphasis placed on the recycling of paper-waste and the protection of the environment and its importance in the economy of the nation. Posters and brochures further enhanced this training. It can clearly be stated that as a result of the trainings, awareness developed in students in terms of the recycling of paper.

Skill development: The placement of paper waste bins in schools and instructing the students on how to use them helped to develop skills in the collection of paper-wastes.

Positive attitude and development: The organization of competition in poetry, composition and art among the students with the inclusion of a reward system motivated students in the direction of paper-waste collection, helped to create a positive development of attitude. Furthermore, in return to the paper-waste collected in the school, the municipality's exchange for plants created a positive behavioral change, which resulted in positive feedback, thus ensuring a continuation of positive.

This procedure had been completed in FI school. However, no class education efforts were rendered at SI school, where short information has been given to students collectively on the matter, which was followed by placement of paper recycle bins and informatory posters at suitable sites within the school building. Even after this »semi intervention« performed utilizing limited efforts and time, the per capita paper waste quantities were found highly significant when compared to that attained in the control school. These methods may be useful especially when activities covered by the scope of what we call full intervention are hard to accomplish and especially the extra load exerted by the educational efforts associated therewith are hard to attain. The point which needs particular emphasis here is that it is an essential requirement that the students themselves should get involved in related attempts and take roles assuming responsibilities, in any similar activities to be performed at schools in general. It is also possible for one to argue that the practice put forth by the Municipality of Istanbul City in its recent campaign, namely exchanging of paper wastes collected by the children with trees or plants would have stimulated positive behaviors.

In the future, in order for the training model used in this study to be developed and continued, the issue must be taken up by the Ministers for Environment and Education, whereby an action plan must be established in which, firstly, elementary school teachers can be trained accordingly. The researchers are in contact with the relevant parties to make sure the program gains speed.

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S. Karabey

İ.Ü. İstanbul Tip Fakültesi, Halk Sağlığı Anabilim Dalı, Temel Bilimler Binası Kat 3, 34093 Çapa, İstanbul, Turkey
e-mail: skarabey@istanbul.edu.tr

MODEL IZOBRAZBE IZ PODRUČJA EKOLOGIJE – SURADNJA SVEUČILIŠTA, OSNOVNOG ŠKOLSTVA I LOKALNE ZAJEDNICE

SAŽETAK

Cilj je ove studije razvoj modela učinkovitog programa izobrazbe koji se može primijeniti na razini osnovnog obrazovanja a koji bi se bavio izobrazbom djece o obnovi i recikliranju starog papira. U ovu svrhu izabrane su tri škole iz jedne četvrti Istanbula. U prvoj je školi primijenjena puna intervencija, u drugoj je provedena djelomična intervencija dok se u trećoj školi nije provodio program te su njeni učenici sačinjavali kontrolnu skupinu. Različite aktivnosti koje su se primjenjivale naročito u školi pune intervencije, bile su usmjerene prema informiranosti u odnosu na reciklažu te prema razvoju pozitivnog stava. Kako bi se evaluirao učinak treninga, posude za prikupljanje starog papira smještene su na odgovarajuća mjesta u školi te je težina njihovog sadržaja mjerena svakog tjedna. Testirano Kruskal-Wallisovom metodom analize varijance, tri škole su se značajno razlikovale ($p = 0.0001$) u prosječnoj tjednoj količini prikupljenog papira u odnosu na broj učenika svake škole. Štoviše, tri škole su se značajno razlikovale i u prosječnoj vrijednosti 7 uzastopnih mjerenjima koja su napravljena prije

ljetnih praznika ($p = 0.001$) te nakon 2,5 mjeseca u skupini od 8 mjerenja koja su napravljena nakon praznika ($p = 0.0001$), što smatramo značajnim rezultatom kao i onaj kada su se uspoređivale samo škole. Smatramo da je prikazani edukativni pristup učinkovita metoda koja se može primijeniti i u drugim sferama zdravstvene izobrazbe.