The role of sustainability in environmental education

PhD Theses

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Contents

Motto: 'Our future will be like today's school'
Albert Szent Györgyi

1. Introduction, topicality of this theme

These days the relapsing environmental problems, which cause health problems as well, urge teaching-educating work to take part in forming health-conscious behaviour. It is indicated by the fact that UNESCO declared the period between 2005 and 2014 to be the decade of education on sustainability at its conference in Johannesburg thanks to Japanese proposal.

In education, thus, it is an urging task to generalize the practice of education on sustainability on all levels of education involving institutional and out-of-school education (Béres et al., 2001). To achieve this, our education considered to be information-centered internationally must be replaced by practice-oriented education (Kelley L.-né et al., 1998).

In Hungary, similarly to many countries, environmental education can be considered to be the antecedent of education on sustainability, the implementation and development of which shows great diversity even in the European countries (Filho et al., 1995; Könczey, 2006).

Elements of environmental education in our country can be found in education since the age of enlightenment, however we can speak about professionally founded environmental education only from the second half of the 20th century (Havas, 1996). In order to make the implementation of pedagogical practice of sustainability

rewarding, we must not ignore the role of teaching-educating work in forming the right health-conscious behaviour. This fact and need is also justified by the indeces of health and diseases in our country (KSH, 2007).

Healthy nutrition forms an essential pillar to achieve the aim of „able body and mind". It has been proved that our eating habits are risk factors of the evolvement of several diseases (Heller et al., 1987; Kékes, 2000; Gidai, 2007). Among others, heart and vascular diseases, - hypertonia, heart attack -, diabetes and several malignant diseases can be in connection with improper eating habits (Smith, 1987; Steinmetz and Potter, 1991; Szamosi, 1993; Zajkás, 1998).

Among the dietetic diseases, obesity affects not only the developed countries, but it is present in almost 80% of the developing countries in the world (Szűcs, 2003; Schmidt és Fehér, 2007). In Hungary too, we face a serious problem - 50 % of the population, and 10% of the adolescents are obese (Mészáros et al., 2001; Alpert and Powers, 2005). The World Health Organization pronounced obesity, or obesitas, to be a chronic dietetic disease which among others proves the fact that we face a really serious problem (WHO, 1996).

Talking about diseases in connection with nutrition, we must understand that their coming into existence is the result of a process. Their evolvement can be prevented or the chance to have them can be reduced in a great extent by improving our health and forming health-conscious behaviour. We must not forget that habits

affecting health in adulthood significantly evolve already in childhood, therefore health education must be considered to be a highlighted field (Currie et al., 2000; Simon, 2006). In other words, effects of adolescent risky behaviour appear in indices of morbidity and mortality in adulthood (Sells and Blum, 1996). For instance, it has been proved that adolescent obesity affect morbidity and mortality in adulthood irrespective of the latter body weight (Miles and Eid, 1997). Another proved fact is that 40 to 60 % of those getting obese in childhood or adolescence remain fat in adulthood (Blatniczky, 2000).

The painful results of international surveys conducted with students also in Hungary urge the development of health education (Aszmann el al., 1999). On this ground there is no doubt that the implementation of efficient health education and health improvement has a reason for existence in all types of educational institutions.

2. Objectives and hypotheses

2. 1. Objectives

Education and all forms of learning have a key role in the effort to sustainability whose essential part must be the right health-conscious behaviour formation. Having these in mind, we set the following objectives in our thesis:

- Comparing the environment-conscious behaviour at families of grammar school and secondary technical school students;
- Comparing health-conscious behaviour of grammar school and secondary technical school students with intensive environmental education and without it, considering eating habits especially;
- Presenting a program for pedagogy of sustainability applicable during formal education, analysing its efficiency with the help of indicator questions and statistical analysis;
- Examining the tools of informal learning in connection with information about nutrition at secondary school age group.

2. 2. Hypotheses

1. Intensive environmental education and supportive school environment, or the lack of these affect the environment-conscious behaviour of students' families.
2. Based on the need that health education must form an essetial part of environmental education, we presume that higher rate of grammar school students know how to form right eating habits, which knowledge they apply in their every day life more successfully than secondary technical school students.
3. We suppose, the program for education on sustainability implemented in the secondary technical school yield a posistive

change in students' health-conscious behaviour and eating habits. At the same time, we expect that in this respect grammar school students will invariably achieve better results in a smaller extent though.

4. Taking into consideration the characteristics of age, we presume that secondary school students try to find answers to their question in connection with healthy nutrition mostly out of family and out of school as they get older.

3. Material and methods

3. 1. Sampling and measuring tool

I conducted the survey in secondary schools involving Vetési Albert Grammar School in Veszprém and Vásárhelyi Pál Secondary Technical School in Békéscsaba. In the grammar school apart from the foreign language specialization, ecology and biology are taught on advanced level. Teachers of the grammar school have been dedicated to environmental education for years which they implement both in class and after-school classes. Considering the type of the secondary technical school, it is an engineering school where geology and environmental professional groups work. In spite of this, the practice of education on sustainability is not worked out. Environmental education after school materializes mostly in the case of the two professional groups mentioned above. Of course, the

program for health and environmental education has been compiled here as well, but the elements of it do not materialize in every day's practice.

In the survey 20 students from each class took part, 630 students in all. The students involved in the survey were selected by systematic sampling method. On the base of the class lists, we took the first twenty students from each class. Instead of those missing, we did not involve other students. We collected information by the help of a questionnaire which the students filled in at the beginning and end of the term 2006/2007 anonymously. I tried to select a sample large enough to find its level of reliability 95 % which is also accepted in social science (Horváth, 2004). In this case the limit of tolerance is ± 4%.

We checked the reliability of the size of sample by the help of the next formula:

$$\mathbf{n = z_w^2 * 0.25 / B^2}$$

Explanation of notations:

n = size of sample

z_w = multiplicating factor belonging to w reliability level (from normal distribution table)

w = reliability level

$$n = (1.96)^2 * 0.25 / (0.04)^2$$

$$\mathbf{n = \underline{600.25}}$$

The result of calculation justifies that the reliability level of the size of sample examined by us is suitbale.

We have also examined the questionnaire as a measuring tool in advance during the term of 2005/2006 according to which the reliability factor Chronbach alfa (α) is 0.71. It means that the questionnaire can be applied safely to the planned survey (Horváth, 2004).

Considering the types of questions, the questionnaire contains both closed and multiple choice questions. Even though closed questions are more fixed, they make data processing easier and more comparable due to which we can evaluate the great number of data more easily. At the multiple choice questions in connection with quantity the answers were given in a logical order taking into consideration specialist literature.

3. 2. Process of data collection

On both scenes examined, the first data collection was carried out at the beginning of term. The questions of the applied measuring tool after the introductory question can be grouped into three bigger themes.

The first group of questions includes those linked with environmental education taking place at schools, the second refers to the environment-conscious behaviour of families and the third part asks about the health-conscious behaviour and eating habits within that. After the questionnaires were filled in at both schools except for four technical school classes, teaching was carried on according to

the normal method. The students of four technical school classes took part in a program for pedagogy of sustainability which was worked out in advance and was implemented in class. At compiling the program, we took into consideration the experience we had previously gained in the institution in connection with the application of cooperative teaching methods (Kosáros et al., 2005b). After organizing the contents of the program, we checked the applicability and efficiency of each elements by an advance examination (Kosáros et al., 2007). The length of project covered ten lessons which dealt with the problems of sustainable cities, shopping habits, alcohol drinking, smoking and eating habits. In three classes 2 the program was implemented in chemistry and biology lessons, in class 4 it was dealt with in the form teacher's lessons.

In both institutions, the second data collection was completed at the end of school year by a shortened form of the original measuring tool. The different points of questionnaire focused mostly on eating habits in accordance with the objectives.

The processing of survey results was executed with statistical probes by the help of Excel Program. We made the statistically determinable data correspond with numbers (nominal table) in accordance with the specialist literature, which made data processing considerably easier (Falus és Ollé, 2000). In accordance with what is general and accepted, we considered demonstrable deviations significant in case of $p<0.05$.

4. New scientific results

Our first hypothesis, according to which students who study in the institution dedicated to environmental education and their families lead a more health-conscious life than families of students in whose school this field is pushed into background, has proved true partly.

A higher rate of grammar school students (70.56%) compared to the secondary technical school students (63.47 %) answered that at home they use energy-saving bulbs, however this difference is not significant. Taking a closer look at this question with having regard to the students' interests along with their places of living, we found remarkable differences. It is demonstrable that the use of energy-saving bulbs is more widespread at the families of students living in the country, which is based on the deliberate choice of local families of students specialized in ecology-biology. In case of secondary technical school students, those students living in town and specialized in environmental protection and their families use this type of bulb in a significantly higher rate compared to families of students who do not have this specialization ($p<0.001$). When examining places of living separately, we did not find any remarkable difference in case of either institutions, therefore in this respect the place of living is not primarily determinant.

Regarding the habits related to the use of car, though we received unexpected results. Nearly half of the local secondary technical school students (46.94 %) answered that they are happy

about not using the car, contrary to the local grammar school students' 22.28 %. This deviation shows strong significance (p=0.0002).

Analysing the shopping habits of families, we did not find significant difference in case of either institutions. Similarly to the use of energy-saving bulbs, we can say also about the families' shopping habits that families of students specialized in ecology-biology or environmental protection shop in a more environment-conscious way than families of students specialized in other fields, irrespective of their places of living. At both institutions, more than 70 % of students would have the broken CD player reapired.

Summarizing the answers given to these four questions, families of grammar school students burden their environment in a smaller degree. Namely, 5.28 % of families of grammar school students use energy- saving bulbs at home, spare their cars with pleasure, organise their shoppings and have the broken appliances repaired. We did not find any families like this at secondary technical school students. However, we must add that the better result at the grammar school means also that only every twentieth families met the requirements, consequently the teaching-educating work has a great deal to do still.

Our second hypothesis, according to which a higher rate of grammar school students have knowledge about how to form right eating habits, and they apply this in every day life more successfully than secondary technical school students, has proven true. In respect of breakfast eating habits, in both institutions a bigger percentage of

boys leave for school without breakfast. Irrespective of their gender, comparing the two institutions secondary technical school students fall behind in this question. When looking at the use of school buffet, at the grammar school healthy and nutritious foods are required mostly, contrary to this, secondary technical school students buy everything without thinking. In respect of the students' use of buffet at both institutions, we received significantly worse results at the secondary technical school ($p<0.001$).

Summarizing all this, we can point out that in the secondary technical school the rate of students who eat in a healthy and conscious way is much lower than in the grammar school. The deviation between the two schools turned out to be significant in this respect ($p=0.0094$).

Our third hypothesis, according to which the project implemented in the secondary school in frame of lessons yield a positive and measurable change in students' health-conscious behaviour and eating habits during one school year, has proven true. By the end of school year, in the group of students taking part in the project a positive change has occured from many aspects. In respect of breakfast eating habits, during one year the percentage of those who leave for school without breakfast has been halved ($p<0.01$). Apart from this, the rate of those who intend to take care of eating in a healthy way has tripled. This result shows a significant improvement ($p<0.001$) compared to any of the examined groups. These students are already aware of what healthy nutrition means.

At transplanting their knowledge into pratice we can still find some gaps, but compared to the results from the beginning of school year survey, they have improved in this field as well. Comparing this group to the grammar school students, the rate of those who consider taking care of their eating habits to be important is significantly higher ($p<0.001$). The students of this group produced a slightly better result at the question of transplanting the gained knowledge into practice than grammar school students, the difference is not significant though.

Our fourth hypothesis, according to which secondary school students try to find answers to their question in connection with healthy nutrition mostly out of family and out of school as they get older, has proved true only partly.

Schools' role of information conveying reduces in some extent during the secondary school years, however it is determinant till the end. Family as the place of information conveying has been marked in a much lower percent, but it is present until the end of secondary school years, and its role reduces only in a small extent similarly to school. In our survey, students gather information from media and friends apart from their school and family.

The influence of media gradually increases during the secondary school years, and it is remarkable that in senior classes it plays a more important role than the family. The results of the survey also draw attention to the fact that school as an absolute source of information is present in a high percentage only at class 1. From this fact we can conclude that primary schools have a great role in

forming eating habits. This role of schools reduces dramatically during years, while the absolute role of media increases.

As it is indicated by the results, using the freedom offered by the National Curriculum by the help of a suitably compiled program, it is possible to develop the students' health-conscious behaviour efficiently and successfully even in the frame of lessons. It definitely contributes to the efficiency of education, if we previously get a picture of the knowledge our students own, the gaps in it, of their habits and values. It is expedient to conclude from these after analysing answers given to numerous questions jointly. It can be followed by the compilation of program and the selection of the method we wish to apply. It might be the most difficult task, as in pedagogy there are not any right methods. Selecting the method itself can be right or wrong. As the freedom of selecting the method is given to all teachers, it is a serious responsibility as well.

5. Recommendation for further research and environmental education

Forming environment- and health-conscious behaviour can not be implemented without the supportive school environment and well-prepared teachers (Kosáros et al., 2005a). It is not suffiecient to convey information, we must form attitudes which can only be materialized with the help of teachers who develop the whole personality beside sharing information (Soósné, 1995; Havas, 1997).

Teachers must be prepared to the importance of differentiated method selection which is based on the knowledge about students' personalities, skills and grounding in each group. In teacher training, acquiring and applying Lewin's model of action research and method adaptation among others give an opportunity to this (Elliot, 1991). The effectiveness of the application of action research is proved by indications of the national OECD-ENSI Teacher Training – Action Research Program (Csobod, 2002). In case of students at faculty of natural sciences, we consider it especially important to acquire the methods applicable out of school for instance field works, project works, green schools, all based on first hand experience (Kárász, 2001; Lakatos, 2003).

During the training of students at faculties of social sciences, an emphasis must be put on the education of sustainability (Csobod et al., 2001). Since we can achieve only in this way that all the teachers find the connection between the subject taught by them and education on sustainability. Thus, educating sustainability must be present at all fields of teacher training irrespectively of the type of chosen subject (Lakatos, 2005).

Extending the knowledge of graduate teachers is at least of the same importance. It can materialize in many ways, their effectiveness will be considerably determined by what extent they are able to motivate the participants. Here practice-oriented postgraduate teacher trainings or spreading distance learning courses on this field may be successful (Lakatos et al., 2003). It would also mean a further step ahead, if well applicable teaching aids were

distributed in a more effective way and if the use of them was displayed.

Since the education on sustainability must be a life-long process, it would be a great achievement to work out and recognize how to measure knowledge gained during informal and formal learning. The evidence of this is the fulfilment of Science Across Europe Program among others (Cutler, 1999). The program enables students to extend their knowledge by the help of the Internet and thematic leaflets, furthermore they can change their point of view with students in other countries. The success and positive effects of the program are indicated by the positive change in environmental attitudes, which could be detected already in the early phase of joining (Varga, 1999). This is the obvious evidence of the fact that education on sustainability is not the task of one subject and teacher, besides its success is to be found in international cooperation.

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7. List of scientific studies

7. 1. List of referred publications written on the subject of this thesis or accepted to be published

1. **Kosáros, A**. and Lakatos, Gy. (2005): The role of methodology applied in environmental education. Journal of Teacher Education and Training Conference, Proceedings-CD-ROM, p.: 456-469.

2. **Kosáros A.,** Katona I. és Lakatos Gy. (2005): The role of higher education in the success of environmental education in secondary schools (A felsőoktatás szerepe a középiskolai környezeti nevelés eredményességében). *Erdei Ferenc III. Tudományos Konferencia Kiadvány*, Kecskemét, p.: 951-954.

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7. **Kosáros, A**., Gaál, E. and Lakatos, Gy. (2006): The role of educational institutions in forming healthy nutrition. *Journal of Teacher Education and Training,* (submitted).

7. 2. List of presentations on the subject of this thesis

1. **Kosáros, A**., Gaál, E. and Lakatos, Gy. (2006): The role of educational institutions in forming healthy nutrition. *The Fourth International Journal of Teacher Education and Training Conference,* Helsinki, Abstract, p.: 15-16.

2. **Kosáros, A**., Lakatos, Gy. and Katona, I. (2007): Health education in secondary schools. *5th International Journal of Teacher Education and Training Conference,* Debrecen, Abstract, p. 17.

7. 3. List of further presentations

1. Lakatos, Gy. and **Kosáros, A**. (2005): The history of nature conservation and education of sustainable development. *The 3rd International Journal of Teacher Education and Training Conference*, Vechta, Abstract, p. 20.

2. Lakatos, Gy., Baracsy, Zs.-né., **Kosáros, A**. and Mészáros, I. (2006): Circumstances of environmental teaching in Hungarian public education.
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7. 4. Posters displayed

1**. Kosáros, A**. and Lakatos, Gy. (2005): The role of methodology applied in environmental education. *The 3rd International Journal of Teacher Education and Training Conference*, Vechta, Abstract, p. 33.

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