http://jates.org

Journal of Applied Technical and Educational Sciences jATES

ISSN 2560-5429

Investigation of the effect of an environmental education package at school age

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Abstract

The article is focusing on how the application of an environmental educational package affected 3rd and 5th-grade students' relation to environment, nature and well-being. The possibilities of developing environmental awareness using an environmental education package based on experience- centred learning techniques is being demonstrated by the results of annual assessments. The effectiveness of the environmental educational package was investigated by a longitudinal study what compared the result of a study group against a control group. The performance of 3rd-grade participants of 2016/17 were compared to their own results in 5th grade in 2018/19. The result demonstrates the effectiveness of experience-based, differentiated environmental-awareness education within the scope of everyday learning. That there are significant differences in specific areas of knowledge between the study group and the control group. Among the examined topics the group utilizing the education package outperformed the control groups over a long timeframe. Experience-based methods are shown to be beneficial based on their utilization and tracking of the results.

Keywords: education; environmental awareness education package; experiential education

1. Introduction

In the following study I examine how environmental education can be implemented throughout the school year with the help of a complex environmental education package that provides students with knowledge and practical assignments related to environmental issues.

In 2007, Leskó, Katona, Kárász and Lakatos conducted a survey on environmental education teaching packages in Hungary. The survey intended to demonstrate how popular, well known and utilised these packages were from the perspective of the educators.

Their study revealed that 74% of the responding Hungarian educators regularly use or have previously used environmental education teaching packages.

The methodology used convenience sampling of educators willing to answer. Therefore, the answers might be biased towards those who use such education packages.

The evaluation also revealed that according to 80% of who had been surveyed their colleagues would not use a teaching package, despite the fact that the responding teachers would recommend the use of these packages to all teachers (Leskó et al., 2007).

In a series of surveys (Krakker 2016, 2017) since 2013 we were interested in the opinion and development of pupils. I examined whether a teaching package that can be used in everyday teaching could help to preserve a long-term environmentally conscious behaviour.

In the present study the aim is to compare students of the study group who were using an activity-based teaching package against students of the control group who were studying in the same ecoschool but didn't use any environmental education teaching packages. The goal is to see how the students' ecological and environmental knowledge and their everyday habits differ over a two-year long period. I tried to assess whether the number of environmentally conscious actions decrease with age or not. Is there a change in the environmental attitude of the third-grade students presented at the beginning of the study and the same students two years later in fifth grade? Moreover, I would like to see if they would be indifferent towards the environment or how their system of habits in the studied topics is different from the students that do not use the study package

2. Literature Review

2.1. The Concept of the Teaching Package

The concept of teaching packages has been present in the Hungarian educational research for decades. According to István Falus (1980), in order to be called a teaching package a pedagogical aid must contain not only audio-visual, learning and teaching material but printed materials too. Tompa and Falus independently declares that in the case of the teaching packages it is important to distinguish between those that were related to practical activities and those that provided a more general knowledge for students. They identified the time covered by the package and its relationship to the curriculum (extracurricular dealing with complex topics or intracurricular dealing with simple topics) as other key factors. (Tompa, 1982; Falus et al., 1977).

2.2. The concept of environmental education in the second half of the 20th Century

The outcome document of the conference held in Tbilisi in 1977 contains the following:

"Environmental education is a process in which a generation of the world grows up that knows and cares about its wider environment and its problems. This generation has the knowledge,

skills, attitudes, motivation and commitment to work individually and in a community to solve current problems and prevent new ones" (Czippán, Havas and Victor, 2010, p2.).

The notion of environmental education does not only carry the traditional meaning of the transfer of knowledge but also the development of personality, tutoring and upbringing of an individual (Koruoglu, Ugulu and Yorek, 2015).

Thus, it can be stated that environmental education includes the protection of the environment, the development of environmentally conscious behaviour, attitude, and conduct (Victor, 1998). Environmental education can also be defined as a process in which the growing generations can get to know their environment better and recognize the problems. They might gain skills and abilities as a result of environmental education that can help them solve environmental problems in communities or individually and to work on prevention (Czippán, Havas and Victor, 2010).

In addition, Czippán, Mathias and Victor (2004) believe that environmental education involves pedagogical work in which students are introduced to their environment and are taught to be able to act responsibly for the animate and inanimate nature around them. In addition to the transfer of knowledge the versatile development and motivation of children is also important as this can contribute to the development of a positive attitude towards their environment (Shepardson et al., 2003; Gévai, 2011).

In 1992 the World Conference on Environment and Development, organized by the United Nations, was held in Rio de Janeiro where Agenda 21 alias Tasks Regarding the 21st Century was of great importance. This document provides guidance for sustainable development not only at the economic level but also at the social level (Net1, Net2). The United Nations updated the objectives of a conference held in Rio de Janeiro in 2002 and in Johannesburg (UNESCO, 2002).

There are four main areas of environmental education. The first is to get to know the man-made environment, that is, the built environment. The second is getting to know the natural environment such as air, water, soil, animals, or plants. The third is to develop and influence proper lifestyle habits. The fourth is to establish internal needs for both environmental harmony and a sustainable lifestyle (Lehoczky, 1999; Orbán, 2006; Gévai, 2011).

In Hungary, the National Core Curriculum (NAT) defined environmental education in this period. It appeared in 1995 as a common requirement for areas of education (NAT 1995).

In 2003, environmental education appeared as an important task complemented by environmentally conscious behaviour and sustainable development as future goals (NAT 2003).

However, environmental education has really appeared just in a few institutions as it was not specified how it should be implemented (Krakker, 2017; Havas – Széplaki – Varga, 2009).

In 2012 integration into subjects was defined giving priority to both environmental awareness and sustainability (NAT 2012).

The updated NAT introduced in 2020 omits science education from first and second grade and this will definitely impact future studies of the subject. It'll be the responsibility of teachers whether they can integrate introduction to nature and the love of that into the scope of other courses (NAT 2020)

2.3. Types of environmental education at school

Environmental education organized by the school can manifest in traditional and non-traditional classroom activities. Traditional classroom activities include environmental education methods implemented during sessions. Non-traditional classroom activities can be divided into two groups. First, we can talk about extracurricular activities in the classroom, such as the project method, the topic day, or the topic week. The second is the group of extracurricular activities, which includes excursions, clubs, competitions, forest schools and visits to demonstration sites (zoos, educational trails, botanical gardens). If these programs were not organized by the school, non-governmental organizations usually ensured their implementation (Vásárhelyi 2010; Lehoczky, 1999; Orbán, 2006).

2.4. Ecological literacy

The term ecology was conceived by Ernst Haeckel from the Greek words oikos and logos (Haeckel 1866).

Defining the discipline of ecology is not an easy task even today. The term ecology is used in a much broader sense in English-speaking countries than in Hungary where the term is more closely related to natural-history (Juhász–Nagy Pál, 1984, 1986)

The modern science of ecology and the literacy of it is defined by its main goals by Benson:

1. understanding the working of nature
2. understanding how humankind affects nature

3. finding methods that helps us mitigating the effects of both natural and human activities (Benson 2000)

3. The Teaching Package for Environmental Education

The teaching package entitled "Environmental Education and Healthy Lifestyle Education" was created by my family in 2007. The goal of the program is to develop environmentally friendly lifestyle and habits in a playful way during everyday pedagogical activities. The teaching package consists of two parts: a weekly audio material and a related exercise book. In the audio material a fictional figure called Csutka Jutka, (Cob Jude) talks every week about memorable days, folk traditions, and content related to a healthy lifestyle. This module is recommended from third grade. Considering the age-specific features the broadcasts are 3-4 minutes long and cover almost 150 topics in a school year. Each month has a distinctive bird that children get to know more and more every week as their voices are constantly heard during the broadcasts throughout the month, thus helping to get to know the birdlife around us.

The exercise book can be used effectively from fifth grade. It contains many playful, thought-provoking and logic exercises that will complement the material heard in the broadcasts. The exercises help differentiated teaching since those students that have difficulties at school and those that are excellent can both find exercises that are informative and help their development. The teaching package develops skills and abilities such as creativity, problem-solving and observing skills. It helps to develop social relationships or a responsible attitude. As environmental education cannot be linked to just one subject, the material of the teaching package can be integrated into the topics of all subjects or it can be an additional unit of afternoon sessions. The first table shows the covered topics and the content of the teaching package.

Table 1. Abstract of the Education package (source: the author)

Name of the Education package	Recommended age	Type	Topic	Content
Teaching Package for Environmental Education and Healthy Lifestyle Education	8-12 years	complex	experiments, environmental awareness, memorable days, bird of the week, observations, folkways, interesting phenomena	answer book, Environmental awareness workbook, Environmental awareness audio content (audio files, reward stickers)

4. Methodology

The two-year long longitudinal study demonstrates how students' environmentally conscious behaviour can develop in addition to the development of age-specific characteristics. The study includes institutions that are all eco-schools. "B" and "C" institutions are control groups not using the aforementioned teaching package while institution "A" is using it.

We tested three hypotheses:

1. The ecological literacy of students educated with the help of an environmentally conscious educational package changes positively over the course of two school years.

2. The environmental attitude of the students who met the teaching package is more positive, they perform more environmentally conscious activities and the ecological literacy of the students is more prominent than that of their peers who did not meet the teaching package.

3. The previous form of environmentally indifferent behaviour is positively changed for the students that participate in the teaching package program during the two school years.

4.1. Sample

In the 2016/17 and 2018/19 surveys three schools participated in the study with their third and fifth grade students, summing a total of 179 participants. Two schools in Budapest ("A", "B") and one in the countryside ("C") were included in the survey; all three of them are eco-schools. The teaching package was used in school "A", while it was not yet introduced in the other two

institutions during the survey. The second table shows that 75 boys and 104 girls participated in the study, a total of 87 third graders and 92 fifth graders.

During the sampling we tried to select students from grades that study from the same textbook family. We also tried to include classes in the survey that have about the same knowledge. Each class had highly talented students, students with special educational needs, pupils of average abilities, and slow-working students.

Table 2. Number of participants of the questionnaire (source: the author)

Grade of students	School utilizing the teaching package	Schools not utilizing the teaching package		Total
	„A" school	„B" school	„C" school	
3rd	28	29	30	87
5th	30	31	31	92
Total	58	60	61	179

4.2. Research Tools

I used my own survey in all four studies. The questions in the survey are mainly close ended, supplemented by some open-ended questions. In the first half of the questionnaire general demographic data were surveyed, while in the second half I focused on students' environmentally conscious habits, ecological literacy, and lifestyle habits. The survey examined seven topics:

- Transportation
- Nutrition
- Leisure and lifestyle habits
- Environmentally conscious household (waste management, energy sources)
- Water protection and water consumption
- Environmentally conscious shopping
- Emergency

In the study the results of the survey of the topics concerning environmentally conscious shopping habits and emergency are to be presented.

During the processing of the findings, as a result of the Two-Sample T-test of the 23rd edition SPSS statistical software I obtained p-value results less than 0.05 for each hypothesis during

the significance test. In other words, it can be stated that the probability that the differences observed during the survey were created only because of random standard variation of the data is less than 5%.

4.3. Procedure

All sampling was done in regular class in the presence of a teacher, so students could ask any questions they might had. The questionnaire was conducted online at two institutions ("A" and "B") and on paper at "C" school. SPSS and Excel software were used for the mathematical statistical analysis. Primary measurements were always taken at the beginning of the school year and secondary measurements at the end of the school year. The data presented in the study was based on the results of the output measurements of the 2016/17 school year and the output measurements of the 2018/19 school year.

5. Results

The data and analysis presented both show the results of the measurements at the end of the school year. At the end of the third grade, the students of school "A" had been listening to the attitude-forming audio material of the teaching package for a whole school year. At the end of the fifth grade they have been participating in the program for three years. During the last year of those three years, the environmental education program, which can be used in any lesson was supplemented with a workbook complementing the audio material. Schools "B" and "C" did not use any environmental education teaching package but as an eco-school they had an environmental education program.

The first figure shows that as soon as the second half of 2016/17 students in the research group (school "A") performed significantly better than the control groups. The result of the measurement two years later showed that they did not become environmentally indifferent. Moreover, more than 80% of the students chose the environmentally conscious solution instead of plastic disposable bags during their purchases. The feedback from their parents also underlines the outcome of the study. Many reported that they had to return home at the kids request when they forgot the basket before shopping.

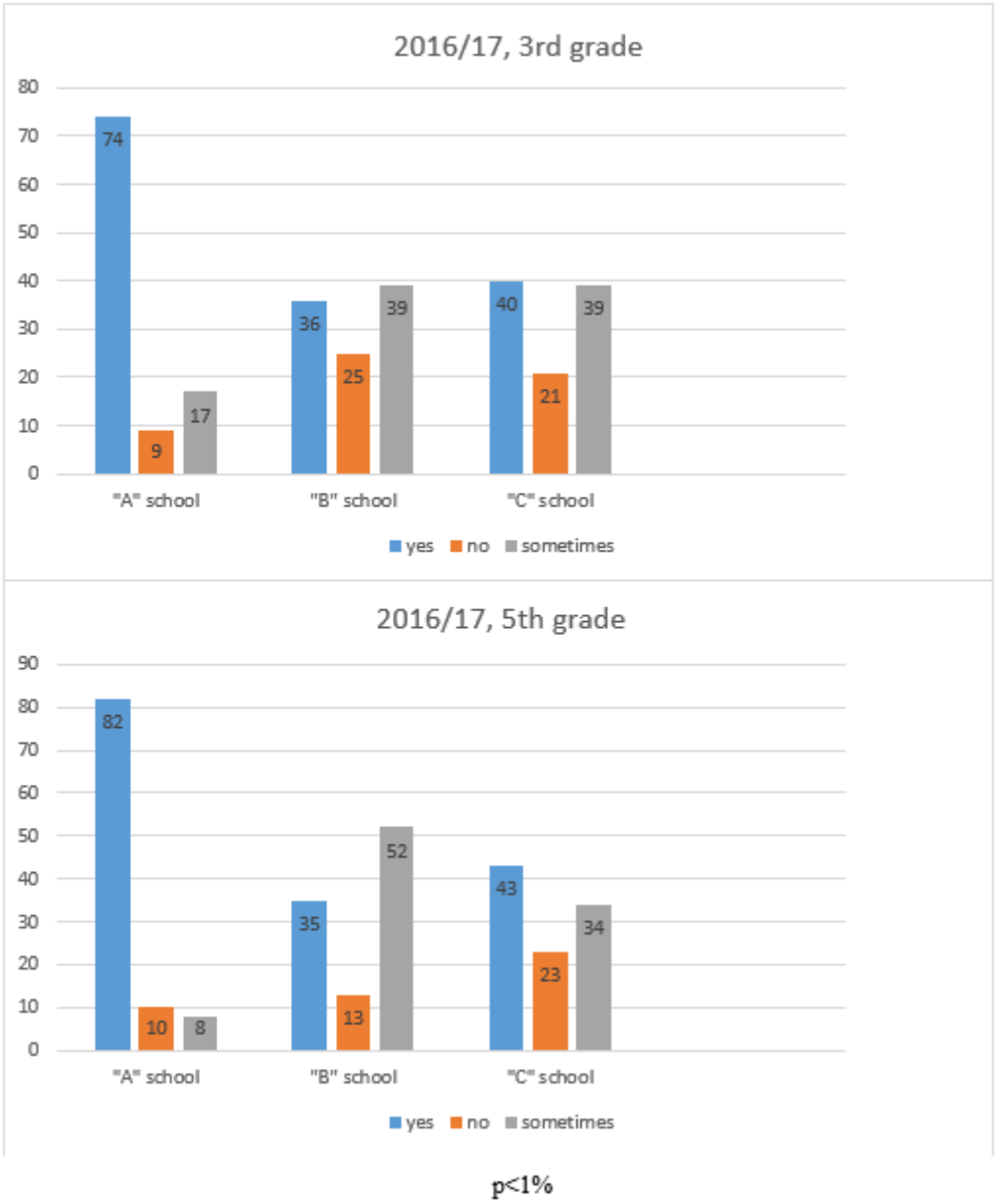
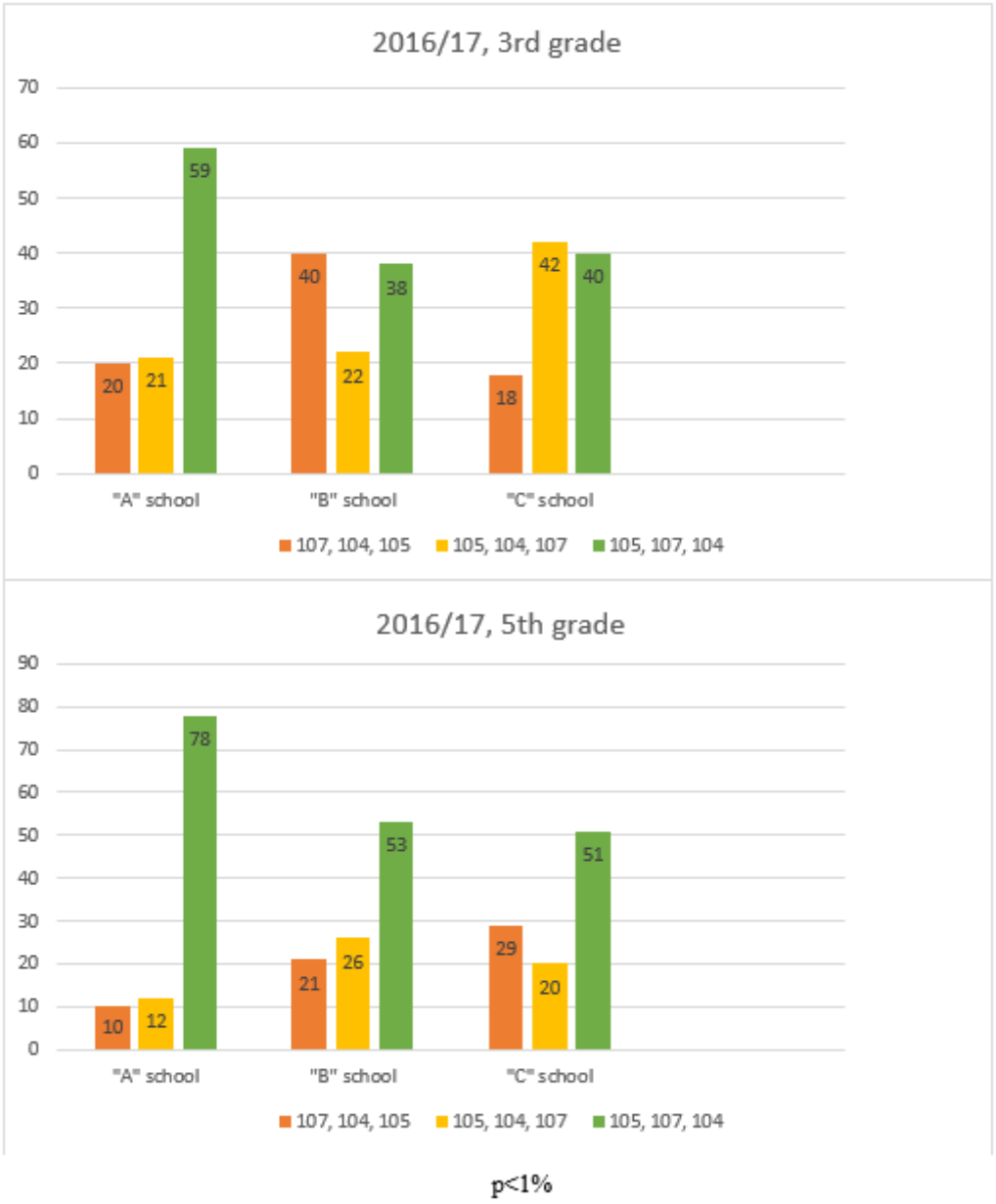


Figure 1. Shopping: Do you bring your own shopping bag, basket for shopping? 2nd term (source: the author)

The 2. figure shows the results of the measurement of the emergency topic. Hungarian experts consider it important to know the emergency number of the fire fighters, police, and ambulance instead of the single European emergency number. At the headquarters of the fire department, police or at the ambulance station they can be more familiar with the local conditions and help can arrive faster. At the end of third grade only 60% of the students in school “A” and less than 30% of the students in schools “B” and “C” could recall the emergency numbers of fire fighters, police, and ambulance. At the time of the measurement in fifth grade it can already be seen that

although the results of all three schools improved, 92% of the students in school "A" knew the emergency phone numbers correctly.



p<1%

Figure 2. Emergency: What are the emergency telephone numbers of the fire department, police and ambulance respectively? 2nd term (source: the author)

The 3. table shows the measured total percentage of the institutions in the seven examined topics. This shows that the group utilizing the educational package achieved better results than the control groups not only in the two examined topics but in all of them. This was supposedly achieved by long-term, activity-based, emotion-inducing environmental teaching efforts.

Table 3. Results of the examined topics at the end of 5th grade (source: the author)

	„A" school	„B" school	„C" school
Transportation	85 %	70 %	51 %
Nutrition	78 %	51 %	76 %
Customs of leisure time and ways of living	69 %	64 %	65 %
Eco-firendly household (waste management, energy sources)	86 %	55 %	35 %
Water protection and management	80 %	49 %	55 %
Eco-friendly shopping	82 %	35 %	43 %
Emergency	78 %	53 %	51 %

p<1%

6. Research Limitations

One of the limitations of the research is that sampling pool is small, so we consider it important to elaborate about it. A larger sampling pool would better serve representativeness and make it easier to detect the reasons behind the discrepancies. The tool used has proven to be reliable, but it is still important to interview educators in person about environmental education and the possible reasons for the results obtained. Based on the costs and time factor of the evaluation the online questionnaire proved to be a more favourable solution. However, the inadequate IT equipment of the institutions did not allow the completion of the online questionnaire in every school. The circumstances of the procedure are aggravated by the fact that the financing of the environmental education teaching package no longer necessarily depends on the decision of the schools, thus this should also be taken into account in further research.

6.1. Discussion

In view of the results, it would definitely be recommended to as many institutions as possible to implement environmental education reinforced by experience-based methods. This is important not only because of the development of an environment-centric attitude but also

because of the differentiated teaching of students. The teaching package provides an opportunity for people with outstanding capabilities to obtain even more knowledge but it also includes games and tasks suitable for skills and capability development, thus helping continuous differentiation.

Based on this it can be stated that programs that continuously reinforce environmentally friendly behaviour and attitude while also affecting everyday activities can help changing the habits of whole families. The fact that plastic bags and boxes have been demonstratively buried and later dug out in school "A" for years may also have contributed to the results. At certain intervals, students have the opportunity to examine if the condition of the plastic products has changed or if they have begun to break down. Such activity-based methods that affect emotions may also have contributed to the fact that school "A" far outperformed the other two eco-schools.

This can also be explained by the fact that the exercise book of the environmental education teaching package places great emphasis on this topic and on the practice of situations. Moreover the audio material contains information about the emergency phone numbers that affect the children emotionally.

7. Conclusions

It is shown how the ecological literacy of a class and its relationship to its environment can change over two school years. It has been examined whether these qualities can be influenced in a positive direction with the help of an activity and experience-based environmental education teaching package. Two questions of the research were processed, with the help of which the three preliminary hypotheses were examined. The preliminary hypotheses have been confirmed, thus helping subsequent research as well.

The study found that students who are part of a permanent, long-term environmental education program that provides them with many tasks that assist the integration of the acquired theoretical knowledge into practice achieved better results. The ecological literacy and the number of environmentally conscious actions of these students is higher than that of their peers in institutions that do not use the educational package.

Such methods promote the more informal implementation of environmental education as they are not subject-specific, so they can be used effectively not only in lessons but also in afternoon classes and during day-care.

It is important for educators to be able to deal with both outstandingly talented students and those who are lagging behind in some areas, thus helping them to develop their skills. A long-term teaching package can form a solid base for that.

In the future I plan to expand the sampling pool in order to get more information about the results of environmental education programs in Hungary.

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