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Summary
"AGENDA 21" DISPLAY OF IDEAS IN PANEVĖŽIO ALFONSO LIPNIŪNO SECONDARY SCHOOL

Ina Kytrienė, Janina Morkevičienė

Our school has been taking part in the programme of Ecological schools for four years. We have been trying to interest our students in ecological problems.We have taught how to sort out waste, we have stimulates our students to use an ecological vehicle – bicycle. Students made Christmas trees from paper, bags, waste. Students have learn to apply their knowledge and abilities to solve every day problems. We have involved our students families into our ecological projects.
Key words: *Ecological school, Agenda 21,sorting of waste, ecological education.*

STUDENTS INTEREST IN NATURAL SCIENCES: CHEMISTRY IN EVERY DAY LIFE

Daina Mozeika[1], Dagnija Cedere[1], Janis Gedrovics[2]
[1] *University of Latvia*, [2] *Riga Teachers' Training and Educational Management Academy*

Introduction

When starting to learn chemistry students often ask questions like – *Why do I have to study chemistry? Is chemistry interesting? Where will I be able to use it in practice?* There are significantly more important considerations behind these seemingly innocuous questions – students are forming their internal mood and are making a decision – to learn this subject or not. Unfortunately teacher's answer is short in the majority of cases: *You have to know it to become cleverer! It will be useful in your life!* For most of the students such an answer is not creating an interest for studying. It is dependant on teacher's professionalism, how to answer in the right way to create interest in students to learn chemistry.

Interest is one of the stages of inducement, will and cognition as conscious action in the learning process (Cehlova, 2002, p. 44.). Students' interest promotes studying of chemistry and that is why during the lessons it is important to connect chemistry curriculum with students' every day experiences and practical life. Nevertheless the main question remains open – how to encourage and maintain students' interest in natural sciences?

A principle of natural science education – to perceive studying process as education for life, is one of the solutions for enhancing interest in chemistry (Broks, 2007). This approach is tended to such studying when student understands and is aware of importance of studying and can successfully realize it through his personal experience. Scientific justification for it is coming from the past when at the beginning of the 20th century Waldorf pedagogy was activated and popularization and use of this pedagogic direction in schools began (Belickis, 2001). It is also endorsed by the words of the founder – antroposoph R. Steiner: „What we do with a child we not only do for that particular moment, but for all its

life. To develop observation in relation to the whole life is something what majority of people is not doing because they want to take observations available at the present. The right observation of life is crucial everywhere. Because with our intellectual culture we have finally come to such era of upbringing and teaching that adults are no more able to understand a child. First of all we have to find a connection to child's nature" (Steiner, 1923). Studying process is understood as a mode of human living which provides development of learning abilities as a base for humans' education for life in order to develop potential for one's individuality (Maslo, 2003, p. 92). Students' individual worldview is formed by perfecting the existing experience with a help of new knowledge. The essence of Waldorf pedagogy is to show a person that he is a part of a unity and that unity is all around him by teaching to think on his own from an early age, to be self–dependent, and that is facilitating motivation to study. Already in 1908, to enhance students' interest to learn more and to make curriculum more understandable in a determined way, Smeil advised that students should make a series of observations and experiments, in groups or individually to obtain new information and make conclusions by using their life experience and logical experience. Students' curiosity is enhanced if a positive internal excitement and emotions arise during the lesson, and that is greatly facilitating the interest to study (Vaivode, 2003).

The majority of students in Latvia lack desire to learn chemistry, furthermore interest to learn has a tendency to decrease (Mozeika, Cedere, Gedrovics, 2007).

The purpose of the study is to determine students' interest level in chemistry.

Main research issues:

- What natural sciences topics are students interested in?
- Do students have interest to learn chemistry when starting to study this subject?
- Is students' interest in chemistry still present until the time they continue studies in Upper Secondary School?

Methodology

A survey was carried out to determine students' interest level in chemistry. Students that learn chemistry for the first year (grade 8) were involved in the survey and those students which continue to learn chemistry in Upper Secondary School (grade 10) were also involved for comparison. In total 271 students from 7 schools of different regions of Latvia took part in the survey. The survey was carried out in December of the school year 2007 / 2008.

20 closed type questions were used for the questionnaire where students' interest in natural sciences was determined by including various questions to determine which of natural sciences subject students are interested in. All the questions of the survey were divided into three clusters:

- *Observations in nature (nature phenomena, plants and animals in my surroundings a.o.)* (coded General);
- *Actual questions (environmental pollution, sewage waters in a city, drinking water, global warming)* (coded Actual)*;*
- Chemical substances and processes in nature and environment (physical and chemical transformations, a.o. (coded Chemical).

Respondents had to answer according to the modified 4 category Likert scale, e.g. respondent had to choose one of the four answers, according recommendation from (Schreiner, Sjøberg, 2004), which expresses his opinion the best in the range from: *do not know* (coded 1) to *I know and understand* (coded 4). Programme MS EXCEL was used for the questionnaire data analysis.

Results

Average values $M_{average}$ ($1 \leq M \leq 4$) and most often used answer (mode) were determined for all grade group answers. The average value $M_{average}$ can lie in the range from 1 to 4, what indicates which of the offered alternative answers students prefer. If $M_{average} \leq 2.5$, it can be considered that students' interest level in natural sciences is low. The answer used most often (mode) indicates which was the answer students chose most often.

In general students' interest level on different survey questions both in grade 8 and 10 is very close (Figure 1), which is indicated by the Fischer criterion (F=0.95). Students' interest in natural sciences changes depending on the topic but not depending on the length of studying.

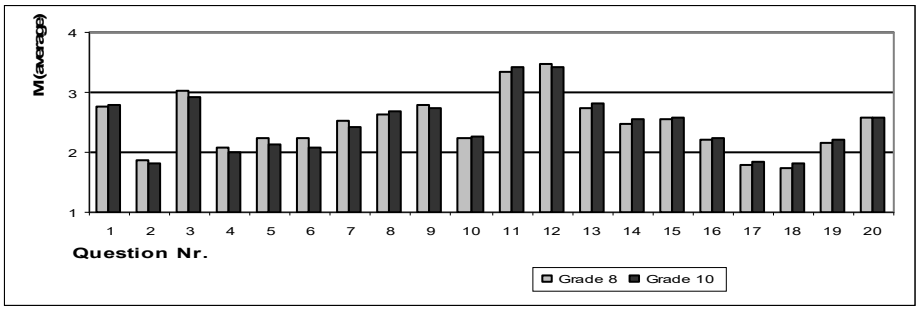

Figure 1. Respondents' interest in various questions of natural science

In general students' interest in natural sciences in both grade groups is comparatively low ($M_{average} = 2.53$). It means that majority of the students have chosen options *rather disagree with* and *rather agree*, by that showing low level of interest. Interest in questions related to chemistry is lower ($M_{average} = 2.38$) than in questions on natural sciences in general ($M_{average} = 2.61$).

Answers of students from grade 8 and grade 10 on actual questions and chemistry questions are surprisingly united in their diversity. It means that prevailing values of answers in both thematic clusters for different age group students are similar (respectively mode 4 and mode 1). In both grades students are interested in chemistry topics at a comparatively low level ($M_{average.} \leq 2.42$), although they are interested in global and essential topics ($M_{average} = 2.81$).

However gender wise in the general question cluster students' opinions are different. Boys from the 10th grade are less interested in observations in nature ($M_{average} = 2.20$; mode 1), but girls have predominantly chosen the answer *rather agree* ($M_{average} = 2.46$; mode 3) (Table 1).

Table 1

Students' interest in natural sciences; distribution of respondents by grade groups

Number of respondents	Grade 8			Grade 10		
	all/ 116	girls/ 46	boys/ 70	all/ 155	girls/ 104	boys/ 51
General questions						
$M_{average,\ General}$	2.44	2.61	2.34	2.40	2.46	2.20
$Mode_{\ General}$	3	3	2	2	3	1
Actual questions						
$M_{average,\ Actual}$	2.73	2.84	2.65	2.90	2.71	3.02
$Mode_{\ Actual}$	4	4	4	4	4	4
Chemistry questions						
$M_{average,\ Chemical}$	2.38	2.42	2.35	2.39	2.33	2.40
$Mode_{\ Chemical}$	1	2	1	1	1	3

Boys (grades 8 and 10) are less interested in general questions of natural sciences which basically deal with observations in nature ($M_{\ average} \leq 2.34$), where as girls have comparatively higher interest ($2.46 \leq M_{average} \leq 2.61$) (Figure 3).

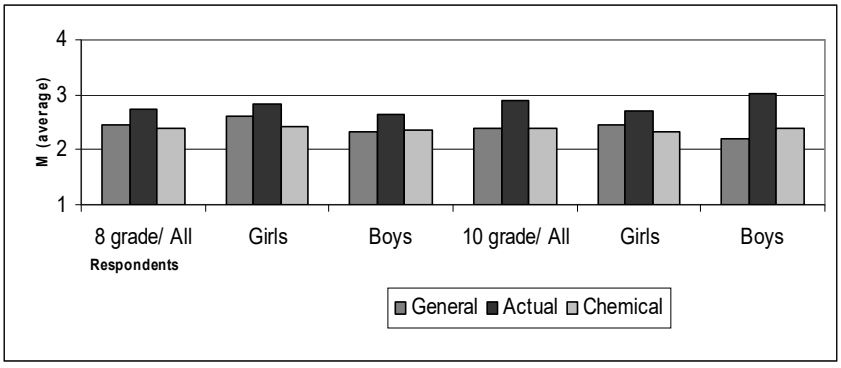

Figure 3. Interest level of respondents: distribution by gender and grades

Students' interest is comparatively high ($2.65 \leq M_{average} \leq 3.02$) in topics which are currently essential and affect any inhabitant of the world. These topics are *Holes in the ozone layer, Quality of drinking water, Waste and sewage in cities.* Students are living for today and are following current events but they are not deeply interested in the environmental processes as such.

Questions were ranked and two *TOP 5* tables were made (Table 2) in order to determine in which questions students have the highest and the lowest interest. The results show that most popular questions ($M_{average} \geq 2.8$) and less popular questions ($M_{average} \leq 2.0$) can be divided in interested *TOP 5* and least interested *TOP 5* questions.

Table 2

Topics of the popular and unpopular *TOP 5* questions

Popular *TOP 5*	Position	Unpopular *TOP 5*
Sorting of waste	**1**	Melting of snow
Processes in nature	**2**	Understanding reasons why the atmosphere is warming up
Observation of objects in nature	**3**	Physical and chemical processes in a cup of tea
Nature phenomena	**4**	Plants in the spring
Observing objects with magnifier	**5**	Formation of summer–lightning

On average students have recognized topic *Sorting of waste* ($M_{average}$=3.25) as very interesting, which is actually a problem in Latvia and in the whole world. Topics *Processes in nature* ($M_{average}$ = 3.23), *Nature phenomena* ($M_{average}$ = 2.87) and *Observation of objects in nature* ($M_{average}$ = 3.03) are in the popular TOP 5. Questions on *Physical and chemical processes* ($M_{average}$ =1.88), *Understanding processes in nature* (*I would like to understand reasons why the atmosphere is warming up;* $M_{average}$ =1.86) are less captivating for students.

Since closed type questions were used in the survey it was not possible to determine why students gave any particular answer. It is possible that in some of the questions students showed low level of interest because they considered that they already knew the question.

Conclusions

By conducting a survey it was determined that in general students' interest in natural sciences is of average level, however in individual topics students showed comparatively high level of interest. In general interest over different chemistry topics does not differ, but it can be concluded that students do not have interest to understand chemical processes. Interests are superficial. Significant differences in students' interests between grade 8 and grade 10 were not observed. Students have slightly higher interest on essential and global issues both in basic school (when starting studying chemistry) and Upper Secondary School (continuing the studies).

Teaching process has to match students' interests in order to rouse students' interest in learning chemistry. As much as possible attention has to be turned to different life spheres where knowledge in chemistry is needed. That would strengthen perfection of knowledge about nature, understanding the main processes that can be observed in nature and getting a taste how to use it in practice. Students' practical research activities have to be encouraged, students' skills to use knowledge obtained at school have to be developed and use of up to date technologies in teaching process have to be enhanced.

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VAIKŲ IR JAUNIMO APLINKOSAUGINIS UGDYMAS KAIMO BENDRUOMENĖS PASTANGOMIS

Rita Nekrošienė
Klaipėdos universiteto Botanikos sodas

Įvadas

Lietuvos švietimo koncepcijos ugdymo tiksluose pažymima kritiška mąstančio žmogaus, gebančio svarstyti esminius žmogaus egzistencijos klausimus, pažįstančio artimiausią aplinką, atsakingai darančio sprendimus, veikiančio savarankiškai, ugdymo svarba. Vaikų ir jaunimo aplinkosaugos ugdymas – viena iš pagrindinių visuomenės aplinkosaugos švietimo krypčių. Kryptinga aplinkosauginio švietimo veikla suteikia galimybę vystyti tikslingai nukreiptus mokinio gebėjimus, padeda vystytis mokinio asmeniniam potencialui, jo individualiems polinkiams ir savybėms. Aplinkosauginis švietimas vystomas pačiomis įvairiausiomis formomis: organizuojami įvairūs gamtamoksliniai renginiai, paskaitos, akcijos, plenerai. Svarbų vaidmenį šiuolaikinės visuomenės, ypač vaikų ir jaunimo, aplinkosauginio švietimo ir jos ekologinės sąmonės formavimo srityje vaidina specializuotos vasaros stovyklos, pažintiniai takai (Kavaliauskas ir kt., 2004). Botaniniai, zoologiniai ir kitokio pobūdžio pažintiniai takai yra įrengti praktiškai visuose Lietuvos nacionaliniuose, regioniniuose parkuose, įvairiose rekreacinėse teritorijose. Štai Nemuno deltos regioniniame parke įrengti net trys pažintiniai takai: Aukštumalės botaninis-zoologinis, Žalgirių botaninis-istorinis, Pakalnės pažintinis („Nemuno deltos regioninis parkas“). Dzūkijos nacionalinio parko pažintinio tako ilgis siekia net 17 km. (Kavaliauskas ir kt., 2004). Talšos (Šiaulių rajonas) ekologinio tako ilgis tik 5 km, tačiau jį sudaro net 23 stotelės. Kiekvienoje stotelėje įrengti stendai, kuriuose pateikiama svarbiausia informacija apie toje vietoje augančius augalus, stebimus gyvūnus („Talšos ekologinis takas“). Tuo tarpu vaikams ir jaunimui skirti pažintiniai takai, įrengti privačiose teritorijose, kol kas Lietuvoje neįprastas reiškinys. Taip pat nedažnai pasitaiko iniciatyvių kaimo bendruomenių, organizuojančių vaikų ir jaunimo vasaros poilsio-pažintines stovyklas. Nors edukologai pabrėžia, kad ekologinės kultūros ugdymas labai svarbus vaikystėje, kai vaiko ryšys su aplinkiniu pasauliu dar labai silpnas, o vidinė galia priimti gėrį, grožį stipri (Lazarevičienė, 2003), mažai kas imasi privačios iniciatyvos ugdant jaunųjų visuomenės narių aplinkosauginį mąstymą. Ryškus lietuvių tautos švietėjas Vydūnas (1868–1953) yra nurodęs daugybę sąlygų, tačiau pirmaeilės svarbos dalyku švietėjas laikė