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PUPILS' SCIENTIFIC RESEARCH ACTIVITY DEVELOPMENT IN COMPREHENSIVE SCHOOL: THE CASE OF LITHUANIA

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Introduction

The formation of scientific research activity (SRA) abilities in comprehensive school is undoubtedly, a very important sphere that has not received a proper attention yet. Current teaching and learning process has changed, in fact, from the point of view of paradigm – subjects taught are becoming a means of the realization of learners' needs and interests. We cannot claim that we did not have this earlier, but for a long time in the teaching / learning process have been emphasized academic interests of some or the other scientific disciplines. Moreover, it has been determined, that Lithuanian people are the ones who are perhaps the least interested in science in the whole European Union and the least informed about scientific achievements (LMJS, 2008). Such situation stimulates to look for reasons. The most likely one is that not enough attention is paid to SRA in comprehensive school. It is understandable that SRA is much better developed outside the school boundaries, e.g. in various clubs (e.g., VIOLA, MEDUMĖLĖ), in informal educational institutions (e.g. DEUM, FOTONAS) young naturalist centres – schools (e.g. Panevezis Nature school), realizing various programmes (e.g. Nature saving schools' programme, which was taken up in 1994) and so on. However, in any case, such institutions comprise only a small part of pupils. On an International scale, such activity is being developed more rapidly. E.g., International network ECSITE (European Network of science Centres and museums) works interestingly. In many European countries, so called science and technology centres work very effectively. We can mention UNIVERSEUM /<http://www.universeum.se/> (Sweden) NEMO (Netherlands), EXPERIMENTARIUM /<http://www.experimentarium.dk/index.php?id=248/> (Denmark), TECHNOPOLIS (Belgium), PALACE OF MIRACLE (Hungary) and other. Some countries care about clever and talented pupils very much seeking to involve them into lively scientific research activity. E.g., state programme

Abstract. *The article deals with the education of pupils' abilities and interest in scientific research activity in comprehensive school. The article presents the assessment of the situation of the teaching process in comprehensive school concerning pupils' interest in scientific research activity, defines the most significant and influential factors stimulating and hindering learners' interest in scientific research activity. The article gives the assessment of favourableness of current teaching processes in orienting pupils for the scientist's, researcher's career and the evaluation of teachers' competences forming and developing pupils' scientific research abilities in the teaching – learning process. The article makes recommendations on the organization and development of the teaching – learning process, seeking to strengthen learners' interest in scientific research activity. It gives the prognosis of the change in the situation educating pupils' interest in scientific research activity and in teachers' competences forming and developing pupils' scientific research abilities in the teaching process.*

Key words: *scientific research activity, comprehensive school, natural science education, career.*

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operates in Singapore (Science Mentorship Programme, 2008). A very effective way is direct cooperation between scientists, researchers and pupils and their involvement in scientific research activity. In such an activity the early-age children's career values are formed (Bolmont, 2007), besides, some of these programmes and projects form conditions for children as well as for teachers to cooperate, to acquire new experience and so on...(Kluiber, 2008).

The newest international ROSE (Relevance of science Education) research showed that the interest in natural sciences and technologies of the 15 year olds is rather poor (ROSE, 2008). This tendency is especially notable in developed countries. The research indicated that 15 - year- old pupils' preferences concerning natural science disciplines in many aspects are negative.

In 2007, a national research of 4th-8th formers achievements in Lithuanian native language, Mathematics, natural sciences and social education was carried out in Lithuania. It has been determined, that pupils succeed better in doing tasks requiring knowledge presentation, the most difficult being the tasks requiring application of practical skills. The research also showed that pupils' research planning, experience of fulfillment the task, ability of drawing conclusions, reading the measurements, using different information sources is insufficient. Pupils lack deeper understanding of phenomena, processes and concepts, application of theoretical knowledge and its relation with practice (Bigelienė, Uginčienė, 2008).

SRA should be universally stimulated and developed. It is very important to start such activity at school with young age students and permanently continue it with senior class pupils (Šapokienė, 2001). Scientific research activity is not an entertainment but responsible, thorough work requiring a lot of self-independence. During such an activity pupils' analytical thinking gets stronger, information searching and using abilities are formed, they learn how to analyze gathered material, prepare reports, make research presentations and so on. Thus, already in primary school not only knowledge, abilities allowing to understand the world are important but also learning to search, investigate, discover (Makarskaitė, 1996). During such an activity certain information is obtained, after all, this activity performs not only educational but also training function (Pivovar, 2002; Zuev, 2006). Finally, it is undoubtedly important that as many pupils as possible were interested in this activity, it should not be the privilege of the brightest ones. However, speaking about SRA development at school, some essential questions arise:

1. Is it possible to teach every child to perform research activity?
2. What to do if a pupil wants to take up scientific research activity but school cannot provide elementary conditions for this purpose (for example, there is no equipment, no competent leader and so on.)?
3. How to integrate effectively scientific research elements into teaching content?

Teachers, SRA organizers and leaders get a special role here. Without appropriate stimulation, arising interest and so on... it is hardly believable that pupils themselves will be interested in this activity more seriously. In any case, the number of such pupils will be relatively small. As E.Šapokienė notices, (2001), to be the leader of the student's scientific work is rather difficult, because you have to lead them to self-independence step by step, raising credo - do it yourself, because there can't be any lie in science. It is also obvious, that developing such an activity at school requires much effort, extra work of the organizers (teachers). Very frequently, such an activity does not fit into the frames of a traditional, ordinary lesson. Many teachers understand that real mind training and thinking lessons take place in nature, carrying out various investigative works. The wish to limit oneself, narrow-mindedness, laziness, shyness and so on... is one of the main obstacles to develop SRA (Bučiuvienė, 1995). This requires teachers' creativeness, initiative, moral and material support from administration. Without doubt, there are many active teachers in Lithuania seeking better conditions for SRA. The participation of some schools in "ComLab" project can be mentioned, as an example. For instance, "Baltija" secondary school from Palanga joined "ComLab" project in spring 2004. Pupils who are interested in biology and computer technologies take part in this project (<http://ausis.gf.vu.lt/ComLab-SciTech/sklaida.html>).

The object of research is the development of pupils' scientific research activity in comprehensive school. The purpose of research is to describe current situation of organization and realization of scientific research activity, to define essential factors promoting and hindering learners' interest in scientific research activity, to determine teachers' competence peculiarities in the sphere of organization and realization of SRA.



Methodology of Research

The study employed expert inquiry. The type of expert inquiry is 'Delphi study', containing several experts' inquiries (stages). The data of every round are generalized and repeatedly submitted to the experts. Such procedure is repeated several times, most often 3-4 times. The research went on from March to May 2008. From preliminary formed 45 expert group 30 participated in the research. M. Turoff and H. Linstone's (2002) recommendations were followed while forming the group. The experts were selected into the group by random – objective way. The most important criterion was the competence of experts and current qualification category (teacher methodologist and teacher expert). The group comprised 7 teachers experts, 10 teachers methodologists and other senior teachers and teachers. There were also six experts in the group having a scientific degree. Among all experts in the group 5 work as managers (are the leaders of educational institutions or institution leader's assistants).

First round involved preparing a questionnaire, which consisted of seven open questions:

1. How do you evaluate current situation educating pupils' interest in scientific research activity in the teaching process in comprehensive school?
2. Are pupils interested in scientific research activity?
3. Do you think that current teaching process is favourable orientating learners to scientists, (researchers) career?
4. What factors, in your opinion, hinder educating learners' interest in scientific research activity?
5. What factors, in your opinion, promote learners' interest in scientific research activity?
6. How would you evaluate teachers' competence forming and developing pupils' scientific research abilities in the teaching-learning process?
7. What would you recommend to change (organize) in the teaching process seeking to strengthen learners' interest in scientific research activity?

After the first round of data analysis, the second stage questionnaire was prepared which comprised closed questions. The experts were asked to distinguish 5 essential factors each- hindering and stimulating learners' interest in scientific research activity (SRA), and to evaluate the statements describing current situation (on a rank scale: agree, partly agree, don't agree). Analogically, the experts were asked to distinguish five most important suggestions.

The data of the second stage were processed applying mathematical statistics (ranks were given). Seeking deeper analysis of the data statistic rank scale rates were transferred into ratio scale and the index of significance (IS) which could vary from 1 ("agree") to 0 ("don't agree") was calculated for each statement. Qualitative analysis of the second stage was carried out.

The third stage questionnaire was prepared according to generalized results of the second stage. Limiting/hindering factors were ranked and once again submitted to the experts to assess and comment upon. They did the same with suggestions. Each of five limiting/stimulating factors and suggestions experts could comment upon once again. In the third stage, there were also two questions submitted for prognosis.

1. 1. The prognosis of the change in situation, developing learners' interest in scientific research activity in the teaching process for the next five years.
2. The prognosis of the change in teachers' competence forming and developing learners' scientific research abilities in the teaching-learning process for the next five years.

Research methodology questions are analyzed more exhaustively in the previous authors' publication (Lamanauskas, Augienė, 2008).

Communication with experts was by e-mail. Taking into consideration research ethical requirements experts were asked to express consent to announce their names in the study report. The majority of experts agreed to this.



Results of Research

After summarizing experts' opinions, 37 statements were distinguished to describe the analysis of the situation. Experts evaluate current situation very professionally; every expert emphasizes certain peculiarities. Statements cover a very wide spectrum: material base of schools, teachers' qualification and competence, the peculiarities of the teaching process (programmes, organization and so on.), administration and its managerial activity, learners' interests and motivation, cooperation between comprehensive and higher schools and so on. It is noticeable, that nature science teachers are most interested in SRA. However, experts draw attention to the fact that such activity is not properly supported and promoted in schools. There is quite a lot of formalism, non-objectivity, passiveness and so on. Very often, it remains a personal teacher's matter.

"Situation is difficult. It seems that interest should be promoted verbally, but conditions for real scientific activity do not exist in schools. Teacher willing to work with pupils has to look for support in higher schools". (Expert's N opinion)

There is no lack of pessimistic moods in experts' assessments. General tendency, which became known, is that situation is not joyful. On the one hand, there are no proper material conditions; on the other hand, common society attitude to science and scientific activity is not favourable to formation of youth orientations.

"Situation is pathetic. There is no necessary equipment, laboratories, tools, literature and methodological descriptions. Scientific research activity for today's pupils is not only unavailable but also unattractive. In the teaching process you can make somebody interested theoretically but to do this practically is complicated. They prefer spending leisure time at the computer, entertaining, meeting friends. They may become interested only temporarily while their efforts are not required". (Expert's N opinion)

SRA requires extra time expenditure for the teacher and the pupil. Teachers' workload is, obviously, big, the priority is given to realization of syllabus requirements. It can be noticed, that very often school administration is also not interested in the development of such an activity and do not stimulate it (do not support teachers, do not stimulate them, do not give extra hours for realization of such an activity). One of the main shortcomings is that school syllabuses are overloaded with theoretical material, very little time remains for SRA in the lessons.

On the other hand, the opinions of experts almost in every respect coincide, are similar. This allows making an assumption, that the dispersion of experts' opinions is not wide thus, the received results are sufficiently valid. The statements and their rates are given below (Table 1).

Table 1. The assessment of the situation developing pupils' interest in scientific research activity in the teaching process in comprehensive school (N/%; IS) /according to the generalized experts' assessments/.

Statements	Agree	Partly agree	Don't agree	Index of Significance, IS
Methods stimulating pupils' self-independence, cooperation are applied while teaching scientific research activity.	25/83.3	4/13.3	1/3.4	0.9
Pupils' interest in scientific research activity is stimulated by participating in various projects.	22/73.3	8/26.7	0/0	0.87
Scientific research activity takes place owing to individual teachers enthusiasts.	21/70	9/30	0/0	0.85



Statements	Agree	Partly agree	Don't agree	Index of Significance, IS
Pupils' interest in scientific research activity depends on school traditions and its attitude to this activity.	20/66.7	9/30	1/3.3	0.82
Most frequently only episodic research works are organized.	18/60	11/36.7	1/3.3	0.78
Very little time is allotted to scientific research activity.	16/53.3	13/43.3	1/3.4	0.75
Pupils are interested in scientific research activity if they are given a possibility to choose the spheres they like.	16/53.3	13/43.3	1/3.4	0.75
Very little attention is paid to scientific research activity.	14/46.7	16/53.3	0/0	0.73
Teachers try to make pupils interested in scientific research activity working extra hours.	13/43.3	17/56.7	0/0	0.72
Situation is not very good because there is insufficient material base and shortage of devices.	13/43.3	16/53.3	1/3.4	0.7
Various researches, experiments, project works are carried out in class, in the schoolyard.	13/43.3	16/53.3	1/3.4	0.7
There is a possibility to take part in international projects and in this way to involve pupils in scientific research activity.	16/53.3	10/33.3	4/13.4	0.7
Teacher willing to work with pupils has to look for support in higher schools.	15/50	12/40	3/10	0.7
It is very difficult to make pupils interested in scientific research activity, as it is very thorough, complicated and responsible job; only responsible, not being afraid of extra work pupils take part in it.	15/50	12/40	3/10	0.7
Situation is pathetic. There is no necessary equipment, laboratories, devices, literature and methodological material.	11/36.7	17/56.7	2/6.6	0.65
Pupils' scientific research activity most frequently is developed in informal educational institutions but in schools, this activity is limited.	15/50	9/30	6/20	0.65
Schools pay more attention to bright pupils' scientific research activity.	13/43.3	12/40	5/16.7	0.63
Pupils' interest in scientific research activity is mostly stimulated during extra-curricular activity.	13/43.3	12/40	5/16.7	0.63
A very high workload of teachers hinders organizing pupils' scientific research activity.	13/43.3	11/36.7	6/20	0.62
The pupils are interested in scientific research activity; some of them willingly carry out different surveys, prepare questionnaires, gladly communicate with respondents, analyze conclusions and take part in project work.	11/36.7	15/50	4/13.3	0.62
Researches are carried out during the lessons, critical thinking, problem solving, information processing and presentation abilities are developed.	11/36.7	15/50	4/13.3	0.62
Pupils are stimulated to be interested in scientific research activity.	9/30	18/60	3/10	0.6
The initiative of teachers in this sphere is poor.	9/30	18/60	3/10	0.6
Due to overloaded syllabus pupils' scientific research activity stimulation and realization is poor.	11/36.7	13/43.3	6/20	0.58
Administration very rarely allots extra hours for scientific research activity.	10/33.3	13/43.3	7/23.4	0.55
Pupils' research activity is combined with school activity and self-learning.	6/20	20/66.7	4/13.3	0.53
Pupils' motivation is low for such an activity.	7/23.3	18/60	5/16.7	0.53
Pupils prefer spending leisure time at the computer, entertain themselves, meet friends but are not interested in scientific research activity.	4/13.3	22/73.3	4/13.4	0.5
Situation at school is not favourable for developing pupils' interest in scientific research activity.	9/30	12/40	9/30	0.5
Pupils do not read additional literature.	4/13.3	22/73.3	4/13.4	0.5



Statements	Agree	Partly agree	Don't agree	Index of Significance, IS
Scientific research activity is nearly non-existent in the teaching process.	9/30	12/40	9/30	0.5
There is no interest in scientific research activity in schools.	3/10	20/66.7	7/23.3	0.43
Pupils are very much interested in this activity and get involved in it in the lessons and during extra-curricular activities.	5/16.6	15/50	10/33.4	0.42
Every year schools organize young scientists' conferences.	2/6.7	18/60	10/33.3	0.37
There is no support from school leaders.	1/3.3	20/66.7	9/30	0.37
Schools do not carry out scientific research activity.	2/6.7	15/50	13/43.3	0.32
Scientific research activity is not only unavailable but also unattractive for pupils.	1/3.3	5/16.7	24/80	0.12

Performing the analysis of factors, 27 promoting and 20 hindering factors were distinguished. It can be asserted, that experts selected both types of factors objectively. Later, after doing extra assessment, five most influential hindering and promoting factors were distinguished (ranking was carried out by experts) (Table 2).

Table 2. The most significant and most influential factors (hindering and promoting)*

Hindering factors	Promoting factors
Lack of teachers' motivation (1)	Teacher's personality and activity (1)
Pupils' orientation to choose easier, less efforts requiring way (2)	Pupils' inquisitiveness, curiosity, wish to develop knowledge, wish to show themselves (2)
Poor school material base, shortage of materials and equipment (3)**	Pupils' abilities (3)**
Shortage of methodic of how to organize research works (3)	Teacher's competence and his interest in research activity (3)
High teachers' workloads, a lot of extra responsibilities (4)	Wish (interest) to take part in the projects, contests (4)
Insufficient teachers' preparation for scientific research activity (5)	Pupils' certain subject science conferences, seminars and similar events (4)
	Trips, excursions to science institutions, meetings with scientists (5)
* Rank is marked in the brackets 1 being the highest rank.	* Rank is marked in the brackets 1 being the highest rank.
** Factors three and four collected the same number of points therefore their rank is the same.	** Factors three, four, five and six collected the same number of points therefore their rank is the same.

It can be asserted, that teachers of the comprehensive schools encounter various difficulties when seeking to form scientific research abilities and develop such an activity in the education process. Experts emphasized such scientific research activity development hindering factors as: social environment (e.g., in village schools, children are brought to and back from school at a fixed time, so it is practically impossible to do extra work at school), nature sciences are perceived as very complicated, high teachers' workloads (they have to work extra time, which is not included in the time limit in educational institutions), weak and not suitable school material base and so on. All this suppresses already low teachers' activity level in this sphere. The experts also noticed that using the material basis absence as an argument explaining poor situation is not a serious statement. The majority of experts agreed that the simplest appliances and materials often used domestically could be applied in scientific research activity. Teacher's position, his interest and motivation are much more important.



"Teachers should make pupils interested in scientific research activity. However, having high workload, they do not find time and, perhaps, wish to do extra preparation and work. The material base of some schools is good enough for not complicated interest arousing researches. Besides, very often the simplest domestic appliances are suitable for scientific research activity, application of which is explained in more than one teaching material". (Expert's N opinion)

In experts' opinion, not only pedagogues or school administration should be interested in the stimulation of pupils' interest in scientific research activity. It should be state's concern in a wider sense, because Lithuania, undoubtedly, is behind in this sphere compared to other states. Europe needs many young scientists, researchers. Even media hardly pay any attention to propagation of such an activity. Proper and well-timed reportages about young scientists, their achievements and research trends would be an effective, stimulating factor. In general, society knows very little about Lithuanian scientists' achievements and discoveries, therefore scientist's career seems to pupils unattractive and not prospective.

"The main reason is poor prestige of science. Active professional orientation directed to more attractive, well-paid professions can be quickly obtained. Who reads science magazines or watches TV programmes? Media will inform about science only episodically. There are no suitable conditions in schools, especially in the province". (Expert's N opinion)

Experts' opinion on whether pupils in general are interested in such an activity, divided equally. 45% of experts tend to think that pupils are interested in such an activity and 55% think that pupils are not interested in such an activity at all (Table 3).

Table 3. Pupils' interest in scientific research activity (situation according to generalized expert group's first stage evaluation).

Interest level	Relative frequency %
<p>Very interested, because:</p> <ol style="list-style-type: none"> 1) Research works, tests, experiments are namely what is most interesting for pupils; 2) Research activity needs attention to detail, thoroughness, determination; 3) Especially like continuous research works and so on. 	7
<p>Interested, because:</p> <ol style="list-style-type: none"> 1) Rather actively take part in different scientific contests; 2) Pupils are curious; 3) Pupils' motivation, inquisitiveness is getting stronger and so on. 	38
<p>Little interested, because:</p> <ol style="list-style-type: none"> 1) Pupils are more oriented to social sciences seeking quicker result, however, natural science research activity requires long-term consistent work and theoretical competence; 2) Scientific research perspective in Lithuania doesn't lure the pupils; 3) Teachers do not have time and conditions to make pupils interested in such activity and so on. 	52
<p>Not interested, because:</p> <ol style="list-style-type: none"> 1) Teachers and pupils are short of time; 2) There are no proper conditions for such activity; 3) Pupils are more orientated to social sciences, seeking quick result. 	3

The received distribution is objective. We can assert that pupils, in fact, are interested in such an activity. On the other hand, a tendency can be noticed that pupils orientate themselves to social sciences seeking quicker result; however, natural science research activity needs consistent, long-term work and theoretical competence.



"Pupils, especially the bright ones, are very much overloaded, there is no time left for extra works. However, there happen to occur some pupils in schools who are interested in such an activity. Usually these pupils are thinking to study medicine, natural sciences. On the other hand, today's pupils choose well-paid professions while scientific work does not guarantee this in Lithuania". (Expert's N opinion)

It is believed, that conditions in schools are not suitable for the development of such an activity with respect to neither educational process nor its organization. However, it is very important to create so-called initial pupil's interest. Later such pupils do not withdraw from scientific research activity but actively take part and are interested in it.

"Of course, research activity requires attention to detail, thoroughness, determination, sometimes it requires giving up other leisure activities (and this is difficult for today's child, sometimes, too much living in the virtual world). However, if a child experiences joy of cognition and discovery (significant results, possibility and ability to present them in conferences, possibility to defend the statements of research work and so on.) usually he doesn't withdraw from research activity". (Expert's N opinion).

Gender problem remains urgent. Participation and interest of boys and girls in scientific research activity is different. It is natural that boys are more interested in technology, computers, equipment and so on. Practically, such activity looks more natural and attractive in itself.

Teaching process peculiarities have a decisive role in the formation of scientific research abilities i.e. how much it is favourable for development of such activity. The received distribution of results allows asserting that favourableness of the teaching process for development of such activity is poor. Even though General programmes and education standards are oriented into pupils' scientific cognition and research ability education, independence in cognitive activity and so on., it is complicated to organize teaching process in that direction (e.g., too many pupils in a class, poor material base and so on.). Very often sensible ideas remain at the level of declarations. Experts notice that in some schools such disciplines as "Experimental biology" and "Experimental chemistry" are introduced in senior forms. During such studies, pupils are taught the basics of scientific work, carry out different experiments, research works, prepare different presentations.

Table 4. The assessment of current teaching process suitability orientating pupils to scientists (researchers) career (situation according to generalized expert group's first stage evaluation)

Assessment level	Relative frequency %
Very suitable	-
Suitable , because:	
1) Scientific – practical pupils' conferences are arranged in schools, districts and in republic;	
2) There are possibilities to continue education process during the studies of optional subjects and extra-curricular activities;	17
3) "Niche" for pupils' orientation to such a career can be found in any teaching process.	
Little suitable , because:	
1) Due to difficulties organizing educational process research activity remains at the declaration level;	
2) Pupils' progress evaluation is too much orientated to knowledge;	76
3) Teaching and learning is "focused on" to passing examinations.	



Assessment level	Relative frequency %
<p>Not suitable, because:</p> <p>1) Teachers are "put " into the frames of standards and teaching plans;</p> <p>2) No time and no money is allotted;</p> <p>3) There is no place for a researcher at school; very wide syllabuses have to be mastered during a rather short time.</p>	7

As table 4 indicates, one of the main obstacles hindering to form suitable conditions for scientific research activity is organizational difficulties in the educational process. Standards and teaching plans limit the development abilities of such an activity in the lessons. According to experts, everything is oriented towards preparation for exams, almost no place remains for creativity, factual type of teaching and learning prevails. Finally, it is easier to measure factual knowledge of a pupil than any other type of knowledge.

"Not suitable. Syllabuses are compiled by people who do not work at school, at least having worked lately. When teachers try to amend them we have to understand that everything corresponds to norms and requirements and nothing can be changed. We are told to discuss them but we have only to praise them and, by no means, to change. The researcher has no place at school; very wide syllabuses have to be mastered during a rather short time." Long live theory"" (Expert's N opinion)

It can be thought that many possibilities lie in the organization of a teaching process. When organizing it in a proper way, it is possible to strengthen considerably scientific research activity.

We have generalized recommendations, which were presented by experts after assessing current situation and hindering and promoting factors. The list of main recommendations is given in table 5.

Table 5. Recommendations for the organization and development of the teaching process seeking to strengthen pupils' interest in scientific research activity.

Statements
Young scientists' contest winners should be given certain privileges entering higher schools (1)*
To review the teaching material, allot hours for pupils' scientific research activity, amend General programmes and educational standards when balancing study-loads (2)
To look for ways of schools and scientists' cooperation so that pupils could have a possibility to touch the real science, perhaps, to work in the real scientists' laboratories (3)
To arrange seminars for teachers on how to organize pupils' scientific research activity, improve pedagogues' pedagogical and psychological preparation (4)
To bring the importance and prestige of natural sciences back to school and society (5)**
To establish clubs near universities so that pupils could work in real laboratories (5)

* In the brackets rank is marked, 1 being the highest rank.

** Recommendations five and six collected the same number of points; therefore, their rank is the same.

Recommendations submitted by the experts reflect the majority of teaching process aspects. They relate to general teacher's situation and his status in the society as well as his educational competence in a wider sense. Experts' position is rather obvious, that it is necessary to ensure quality physical environment in schools and investments to material base necessary for realization of scientific research activity. Experts notice that very often the number of hours is allotted to other subjects at the expense of natural sciences. Another essential idea is that only teacher, who fully understands the essence and methodics of scientific research activity, will be able to involve pupils into this work. Experts gave also purely organizational suggestions, e.g., to include scientific research activity as a discipline into school - leaving certificates and to mark it. The organization of SRA should be one of the main criteria certifying teachers and so on.



The majority of experts think that situation in the nearest five years will get better; however, probably there will be no considerable improvement (Table 6).

Table 6. Prognosis of the change in situation educating learners' interest in scientific research activity in the teaching process for the next 5 years.

Prognosis	N/%	Comment
Will improve very much	2/7	EU is interested in ways to develop learners' interest in scientific research activity. Experts think that this will have influence in Lithuania. Experts thinking that situation will improve give some conditions. A significant improvement will happen if new equipment is installed, comprehensive school classrooms are modernized (especially those for natural sciences). The necessity for teachers' continuous professional development in this sphere is emphasized as well.
Will slightly improve	20/69	The latter expert group (the majority) thinks that situation will improve a little. Experts tend to think that situation will improve only in the biggest cities where higher schools are closer, it is simpler to reach them and it is easier to get the desired consultations. The change of the situation in the positive direction is also stimulated by the fact, that learners access a lot of information on the internet, are interested in the choice of profession, schools are provided with computers, pupils want to take part in the Olympiads, contests, are interested in the studies abroad, more money is allotted for stimulation of teachers. This expert group also thinks that the situation would change more rapidly if learners' scientific works were recognized entering higher schools, if teaching programmes were amended giving more attention to scientific research activity.
Will not change	6/20	The fifth part of experts tend to think that situation will remain the same, because scientists are not the part of society whose work is valued (this time financially). Young man (pupil) understands that he will have to obtain apartment, bring up children and so on. , however, scientist's career cannot give such possibilities. Current teaching programmes and education standards give very little attention to pupils' interest in scientific research activity.
Will get worse	1/4	Nothing is being done in this direction.

Experts assessed teachers' competence in forming and developing learners' scientific research activity through the teaching process as follows: 14% think that competence is high, 69% that competence is average and 17% asserted that competence is low. Most of the experts stressed that teachers need special preparation organizing and realizing SRA (ability to teach and professional knowledge is not enough).

Prognosis concerning change in teachers' competence is much more negative (Table 7). Quite a big part of experts thinks that competence will not change. Strong teachers' generation is certainly not coming to schools and it is hardly believable that will come any time soon.

Table 7. Prognosis of the change in teachers' competence forming and developing learners' research abilities in the teaching-learning process for the next 5 years.

Prognosis	N%	Comment
Will increase very much	3/10	Projects preparing teachers-researchers are being carried out.
Will slightly increase	15/52	Half of the experts think that teachers' competence is increasing, because there are possibilities to search, communicate; conferences take place, various projects are being carried out. However, in order to have essential changes in this sphere, it is important to ensure that teacher-researcher's competence is being developed consistently. Creation of teacher promoting and motivating system would have influence for the change. It is necessary to create methodics on how to make learners interested in scientific research activity.
Will not change	11/38	Experts think that state's attitude to education is not adequate to its importance, therefore school's position as concerns personnel will get only worse. Strong teachers' generation is certainly not coming to schools and it is hardly believable that will come any time soon. Young teachers are not very much interested in this activity and are not ready "to sacrifice" themselves without reward.
Will decrease	-	-



Experts agree that it is impossible to change situation using only administrative means. This requires complex solutions (e.g., flexibility increase in qualification development system, realization of economic means including school material base and teachers' promotion, in general, change of politics in all levels, acknowledging that SRA is important for development of the country and so on.). It is obvious, that final education process result is too much oriented to pupils' preparation for school-leaving exams. However, according to experts, conditions are gradually getting better: education content is being renewed, the attitude towards teaching and learning is changing, project work activity is spreading, attention to bright pupils is getting bigger and so on.

Discussion

Society requirements towards education are constantly changing: at the beginning of the eighth decade economic attitude towards education prevailed; the significance of economics to education and education's reproductive role were stressed; in the ninth decade every person's need to improve, to seek self-realization in the professional career and to become stronger in society by seeking higher education was stressed; in the tenth decade of last century continuously learning society's idea was stressed which was supplemented by information society idea corresponding to global enormous progress of information technologies, changes in economics and rapid development of all science branches. Therefore, today every nation's main wealth becomes its citizens' scientific activity skills and insight (Reich, 1992).

School has to be that place where the learner could find himself, cognize, perceive his real wishes, learn how to choose important and complicated things. School has to create favourable atmosphere for pupil's free and creative self-expression. Therefore, already at school conditions have to be formed which could allow the pupil not only perceive his wishes, desires, feelings and abilities but to take into account them and to try in a concrete activity. One of such activities is scientific research activity, which creates possibilities for the development of pupils' scientific and critical thinking, insights, creativity, personal features. Scientists (Iljin, 2000) note that not distinctive intellectual abilities tell the scientist researcher from the other people but strong scientific research activity motivation, which combines several passions: love for truth, wish to create and discover and honour for discovery. Therefore, already at school all the pupils have to have a possibility to obtain scientific research activity abilities and to experience joy of cognition. However, the performed research analyzing natural science activity possibilities at school and Lithuanian education documents allows to assert that at school less and less attention is given to pupils' scientific research activity ability development and stimulation of motivation (Lamauskas, Augienė, 2009). This activity has to be developed in every possible way. Of course, there are people who think that this activity has very little in common with real research. It is emphasized that the word "research" is used in a colloquial and incorrect manner (Orlik, 2008). According to Y. Orlik's opinion all students' activities are only the initial and preliminary stages and really are not true to "research". The other authors (Schwarz, 2004; Kellett, M., 2005; Goodwin, 2005) are contrary to them thinking that these in one way or another are research fundamentals and they have to be inevitably developed under such circumstances when youth are less and less interested in natural sciences and technologies. Our opinion is that, that learners' scientific research activity is a key component of science education in comprehensive school (Lamauskas, 2008)

While reorganizing teaching content in Lithuania, a very important and purposeful integrating programme General scientific culture education was eliminated (1994). Some content elements of this programme are integrated into senior forms' teaching content and only for pupils having chosen natural science education course of extended syllabus. For pupils not having chosen natural science education course of extended syllabus, possibilities to acquire scientific research activity abilities decrease.



Conclusions

After summarizing research results, we can draw such conclusions:

- Scientific research activity in comprehensive school is, undoubtedly, significant, integral sphere; however, not suitable attention is given to such activity development in Lithuanian comprehensive schools;
- Teachers of comprehensive schools encounter various difficulties, such as lack of administration support, lack of pupils' motivation, shortage of material, financial resources and so on, when seeking to form scientific research abilities and develop such an activity in education process;
- In experts' opinion, the great majority of pupils are more or less interested in scientific research activity; however, in bigger part of schools there are no suitable conditions. More than two thirds of experts assessed current teaching process as very little suitable for SRA, and teachers' competence forming and developing pupils' scientific research abilities they assessed only as average;
- It has been determined, that essential hindering factors of pupils' interest in scientific research activity are: a) lack of teachers' motivation, b) pupils' orientation to choose easier, less efforts requiring way, c) poor material school base, d) the shortage of methodics on how to organize pupils' scientific research activity, e) insufficient teachers' preparation for scientific research activity.
- It has been determined, that essential promoting factors of pupils' interest in scientific research activity in the teaching process are: a) teacher's personality and activity, b) pupils' inquisitiveness, curiosity, wish to develop knowledge, to show themselves, c) pupils' abilities, d) pupils' scientific conferences of certain subjects, seminars and similar events, e) trips, excursions to scientific institutions, meetings with scientists;
- It has been determined, that for positive SRA development influence would have: a) giving certain privileges for young scientists' contest winners entering higher schools, b) lessening and balancing the amount of teaching material, more effective cooperation between scientists and schools, development of teachers' qualification, improvement of pedagogical and psychological preparation and so on;
- As majority of experts think, there will be no changes in this sphere in the nearest five years: situation in the development of SRA will improve a little, teachers' competence will slightly change.

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