

International comparative educational research in Latvia: current results and trends

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The article presents results of the comparative educational research in Latvia in latter ten years. The article reviews IEM TIMSS and SITES, OECD PISA research results gain in Latvian and other countries. This research material help to form a view on Latvian and other countries educational research.

Introduction

Latvia as the country, which has regained its independence to develop its system of education, needed and still needs the international comparative data and research, which already in 1991 determined the aim and objectives for enormous and innovative scientific and organizational work in this field.

The aim of the work – to establish the scientific research directions of international comparative education and a durable functioning system for a continuous international comparative assessment, to use it for a better understanding of advantages and disadvantages of our educational system and for working out recommendations to improve the education, for integration in the education developmental processes in Europe and the world.

In order to achieve the aim it was necessary to implement a whole set of different objectives, which can conditionally be classified into scientific, methodological, organizational and financial objectives and which largely had to be performed in a direct international cooperation and international context:

- to develop the directions of international comparative research in Latvia by participating and accumulating experience in international studies, by obtaining and publishing scientific results, by educating the research staff, etc;
- to master the methods of measuring international educational studies, including the possibilities of international training;
- to develop and ensure the infrastructure necessary for international educational studies:
 - research structural units,
 - informative and technological provisions (modern computers, specialized software, Internet, scientific literature),
 - finances,
 - cooperation with the Ministry of Education and Science;
- to participate in the international research projects, in the respective organizations and international cooperation, which gives a possibility to implement a continuous comparative assessment of Latvia's system of education;
- to obtain specific practical results, to hand them over to respective institutions and make them public.

The aim and objectives were determined by the situation that during the Soviet times Latvia together with many other countries of the world had no possibility to participate in the international educational research in order to evaluate comparatively the achievements and shortcomings of our system of education. Thus the scientific research directions of international comparative education and its methodology had to be created anew in Latvia, which of course, went hand in hand with the necessity to train the research staff, to find the finances, to develop the infrastructure and gradually join the respective international research programmes because correct and valid comparative data and conclusions can be obtained only by participating in different programmes (Geske, Grinfelds, Kangro, 1997; Geske, Kangro, 1996; Geske, Kangro, 2000; Kangro, 1999; Kangro, 2000).

All these objectives (even providing the initial financial resources and material resources) largely were to be solved internationally. This, to a certain extent, guaranteed us the scientific, didactic and organizational development, which corresponded to the international standards; however, at the same time the fast alignment with the global educational studies in the conditions when Latvia ran short of respective financial resources and experience demanded extreme effort, enthusiasm and selfless work on the part of the researchers. The development of the comparative educational research directions in Latvia is successful thanks to participation in the comparative educational research programmes of the IEA association (The International Association for the Evaluation of Educational Achievement) and OECD organisation (Organisation for Economic Co-

operation and Development). The Institute for Educational Research, faculty of Education and psychology, University of Latvia, in close cooperation with the Ministry of Education and Science performs the research in Latvia.

Conceptual approach and methods

The studies of the IEA association and OECD Programme for International Student Assessment – PISA are focused mainly on the quality of student achievement looking at them in a very broad context of educational system, school and student level.

The study model of intended, classroom implemented and student's achieved curriculum (Plomp Tj., 1992) lies at the basis of the IEA association studies. It means that the subject contents in the respective subjects or fields of education, the themes covered in the classroom and knowledge and skills actually mastered by students are being researched comparatively in the education standards, curricula and textbooks of the countries participating in the study. Many context features in all these three levels are being researched: the procedure of educational processes determined by state and educational system, educational resources in the country and the respective school, teaching / learning methods through eyes of the teachers and the students, students' attitude towards education and other issues, the social and economic situation of students' families, etc. IEA studies usually include students from elementary school, basic school and secondary school, as well as their teachers, school principals and parents.

- The conceptual approach of the OECD study (Measuring Student Knowledge and Skills,

2000) differs to a certain degree from the model offered by the IEA association. Actually the OECD countries set forward a very serious and complicated task for the student assessment programme – to examine if the results of country’s educational system correspond to the advanced aim – to educate students so that they are prepared for life in future and life long learning, that they acquire knowledge, skills and competencies, which would provide their personal and social well-being. OECD PISA assesses more the student skills to use the knowledge acquired at school in real life situations than it examines what students have mastered in the respective school subjects. OECD PISA assessment is as if student– future directed – it assesses his / her readiness for life and further education in a complex way, it is not past-directed – it does not establish and compare student achievements in the most important common parts of the learning contents in the participating countries.

- The study instruments are worked out on the basis of the previously mentioned conceptual approaches and the research questions posted for the particular study. The main of them are: the student tests and student, teacher, school principals and parents’ questionnaires, as well as the methods for analyzing different documents of the educational system (e. g., education standards, etc.) and text books. It should be mentioned that usually half of the questions included in the tests look for free answers; they are not multiple-choice questions.
- Sampling of the study participants is carried out with the help of random-stratified method in strict correspondence with the interna-

tional demands. OECD PISA selects 15 year old students irrespective of their grade and school type (general school, vocational school, technical school, evening school), who are studying. IEA studies select particular student age groups from the elementary school, basic school and secondary school; participants in the study are selected from the respective grades, usually from the general educational institutions. Lately also students from schools and grades with Russian as the instruction language are always included in the studies. The total number of participants from each country according to the set demands is several thousands students.

Each study includes also the field trial the aim of which is to select and specify the instruments and methods of the study.

The wide composition of the participating countries allows us to evaluate the educational system of our country both in the broadest international context and in the European context, in the group of candidates to the European Union and among our closest Nordic neighbour countries, in the group of Central European and eastern European “post-socialism” countries, etc.

Survey on achievements of Latvia’s students and tendencies of their change in international comparison

Since regaining its independence during the time period from 1991 till 2002 Latvia participates in nine large-scale international comparative studies. One of the obtained results in this research usually is the place of Latvia’s students among other participating countries in accordance with students’ performance and achieve-

ments in knowledge and skills tests in the respective subjects or educational fields. The summary of such results is given in Table 1. (Geske, Grinfelds, Kangro, 1997; Geske, Kangro, 1996; Geske, Kangro, 2000; Kangro, 1999; Kangro, 2000). Usually the differences in the average results of several closely positioned countries in the performance tables are not statistically significant. Even more, for instance, in the studies of civic education and reading literacy where the differences among the average performance results of the countries are less than in mathematics, the countries can be divided into three groups:

- the achievements above the international mean score;
- the achievements which statistically significantly do not differ from the international mean score;
- the achievements below the international mean score.

Usually the differences in students' average performance among the mentioned country groups are not statistically significant.

Table 1 proves, that we have shown the best results among all the other participating countries in the TIMSS-R study, which gives the comparison of 8th graders performance in mathematics and science during the time period 1995–1999. The table also shows that the results of our 8th graders in mathematics and science in 1995 were below the international mean score, in 1999 – they were along the international mean score; however, Latvia had shown the greatest improvement of the performance within this time period among all the participating countries. It should be mentioned that TIMSS-R is the first study where Latvia obtains a proper comparison of changes in students' performance over time. With Latvia continuing to participate in the international cyclic programmes we will in future receive a regular assessment of our developmental tendencies in

education. Our students have also had very good results in information science – the 2nd place among 8 participating countries. The performance of our students in other studies corresponds to the countries with average results or countries showing results that are below the mean score. We can see that at the elementary school stage the results of our students in all the previous studies (reading literacy, mathematics literacy and science literacy) correspond to that group of countries the results of which do not statistically significantly differ from the international mean score.

However, in the OECD PISA study the results of our 15-year-old students in all three content areas – reading literacy, mathematics literacy and science literacy are below the mean score.

These OECD PISA results do not contradict the results of the previous international studies (for instance, TIMSS-R) where Latvia was in the group of countries with average achievements. Here we have to keep in mind the differing composition of the participating countries, different selection of the study participants, different conceptual approach and another type of test tasks in the OECD study, where the main emphasis was put on using the knowledge and skills in real life situations.

Usually in the international studies it is impossible to explain the definite results and the position of countries in the group with the highest, average or lowest achievements with the help of one hypothesis. For instance, in the study of civic education not all the countries with traditions of lasting democracy and civic education have better results than the students representing countries, which have recently developed a democratic state, etc.

It should be definitely mentioned that the place of the country in the table of students' mean scores in no case is the only result of in-

ternational studies and it even cannot be considered to be the main result.

A more detailed insight into the research results is given by distribution of students' results, which together with students' mean scores also show the differences of students' performance in each participating country. The differences among students' achievements within each participating country are greater than the differences in the meanscores of students' achievements among the participating countries. Such a situation is characteristic of any research. Therefore in analysis of the performance differences within countries in the international context is the main direction in the international and national analysis of the research data in every international study. The students' performance distribution analysis is carried out using the vast information included in students, teachers, and school principals and parents questionnaires. Thus it is possible to determine at least a part of the reasons causing differences in students' achievements.

In Latvia, too, during the previous ten years the results of each international study were analyzed in such an aspect and many common conclusions were drawn, too, which are based on the results of practically all international studies in which Latvia has participated since 1991 till 2001.

Let's give just some results as an example:

Differences in students' knowledge and skills in Latvia are determined by:

- *Factors related to the educational institution and class (whether school is situated in the city, town or country, school type, class atmosphere);*
- *Factors related to the family (number of books at home, level of parents' education);*
- *Factors related to individual students (learning motivation – the length of the planned further education, attitude to studies, gender).*

All international research in Latvia proves that students of the capital – Riga and students of other large cities have higher average achievements; the lowest achievements are shown by students of country schools. Thus, one of the objectives of education policy in Latvia is to ensure possibilities of attaining equally qualitative education in urban and rural schools.

Within the same grade set, students of secondary schools show better results than students learning at basic schools.

The OECD PISA, TIMSS research results show that the education quality of the state depends on state's economic situation.

OECD PISA achievements of Latvia's students correspond to the level of state's economic development in accordance with the criteria set by the OECD countries.

The analysis of the international research data shows that both students showing the highest academic achievements and students with very low achievements learn in schools of Latvia. Amount of the weak students is rather big. Thus the educational system has to pay an increasing attention to this group of relatively weak students, which will certainly face difficulties in their future education and life.

Students of Latvia and their families in the international comparison excel with a great number of books at home, classic cultural activities (visiting museums, art galleries. Ballet, opera, chamber music concerts, etc.) and discussions of these themes, as well as presence of culture-related articles (fiction, pictures, etc.) at home. Knowledge and skills in the international tests are better to those students in Latvia whose families are characterized with the above mentioned features to a greater extent, the same refers to the communication with parents (different discussions, including discussing school, joint meals, etc.).

Results of the Civic Education Study in two age groups

Two IEA organized studies in civic education were carried out at the end of the previous cen-

tury (Torney-Purta J., Lehmann R., Oswald H., Schulz W., 2001). The target population in the first of them CES (Civic Education Study) was 14-year old students, which in most participating countries corresponded to grade 8. All in all

Table 1. Summary of the international comparative educational studies (number of participating countries and Latvia's ranking according to results of students' tests)

Study (year of data collection)	Grades covered (age)	Topic	# of participating countries	Latvia's ranking
RLS (1992)*	3-4	Reading literacy	28	17
	7-8	Reading literacy	32	25
COMPED (1993)	11	Informatics	8	2
TIMSS (1995)	3	Sciences	24	16
		Mathematics	24	14
	4	Sciences	26	18
		Mathematics	26	15
	7	Sciences	39	34
		Mathematics	39	28
	8	Sciences	41	32
		Mathematics	41	30
12	Physics	16	9	
	Math. (advanced course)**	17	5	
TIMSS-R (1999)	8.	Sciences	38	20
		Mathematics	38	18
CIVIC (1999)	8	Civic education	28	26
CIVIC (2000)	10	Civic education	16	Comparisons between grades within each country
TIMSS-R (1995, 1999)***	8	Sciences	26	1
TIMSS-R (1995, 1999)***	8	Mathematics	26	1
OECD PISA (2000)	15 years old	Reading literacy	32	28
		Mathematics literacy	32	25
		Sciences literacy	32	27

* Parallel study – data were collected after IEA RLS study and were not included in the international report, but in data analysis it was possible to use the full database from the international study.

** Parallel study in Latvia using IEA TIMSS instruments.

*** Trends in the achievement of students between 1995 and 1999.

- RLS – Reading Literacy Study
- COMPED – Computers in Education
- TIMSS – Third International Mathematics and Science Study
- TIMSS-R – Third International Mathematics and Science Study Repeat
- SITES – Second Information Technology in Education
- CES – CIVIC Education Study
- OECD PISA – OECD Programme for International Student Assessment
- PIRLS – Progress in International Reading Literacy Study

28 countries participated in CES, tests and questionnaires were spread and analyzed in 1999. 2849 8th grade students represented Latvia from 142 schools. The test included 38 tasks with the help of which it was possible to determine students' knowledge in civics and their skill of interpreting the political events. There was also a background questionnaire and a questionnaire on attitudes and opinions about different social processes.

The target population of the second study (CES Old) was secondary school students. 16 countries of which only Israel had not participated in the first study, took part in it. Tests and questionnaires were spread and analyzed in year 2000. Latvia in the study was represented by 2756 10th grade students and the first year students of the vocational schools. The test part was changed – some simple tasks, not appropriate for the secondary school students were excluded, it was supplemented with new tasks, including a set of tasks on economics. The questionnaire was preserved the same as in CES study.

The results of Latvia's 8th graders in the CES 1999 study were not high – they were statistically significantly lower than the mean score (see Table 2). Therefore we with great interest awaited the results of the international comparison of the secondary school students in the repeated CES study in year 2000. As the CES Old was performed at the secondary school level then it is very equivocally to compare the countries according to their average achievements. It is based on two conditions. Firstly, each country could include any secondary school class in the study. It could vary from grade 10 to grade 12. The selection of grades depended on the aims set forward by the researchers of the particular country. The researchers of Latvia were interested in assessing the influence of the civic education course

on students' academic achievements and opinions. As civic education as a subject is taught in grade 9, then we chose grade 10 for the study – it is already a secondary school grade (an compulsory precondition of the study) and is the closest to grade 9. Thus Latvia's students were the youngest in comparison with students from other countries, their average age was only 16.6 years. The oldest students in the research were from Denmark – their average age was 19.4 years (these and other data on CES and CES Old studies are presented in Table 2).

The second condition is the target population of the study – i.e., the group of students forming the sample. Usually the target group in the study is made of all the students of the respective grade in the country. In case of the secondary school the situation is more complicated. First of all, not all students continue their education in the secondary school. Secondly, students are divided in several tracks in the secondary school stage. There are the following tracks in Latvia: general comprehensible secondary schools, technical schools, vocational schools with secondary education inclusive, vocational training of different length secondary education exclusive. Each of these tracks has a different study standard and the choice of these tracks mainly depends on students' academic achievements. If the sampling includes students from the classical secondary school then, unequivocally, the mean score will be higher in comparison with the situation when sampling includes also students from vocational schools. Latvia's sample included students from actually all respective educational institutions and out target population was less than 5.0 per cent of the youth of the corresponding age.

Taking into consideration the above said, a direct comparison of Latvia and Denmark's

score does not tell us much. It is better to use another aspect – the increment of students' mean score per a year. We get the increment of score by dividing it with the increase of the average age of students. The increment of students' mean score per year varies from 2 points (Poland) to 8.9 points (Estonia). Latvia has 6.1 point, which ranks her 6th among 15 participating countries.

It is also possible, when estimating, to take into consideration the target population, which in this case is a set of students, which makes a sample. For instance, the sample can be developed both from the set of all 15-year-old students and only from the set of the classical secondary school (gymnasia) students of the respective age group. The increment of the mean score is negatively correlated with the size of the target population, which is expressed as a proportion against all the young people of the respective age in the country. It is seen in Figure 1, which presents the relationship between the increment of mean score and the size of the sample target population. The simplest way is to estimate the regression equation and to recalculate the increase of the average results per year, thus getting the adjusted increment of mean score. With the help of such estimations, the dispersion decreases, the greatest increment of score is 8.4 (Estonia) and the smallest – 3.4 (Poland). Thanks to the large target population Latvia receives additional 0.7 points and would share the 5th and 6th place with Norway. The difference with Estonia's increment of score has decreased from 2.8 points to 1.6 points. Latvia's results are higher than the mean score of the participating country and a bit lags behind the very best (Estonia, Portugal and Switzerland).

It is interesting to compare the mean score of the basic school students with that of the

secondary school students. The increment in score is lower in the countries, which had very high score in the first study (Hong Kong, Cyprus and Poland). It is well seen in Figure 2, which presents the mean score of the countries in CES and the average adjusted increment per year (Figure does not include Columbia and Chile).

If the mean score of students in CES and CES Old in each participating country are extrapolated to 18-year-old students, then the differences diminish considerably. For instance, the standard deviation of mean score of basic school students in 13 participating countries (Columbia and Chile excluded) is 5.4 points, but among the 18-year-olds it would be only 3.9 points. Thus we may conclude that the score of Latvia's secondary school students in the CES Old study is considerably better than in the CES study and Latvia's students show higher increase of mean score per year than the international average. Despite the low score in the basic school, the results have become better in the secondary school and the difference between the mean score of Latvia's students and those of other countries has decreased.

One of the explanations for the considerable increment of Latvia's 10th graders in the field of civic education in comparison with the 8th graders is the more open atmosphere in the lessons. Thus, for example, the number of answers "strongly agree" and "agree" given to the statement "Students feel free to disagree openly with their teachers about political and social issues during class" has increased from 61 per cent in 8th grade to 75 per cent in 10th grade. The number of the above mentioned answers has increased considerably also to the other statements – "Students are encouraged to make up their own minds about issues" (from 63 per cent to 77 per cent), "Teachers respect our opinions and encourage us to express them during class" (from

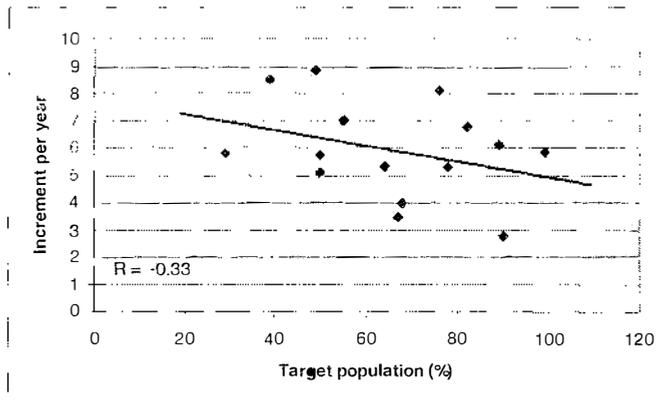


Figure 1. Relationship between the increment in performance and size of the selected target population

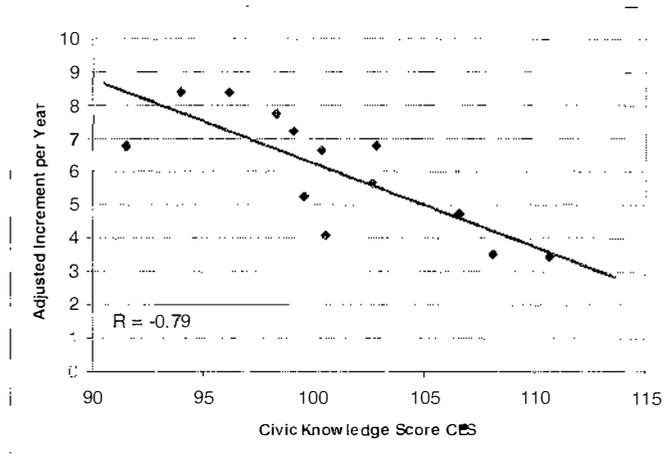


Figure 2. Relationship between the increment in performance and performance of the basic school students

65 per cent to 76 per cent), “Students feel free to express opinions in class even when their opinions are different from most of the other students” (from 68 per cent to 78 per cent), “Teachers encourage us to discuss political or social issues about which people have different opinions” (from 44 per cent to 55 per cent). Thus in these senior grades the students are encouraged to

develop and openly express their opinions. The more open atmosphere and discussions in the classroom is positively connected with students’ knowledge and skills in the field of civic education, which is also proved by the correlation of the test and questionnaire results. The correlation of the 8th graders’ knowledge and skills in tests and answers to the set of the above men-

Table 1. Data on CES and CES Old research results

Country	Mean age in CES	Grade in CES	Mean Score in CES	Mean Age in CES Old	Grade in CES Old	Mean Score in CES Old	Target Population in CES Old (μμσσ)	Increment per Year	Adjusted Increment per Year	Extrapolated Mean Score to age 18
Chile	14.3	8	88.4	17.9	12	107.7	64	5.3	5.3	108
Colombia	14.6	8	86.4	17.7		102.4	50	5.1	4.6	102
Cyprus	14.8	9	108.1	17.7	12	118.2	67	3.5	3.5	119
Czech Republic	14.4	8	102.6	17.9	12	121.1	78	5.3	5.7	123
Denmark	14.8	8	100.4	19.4	12	132.3	55	7.0	6.7	121
Estonia	14.7	8	94.0	18.2	12	124.8	49	8.9	8.4	121
Hong Kong (SAR)	15.3	9	106.6	18.5	12	124.8	29	5.8	4.8	119
Latvia	14.5	8	91.5	16.6	10	104.8	89	6.1	6.8	115
Norway	14.8	8	102.9	18.1	12	121.8	99	5.8	6.8	124
Poland	15.0	8	110.6	17.6	11	117.8	90	2.8	3.4	121
Portugal	14.5	8	96.2	17.6	11	121.1	76	8.1	8.4	126
Russian Federation	15.1	9	99.6	17.0	11	110.9	50	5.7	5.3	115
Slovenia	14.8	8	100.6	18.4	12	115.3	68	4.0	4.1	114
Sweden	14.3	8	99.1	18.9	12	130.2	82	6.7	7.2	126
Switzerland	15.0	8.5	98.4	17.9	11	123.7	39	8.5	7.7	122

tioned statements is 0.21. The correlation between the students' knowledge and skills in the field of civic education in the 10th grade is even more pronounced – the respective correlation coefficient is 0.31. It is well illustrated in Figure 3, which presents the relationship between the answers to the statement “Students feel free to disagree openly with their teachers about political and social issues during class” and the results in the civic education test in grades 8 and 10.

The civic education research provides us with comprehensible information on students' opinions and attitudes in the field of civic education in the basic school and secondary school group.

A wish to participate in such political activities as, for example, joining the political party, to nominate themselves for local municipal elections, etc. in future, which is greater than the average in other participating countries characterizes the 14-year-old students and also secondary school students of Latvia in the international comparison.

51 per cent of Latvia's 10th graders admit that they are interested in politics. 41 per cent of 8th graders are of the same opinion. The international comparison as well shows that interest in politics is much more expressed in the group of secondary school students. Thus the increase of the secondary school students' interest in politics in Latvia corresponds to the international tendency. The Latvian students' interest in politics in both age groups corresponds to the average international level.

71 per cent of the Latvian 8th graders and 79 per cent of the 10th graders think that they will participate in the elections through voting, which, in its turn, is a lower showing than the average in other participating countries. Even a smaller part of the 14-year-old students in Estonia, Czech republic and Switzerland think that they will vote and this also refers to the secondary school students in Slovenia and Switzerland. However, in Denmark 97 percent of secondary school students think that they will participate in elections.

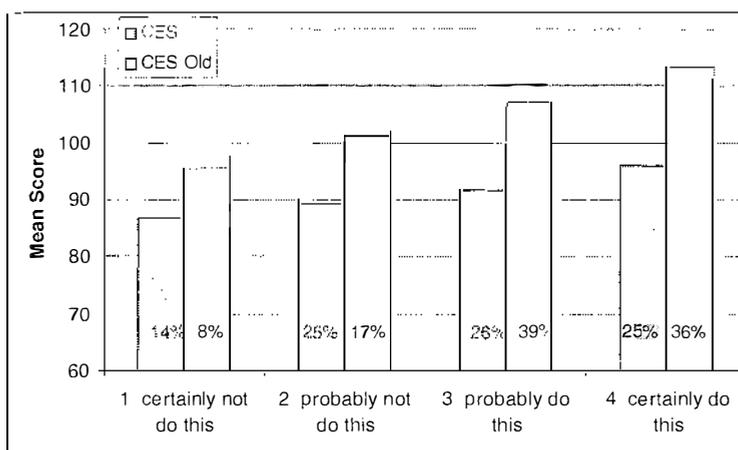


Figure 3. The relationship between the answers to the statement “Students may openly disagree with their teachers when discussing political and social issues in the lesson” and the results in the civic education test in grades 8 and 10

Certainly, such an opinion expressed by the students does not yet guarantee that they will actually participate in the elections when they reach the respective age.

The trust of Latvia’s secondary school students in state institutions has decreased if compared with the 14-year-old students. The trust in Latvia’s government has decreased from 30 per cent to 22 per cent, in Sacima (National Parliament) – from 35 per cent to 28 per cent, in political parties – from 20 per cent to 14 per cent. This tendency – the more senior students show a lower degree of trust – on the whole is also observed in the international comparison. The more critical attitude of senior students is expressed also in their answers to the statement “Politicians soon forget the needs of their voters” (68 per cent of 8th graders and 81 per cent of 10th graders gave a positive answer).

The degree of trust in state institutions is very different in different countries. For instance, 18 per cent of secondary school students of Slovenia, 23 per cent in Poland and 25 per cent in Czech Republic have trust in government, while 91 per

cent of students in Denmark, 66 per cent in Norway and 57 per cent in Sweden trust the government. The degree of trust in state institutions is higher in the countries with longer traditions of democracy (more than 40 years). Latvia belongs to the group of states where the degree of trust in state institutions is lower than the international average. A more detailed national analysis of data shows that the opinions in the field of civic education in Latvia in many questions differs considerably among the students from schools and classes with Latvian or Russian language of instruction though the knowledge and skills in the test are the same. Thus, for instance, Table 3 presents students’ attitude to the state, its flag and its achievements. It can be observed that the opinions of the Latvian speaking students actually correspond to the international average while the opinions of the Russian speaking students are different. This difference in opinions is even more pronounced in the senior group (the 10th graders).

The analysis of other research data also shows that Latvian and Russian speaking students have

Table 2. Positive attitudes toward one's nation (percentages of responses "agree" and "strongly agree")

Item	International Item Frequencies (14-year-olds, survey in 1999)	Latvia 14-years-olds, survey in 1999 (grade 8)		Latvia 16-years-olds, survey in 2000 (grade 10)	
		Latvian Language of instruction	Russian Language of instruction	Latvian Language of instruction	Russian Language of instruction
The flag of this country is important to me.	82	86	43	89	34
I have great love for this country.	87	84	63	82	53
This country should be proud of what it has achieved.	86	83	70	81	59
I would prefer to live permanently in another country. (negative)	23	28	33	27	42

different social value systems and the sense of civic belonging. Therefore the integration program of Latvia's society should place great importance on civic education at schools, which has to develop at a maximum degree also the development of social cohesion in educational system.

In general the differences among the opinions and attitudes in the field of civic education in Latvia in both age groups are similar to the most participating countries.

The increase in the knowledge and skills of the 10th graders in the field of civic education in Latvia if compared with the 8th graders is greater than the corresponding mean increment score in the international comparison.

One of the factors which determine students' better knowledge and skills in civic education is a more open atmosphere in the classroom, a possibility for the students to discuss openly the political and social issues in the lessons.

IEA SITES study in Latvia

Taking into consideration the rapid development of information technologies and their increasing use in different spheres of community life, we can justly assert that already today educational systems of several countries have to solve very serious questions connected with adaptation of such aims of education which ensure the education of youth that corresponds to the needs and demands of the information society.

The development of ICT – Information and Communication Technology in the field of education has been so fast that a certain information vacuum on the development and integration processes of the ITC in education has developed during the latest decade. The International IEA association has provided a considerable contribution in decreasing the lack of information by implementing the international research in 1989 and 1992 COMPED (Computers in Education) (Pelgrum, Plomp (1993); Pelgrum, Janssen Reinen, Plomp (1993)) and by starting in 1997 the international research

SITES (Pelgrum, Anderson (2001)), as well as by including several ICT related indicators in other IEA studies. During the time period of twelve years information has been collected several times on different aspects of using ICT at schools. The analysis of this broad database allows seeing several common tendencies, which can be observed in different educational systems.

School principals and ICT strategy at school level

It was stated already in 1991 that school principals taking into consideration their post could be an important change agent at schools (Pelgrum, Plomp, 1991). On the basis of the IEA COMPED and SITES research results we can confirm that the increase of positive attitude towards the introduction and use of ICT in the study process can be observed. School principals on the whole have a positive attitude and support the introduction of new technologies at school. It refers both to the introduction of innovative pedagogical experience concerning the use of ICT in different school subjects and to the use of computers in administrative work and planning. The strategy of introducing and using ICT at more than 50 per cent of schools in the countries participating in the research is included in the documents, which summarize the main objectives and directions of actions (Pelgrum, Anderson, 2001).

Readiness of teachers to use ICT

All the countries participating in the SITES study support the view that the teacher has a very important (even may be the most important) role in the process of innovations is connected with

the introduction of ICT at schools. In order to use ICT effectively and in a methodologically well-grounded way at school teachers are to be prepared at due time and at a very good level for using ICT in their subjects.

It is clear that teachers of information science have a rather important role in disseminating the new ICT use – related information at school. In this case it would be interesting to know how well these people are prepared for the cooperation with their colleagues in explaining and popularizing the latest developments in ICT.

The teachers of information science and the coordinators of the computer use in the schools participating in the study had to answer questions concerning their competence in issues of general ICT use (NetWare, MS-DOS Shell – operational systems, text processing, data basis, chart processors), as well as the specific use of ICT in the study process (specialized software in different subjects, the didactic basis of integrating computers in different subjects, the choice of the teaching software and assessment, the use of computers in individualization of the study process). Having summarized the obtained information at the secondary school level (see Figure 4), it is possible to admit that the computer specialists of the school in all countries have assessed their level of preparedness in the issues of general ICT use considerably higher but their preparedness in the methodological and didactic questions connected with the use of ICT rather low.

In Latvia, for instance, the respective assessments are 72 per cent and 33 per cent, which clearly indicate the field in which much has to be done in order to approach the optimal situation. It should also be noted that a similar situation was established also in other educational levels – basic school and lower secondary classes (Pelgrum, Anderson, 2001).

The infrastructure development of ICT and some indicators

The information collected in Module I of the SITES study allowed establishing a rather wide system of indicators, which can be used to characterize the current state of the country's educational system in the field of ICT use (see, Pelgrum, Anderson, 2001). However, it should be admitted that in everyday context it would be much easier to work with a small group of indicators, which were easy to measure and interpret.

For instance, today one of the widely- used indicators shows how many students share a computer at school. This indicator is also included in the OECD yearbook of 1998 (OECD At a Glance). Figure 5 presents the comparison of how this indicator has changed over time using the data from the OECD yearbook and reports of the SITES study as the basis (Pelgrum, Anderson (2001)). Schools are try-

ing to keep in pace with increasing informatization of the society and wish to provide their students with the best possibilities of acquiring modern technologies. The student/computer ratio in Canada, Denmark, New Zealand and Norway is approximately ten students per computer. According to IEA SITES research data the students/computer ratio – five students per computer, which could be considered optimal for the effective acquisition and use of modern information and communication technologies, is the nearest aim at the secondary school level.

Latvia has to achieve much in this field because students' provision with computers is a slow process. Picture 3 shows that in 1998 47 students had to share a computer in schools of Latvia, which is a very bad ratio. In spite of the fact that at present two broad investment programs (LIIS – informatization system of Latvia's education; RIIS – informatization sys-

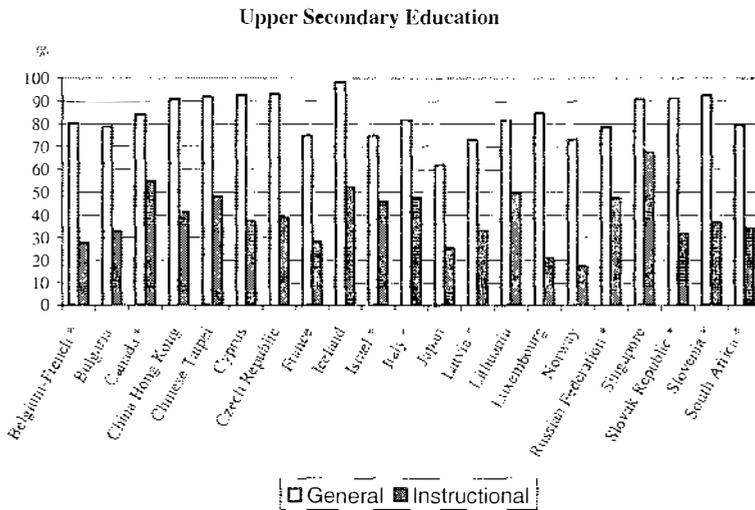


Figure 4. Comparison of teachers' selfassessment in Module I of the IEA SITES study (Pelgrum, Anderson, 2001)

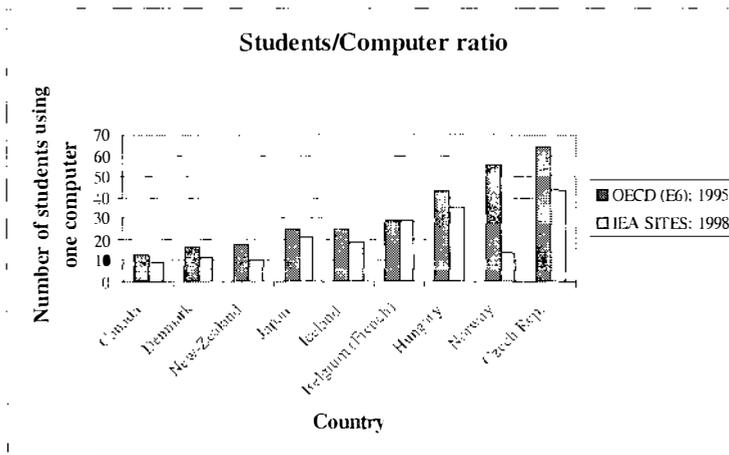


Figure 5. Changes in students/computer ratio in Grade 8 in 1995–1998 (OECD, 1998)

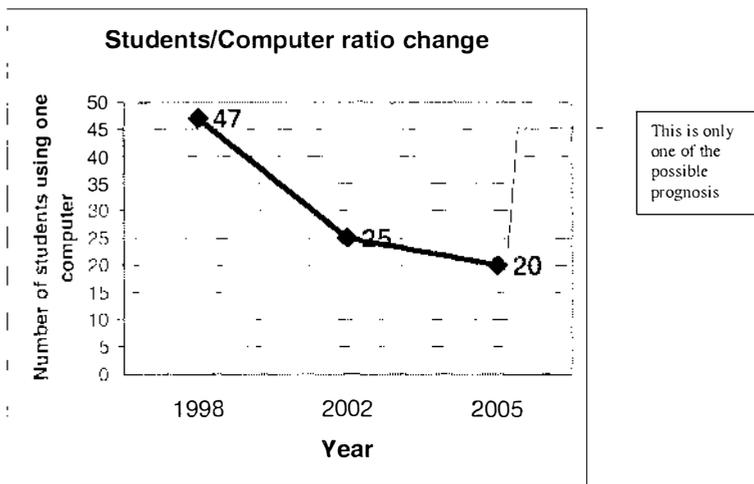


Figure 6. Changes of students/computer ratio in schools of Latvia (SITES, LIIS, and Ministry of Education and Science data 1998–2000)

tem of Riga) are being implemented the amount of the investment has not allowed to make this ratio better than 25 students per computer in 2002.

The above said allows us to conclude that student / computer ratio is a valuable indicator,

which characterizes the technical provision of the school with ICT. Using the methods of SITES research it is advisable to estimate this indicator taking into consideration the number of all students and all computers at school, which are to be used in the study process:

$$N_{\text{stud/comp}} = \frac{N_{\text{stud}}}{N_{\text{comp}}},$$

where

N_{stud} is the total number of students at school,
 N_{comp} is the total number of computers to be used in the study process.

Today effective use of ICT is not imaginable as working in isolation from the Global Network. In order to find out how the access to computer networks is realized at schools participating in IEA SITES study, the school principals and teachers of the information science were asked more than ten different questions about school's computers network connections, WWW pages, e-mail addresses, teacher-students-parents' communication with the help of e-mail, etc. The simple indicator, which characterizes the potential of the school in using ICT to search for the information and to process it in computer networks, can be estimated in the following way:

$$C = \frac{N_{\text{agn}}}{N_{\text{comp}}},$$

where

N_{agn} is the number of computers with access to global network,
 N_{comp} is the total number of computers to be used in the study process.

The assessment of the LIIS program in March 2002 showed that 74 per cent of schools had Internet connection (768 schools out of 1029 schools of Latvia have the Internet connection; 396 schools have a Dial-Up, but 372 schools– the On-Line).

The use of ICT in the study process is quite an important issue. How can we find out if the computers at school are just the object of investigation at mathematics classes, a technical device to write a text or draw a graph, or in the study process

they are the necessary information processing means, which helps in solving problems, a deeper understanding of the subject and promotes everything described as the innovative methods in education with orientation towards life long learning? In order to get an insight into school's attitude towards a traditional or innovative use of the computers we can apply an indicator, which is rather simple to estimate at school – 'the dispersion' ratio of computers at school:

$$I = \frac{N_{\text{disp}}}{N_{\text{comp}}},$$

where

N_{disp} is the number of computers in different study rooms (specialized computer class excluded),
 N_{comp} is the total number of computers at school to be used in the study process.

A stable tendency can be observed in the latest 10–15 years – the school principals on the whole assess the introduction and use of ICT in different spheres of school life very positively.

The proportion of examples showing the innovative use of ICT in teaching/learning methods is becoming more and more important. Most of the countries participating in the IEA SITES study emphasize that a special attention should be paid to the use of Web Technology in collection and processing of information, as well as to the cooperative methods with using ICT in different stages of task performance.

ICT is being introduced in the study process earlier and earlier with every year, starting already with the elementary school. Thus, it is planned that pupils graduating from the basic school will have reached the ECDL (European Computer Driver License) level in ICT competence skills.

The computer specialists of the school in all countries participating in the study have assessed their level of preparedness in the issues of general ICT use higher but their preparedness in the methodological and didactic questions connected with the use of ICT rather low.

Conclusion

Having participated in international comparative studies for 10 years Latvia during this period has developed this scientific direction, has obtained practical results and has accumulated large-scale databases, which allow continuing a many-sided educational analysis, to draw conclusions and discuss tendencies.

The quality of education in the grades 1 to 4 in Latvia corresponds to the international average level. A really serious attention should be paid to the grades 5 to 9 of the basic school – especially, by developing students' competences

to use the acquired knowledge in real life situations.

The results of the research cycles show that our system of education has improved continuously. Latvia has always shown better results in the repeated studies but at the same time new important data for further development and improvements are obtained.

Participating in the comparative research programmes of the OECD PISA and IEA association we set the highest standards in today's world both to the educational system of our country and its improvement and to the level of research work and research methods with the help of which we compare the quality of Latvia's education internationally. The participation in these comparative studies gives a possibility for Latvia to integrate in the European and world development and improvement processes of education.

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TARPTAUTINIAI LYGINAMIEJI TYRIMAI LATVIJOJE: REZULTATAI IR KRYPTYS

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Santrauka

Šiame straipsnyje pateikiama lyginamųjų edukologijos tyrimų, Latvijoje atliktų per pastaruosius dešimt metų, apžvalga. Aptariami pasaulyje plačiai žinomų IEA TIMSS ir SITES, OECD PISA ir kitų tyrimų rezul-

tatai, gauti Latvijoje ir kitose šalyse. Tai leidžia susidaryti vaizdą tiek apie Latvijos, tiek apie kai kurių kitų šalių edukologijos laimėjimus.

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