ICT Development in the Latvian Educational System: Research Results

A study "ICT Development in the Latvian Educational System" was organised by Microsoft's partner training programme in conjunction with the Ministry of Education and Science of Latvia. A memorandum of co-operation was concluded on September 6, 2004. The study was conducted by the social and market research centre "Latvijas Fakti" at the commission of Microsoft Latvia. Support was given by the secretariat of the minister with special portfolio for E-governance, the Ministry of Education and Science, and the www.skolotajs.lv Internet portal.

GOALS AND MISSIONS

The aim of the study was to focus on the way in which the quality of education in Latvia's schools is being improved, and on the availability of technologies in schools. The authors of the study sought to analyse the way in which technologies affect education, while identifying the true needs of Latvia's general education schools. Three basic issues were considered in terms of the development of information and communications technologies in education – the accessibility of technologies, skills in the use of technologies, and the content of digital education.

The study, which was called "Development of Information and Communications Technologies in Education", provided Latvia's first look at the accessibility and use of ICT in education, but also at the technical, emotional and curriculum-related obstacles which exist against the integration of ICT in the educational process. Experts, computer teachers, other teachers, future teachers, students and parents were all surveyed.

The study is meant for those who shape and implement educational policies in Latvia, as well as for school directors, teachers, students, parents and other interested parties.

STAGES OF RESEARCH AND RESPONDENTS

Three mutually linked studies and questionnaires were organised – the "Office Study", a qualitative study, and a quantitative study.

The "Office Study" sought to extract information from the Education Ministry, the Latvian Education Informatisation System (LIIS), and the school boards of Latvia's various local government territories. The study was conducted in September and October of 2004, and in May of 2005.

The *qualitative study* involved a survey of experts which took place from January 10-25, 2005. Twenty people who are directly related to the introduction or use of information and communications technologies in the educational system were surveyed. Respondents came from the Ministry of Education, the secretariat of the minister with special portfolio for E-governance, the Latvian Education Informatisation System, the Regional Education Board, several institutions of higher education (the Faculty of Pedagogy and Psychology of the University of

Table 1. Sample of schools

		Latvian	Minority	Total
Rīga	High school (large)	(large) 5	5	10
	High school (small)	(small) 3	4	7
	Elementary school	3	2	5
	Total in region	11	11	22
Vidzeme	High school (large)	(large) 3	0	3
	High school (small)	(small) 10	1	11
	Elementary school	29	0	29
	Total in region	42	1	43
Kurzeme	High school (large)	(large) 2	1	3
	High school (small)	(small) 6	0	6
	Elementary school	17	0	17
	Total in region	25	1	26
Zemgale	High school (large)	(large) 2	1	3
	High school (small)	(small) 7	1	8
	Elementary school	18	1	19
	Total in region	27	3	30
Latgale	High school (large)	(large) 1	2	3
	High school (small)	(small) 6	3	9
	Elementary school	16	4	20
	Total in region	23	9	32
TOTAL		**128**	**25**	**153**

Table 2. The number of computers at Latvian schools

	2004		2003	
Type of school	No. of computers (2004, Ministry of Education)	Computers per 100 students (2004, Ministry of Education)	No. of computers (2003, LIIS)	Computers per 100 students (2003, LIIS)
Primary school	352	4.5	291	3.1
Elementary school	6,448	9.1	5,902	7.5
High school	12,945	6.3	12,049	5.6
Special school	1,029	13.8	954	9.7

Source: The Ministry of Education and Science of Latvia, 2004

Table 3. Ratio between students and computers (1996 to 2004)

Year	No. of computers	No. of students	Students per computer
1996	3,593	342,081	95
1997	5,183	347,254	67
1998	6,247	348,205	56
1999	9,999	347,052	35
2000	13,763	344,822	25
2001	15,632	336,824	22
2002	17,222	325,503	19
2003	19,196	312,489	16
2004	20,774	289,638	13.9

Latvia, the Pedagogical Academy of Liepāja, the Daugavpils Pedagogic University), and a number of schools (the Ogre Gymnasium, the Ventspils No. 1 Gymnasium, the Aizkraukle District Gymnasium, and the Smiltene Gymnasium).

The *quantitative study* involved a survey of schoolteachers, including informatics teachers, as well as deputy school directors for informatisation. Also surveyed were future teachers, as well as students. Finally, researchers surveyed people in households with school-age children. This survey was conducted in April 2005.

The statistical data were studied so as to come up with the sample presented at Table 1.

The quantitative survey involved 153 computer teachers, 450 other teachers, 2,169 students, and 101 university students who are hoping to become schoolteachers. Also surveyed were 249 families (households) with school-age children.

AVAILABILITY OF COMPUTERS, INFORMATICS TEACHERS AND INTERNET CONNECTIONS AT LATVIAN SCHOOLS

According to the Latvian Ministry of Science and Education, the 990 schools which are in operation in Latvia owned 20,774 computers in 2004 (an average of around 21 computers per school). The number of computers increased by 1,578 in comparison to the number in 2003, when the Latvian Education Informatisation Centre reported that there were 19,196 computers at Latvian schools.

When people discuss the level of computerisation in the education system, the criterion which is usually used is the number of students per computer. In 2004, according to the Ministry of Education, there were 13.94 students per computer (as compared to 16.3 per computer in 2003, according to the LIIS). The average in the EU is around eight students per computer. The best situation reportedly exists in Denmark, where the ratio is roughly 3:1 (this information came from civil servants at the Ministry of Education during the qualitative study).

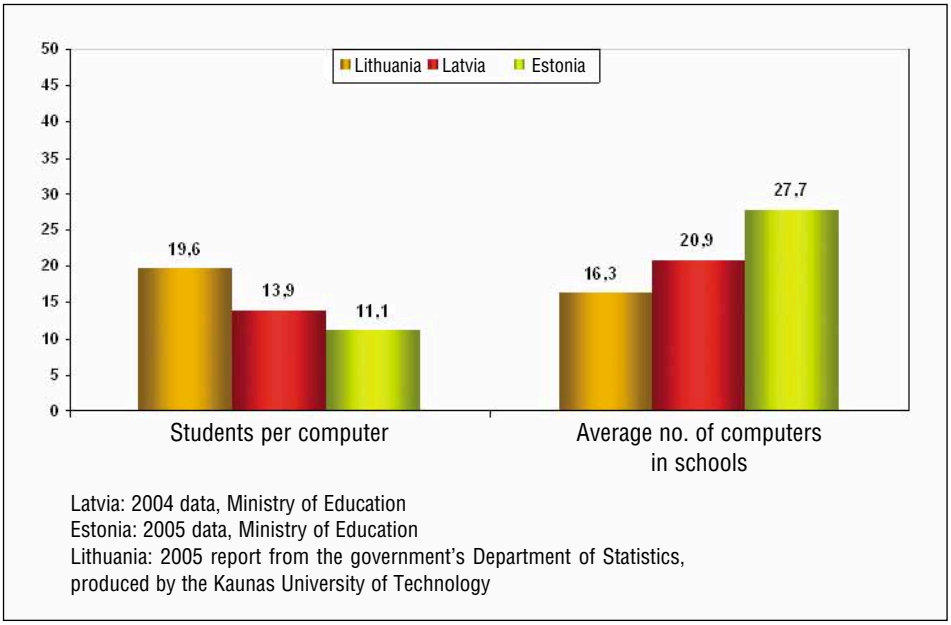
When the ratio between students and computers is calculated, this usually involves both the number of computers and the number of students, but this unified approach in calculating the criterion does not exist in Latvia at this time, so different sources of information provide different numbers. Latvia's situation, therefore, is hard to compare to the EU average, because the methods in calculating the students-to-computers ratio are not always known.

It needs to be remembered here that some school computers are too old to be used for the teaching process, but they are still included on the list and are considered when the number of students per computer is calculated.

In 2004, according to the Ministry of Education, Latvia's schools employed 938 informatics teacher (as compared to 1,145 in 2003, according to the LIIS). Of these, 762 have a higher education in pedagogy, while 176 have a different kind of education. 167 of the teachers have spent less than five years on the job, 157 have worked for between five and 10 years, and 614 have more than 10 years of experience.

In 2004, 178 schools had dial-up Internet access (18%), 48 had an ISDN connection (4.8%), 328 had a connection with a speed of up to 128 Kbps (33.1%), 213 – a speed of 128 to 512 Kbps (21.5%), 512 – a speed of 512 Kbps to 2 Mbps (10.6%), and 50 – a speed of more than 2 Mbps (5.1%). Also, there are 68 schools with no Internet connection at all (6.9%).

If we compare the level of computerisation in the schools of the Baltic States, we see that Latvia is below Estonia, where there is the largest number of computers per student, but above Lithuania.



Latvia: 2004 data, Ministry of Education
Estonia: 2005 data, Ministry of Education
Lithuania: 2005 report from the government's Department of Statistics, produced by the Kaunas University of Technology

Figure 1. Level of computerization in schools

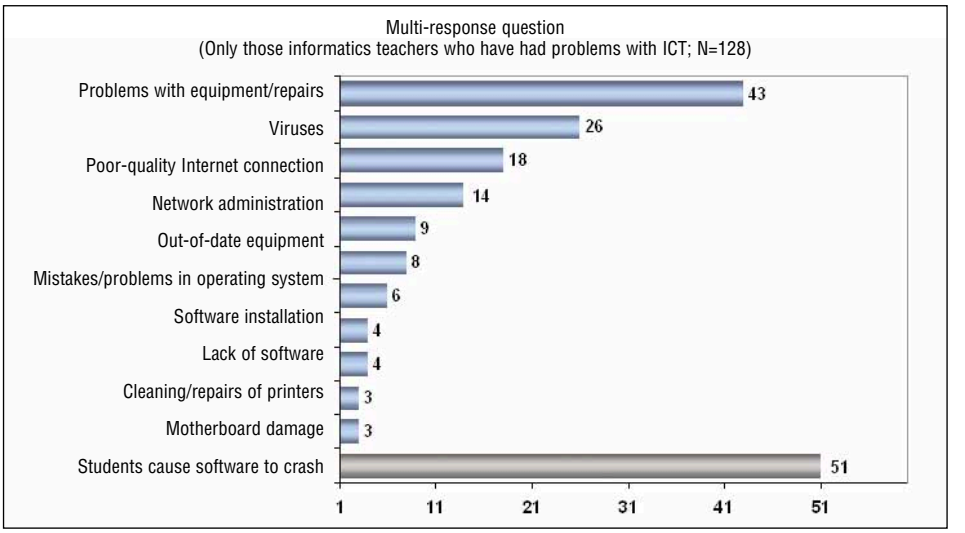


Figure 2. Most frequently mentioned problems with ICT

PROBLEMS WITH ICT USE IN SCHOOLS

The study involved a survey of 153 informatics teachers and deputy school directors for informatisation. They were asked about the supply of ICT at their schools – computers, processors, operative memory, hard discs, operating systems, computer classrooms, projectors, copying equipment, printers and scanners, as well as about where ICT is located at the school – in computer classes, in other classrooms, in administrative offices, or elsewhere. Respondents were also asked about technological problems in the area of ICT.

The 153 educational institutions which were surveyed have 3,847 computers among them, and most (74.1% or 2,851) are housed in computer classrooms. Others are in other kinds of classrooms, in school libraries, or in administrative offices. 63 computers (1.6%) were located in other parts of schools – student government offices, the offices of a psychologist, social aid officer or speech therapist, a lunchroom, student dormitories, recreation facilities, etc. Of all of the computers that are found in schools, the vast majority (3,282 or 85.5%) are connected to a network.

Among those informatics teachers and deputy directors who were surveyed, 38.6% reported that they encounter ICT-related problems once a month, on average, approximately 45% said that they encounter such difficulties once per year or half-year, while 16.3% did not report any problems of that type.

Those teachers who face problems with their computer equipment most often are usually found at pre-schools in rural areas. Informatics teachers in Rīga and the country's district centres, by comparison, almost never have problems of this kind (see graph on the next page).

The most common problems related to ICT include repairs of computer equipment (43 respondents), computer viruses (26), and poor quality in Internet connections (18). 21 computer teachers had faced problems with software – problems with the operating system, problems with software installation, crashes of software caused by students, etc.

ACCESSIBILITY AND USE OF ICT

Researchers surveyed 2,169 students, 450 teachers, 153 informatics teachers and deputy directors for informatics, and 101 university students who are pursuing a degree in pedagogy. They were asked about the availability of computer equipment at home and at their place of education or work. People were asked about how intensively they use the computer, whether and how much they access Internet resources, and whether they use these resources in the education process. Respondents were also asked to evaluate their own ability to use ICT in the educational process.

Most respondents in each of the aforementioned groups said that they have access to a computer at home. This was true among 86.1% of the university students at the top end, and 63.1% of schoolchildren at the lower end.

Among those respondents who said that they have a computer at school, at least one-half also said that the computer is hooked up to the Internet (50% of schoolchildren up to 63.2% of the university students). Nearly all of these people enjoy a permanent Internet connection.

The results of the public opinion survey of households were much

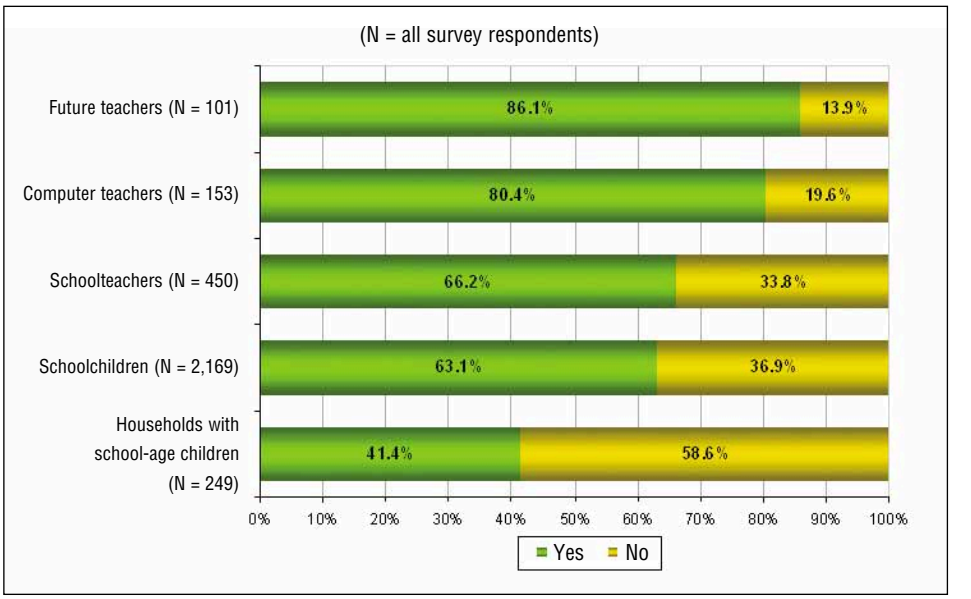


Figure 3. Do you have a computer at home (where you live during your studies)?

humbler – only 41.4% of households with school-age children have a computer, but it is clear that the older the school-age child, the more likely it is that there is a computer at home (54.4% of households with high school-age children have computers). This means that as students progress, they have an increased need for a computer, and many families do their best to purchase one.

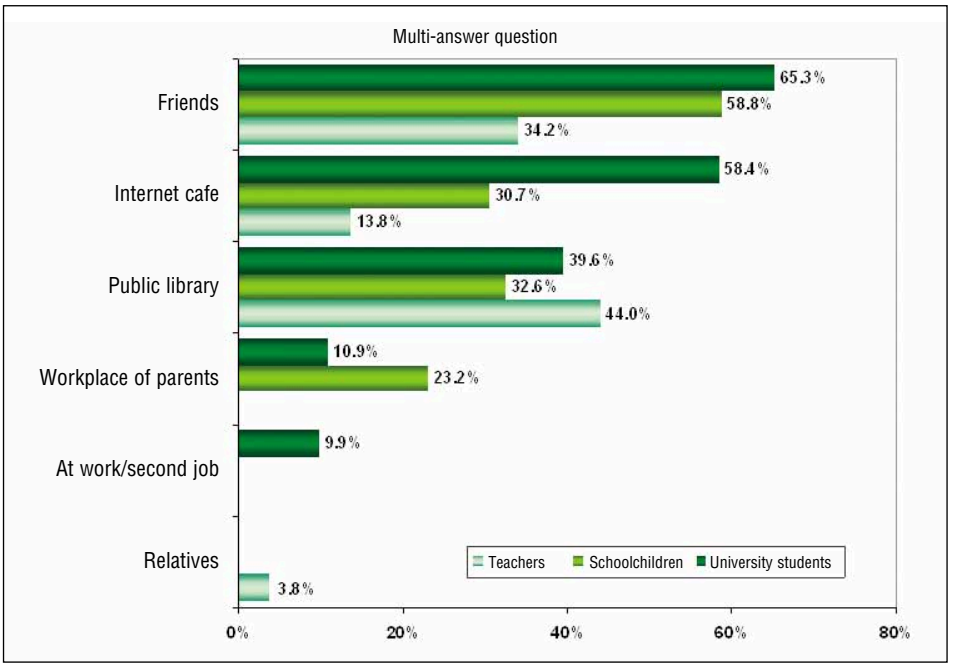


Figure 4. Places outside the home/school where a computer is available

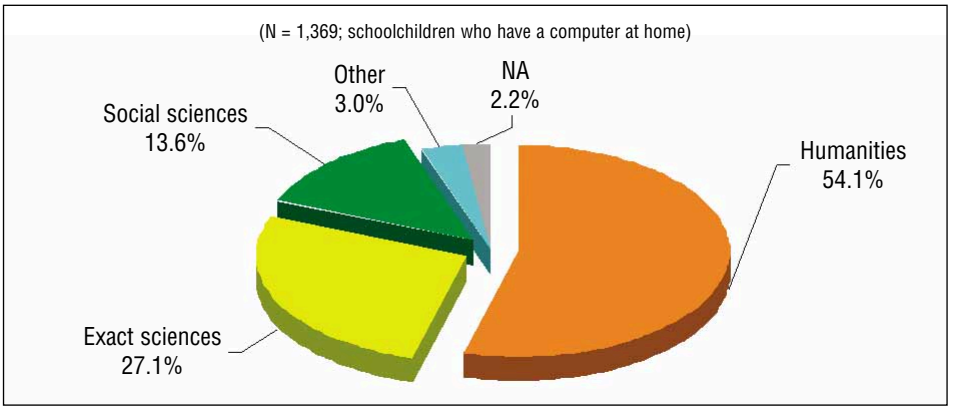


Figure 5. In what study subjects to you use the computer most often?

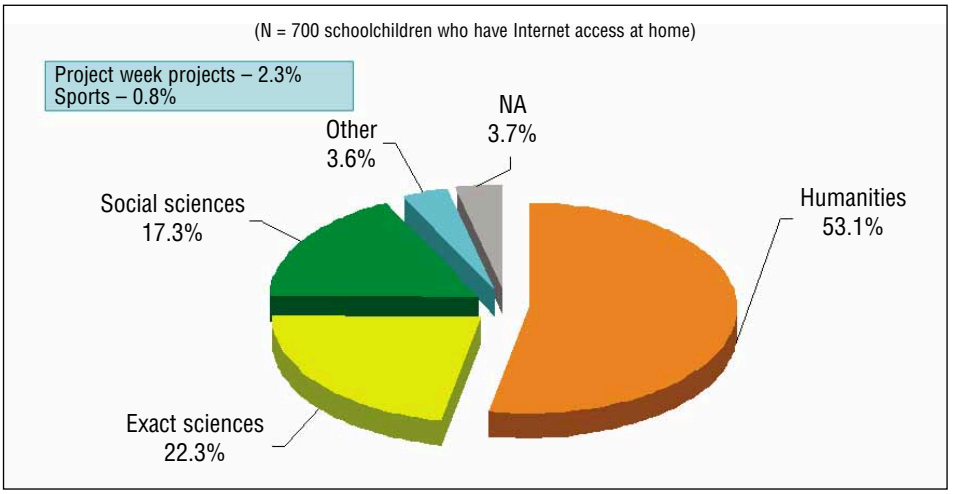


Figure 6. For which study subjects do you most often use the Internet?

In terms of computer and Internet access in the Baltic States, Latvia is behind Lithuania and Estonia in terms of the availability of computers among teachers and students. In terms of Internet access, Latvia is ahead of Lithuania, but behind Estonia.

Most of the future teachers (65.3%) and schoolchildren (58.8%) say that the place outside of their home and educational institution where they most often have access to a computer is the homes of friends. When teachers were asked about access to computers, they most often mentioned public libraries (44.0%).

USE OF ICT IN EDUCATION AND LEARNING

Computers are used most actively by the university students who are pursuing a career in education – 73.3% use the computer at home and at their university. The same was reported by approximately one-third of surveyed schoolteachers and schoolchildren.

More than one-half of surveyed respondents study computer skills or prepare related lessons each day or once or more than once per week. These answers were given by 58.3% of schoolchildren, 72.1% of schoolteachers, and 71.2% of future teachers.

Students most often use computers in the humanities (54.1%), followed by the exact sciences (27.1%). In the latter case, most of the subjects of study involve informatics.

A similar situation exists when it comes to the use of the Internet among schoolchildren.

Only 38.7% of schoolteachers use the Internet at school and at home regularly (each day or one or more times per week). The percentage of university students and schoolchildren who gave the same answer to the question was much higher – 68.3% and 50.4% respectively.

Most of the surveyed schoolchild-

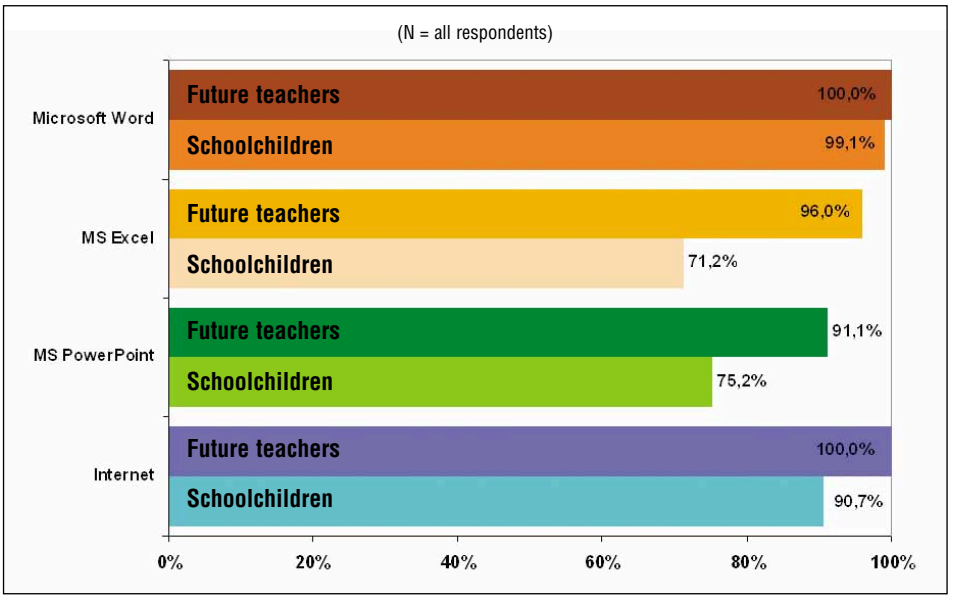


Figure 7. Future teachers and schoolchildren who been trained to use ...

ren and future educators said that they have been taught to use basic Microsoft software (MS Word, MS Excel and MS PowerPoint), as well as the Internet. The level of training among schoolchildren lags behind the future teachers to a greater (Excel, PowerPoint) or lesser (Word, the Internet) degree.

When asked about what they do with basic Microsoft software and the Internet, it was the university students who said that they use the technologies and solutions to the greatest extent in their learning process. Schoolchildren were the next most likely to make use of the technologies and software (except for the area of creating tables and graphs in the Microsoft Word environment). Schoolteachers were only in third place when it came to software use. The same was true when it came to the use of the Internet in the educational process.

BELIEF IN ONE'S OWN ABILITIES

The university students and the schoolchildren tended to be more convinced than others of their own abilities in making use of a computer – those who said that they are "very" or "quite" convinced of those abilities made up 59.4% of the former group and 57.8% of the latter. Among schoolteachers who answered the question, 12.7% said that they are "very much unconvinced."

It has to be added here that more than one-half of the future teachers said that their instructors have good or very good skills, while only 5% said that the skills are poor. This, however, applies only to the university students and their instructors, not to the situation in general education schools.

Nearly one-quarter of the schoolteachers (24.7%) admitted that at some point or another they have declined to use ICT in the teaching process because they fear appearing foolish in the eyes of their students.

The information obtained through these surveys correlates with something that was learned in the qualitative research. "It is psychologically difficult for adults to admit that they are unable to do something. Children don't have that problem – if they find that they cannot accomplish something, then they ask others for help. Few teachers, however, can force themselves to ask for the assistance of a student. Teachers are ashamed of making such requests. A Latvian language teacher should make peace with the fact that at the 7th grade level, three-quarters of the students will have better computer skills than she does when it comes to applications. This is a psychological problem for an entire generation – young people will always have a better command of new technologies."

READINESS TO USE ICT IN EDUCATION AND INTENSITY OF USE

54.9% of informatics teachers said that teachers at their school are more or less prepared to use ICT in the teaching process – only 0.7% of respondents said that teachers are completely not ready for this. At the same time, however, only 33.4% of computer teachers that ICT is used actively in the educational process at their school.

OBSTACLES AND DRIVING FORCES IN ICT USE

Both computer teachers and teachers in other subject areas said that

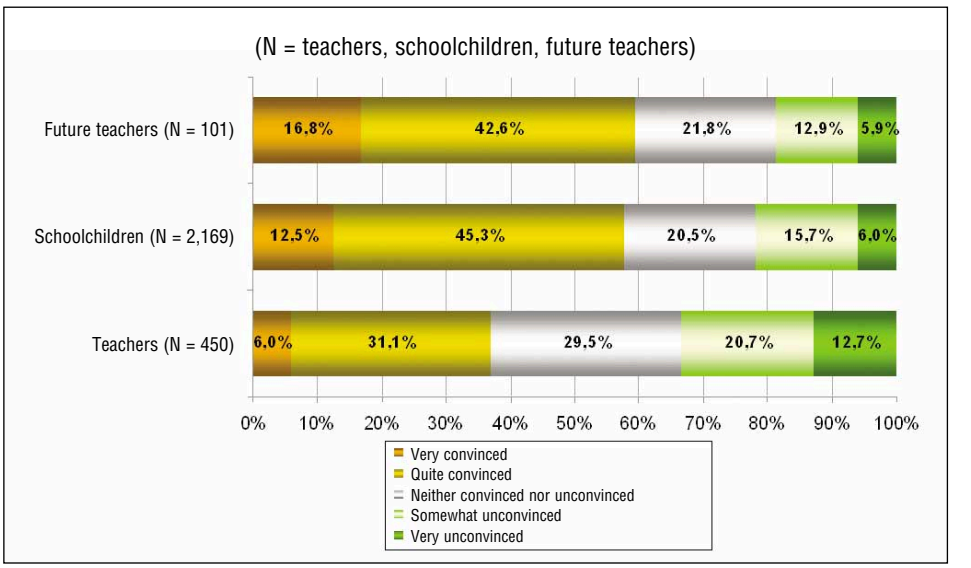


Figure 8. How convinced are you of your abilities in making use of a computer in the education process?

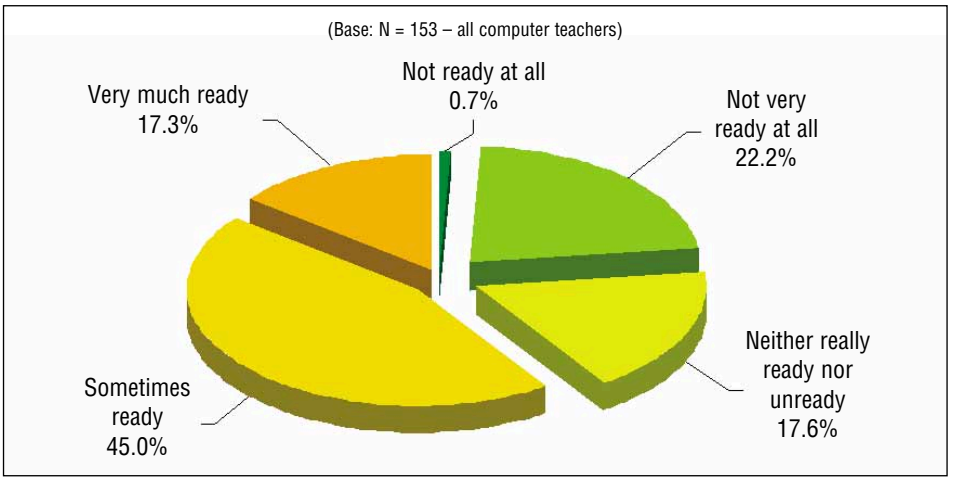


Figure 9. To what extent are teachers at your school ready to use ICT in the teaching process?

money is the major problem in terms of active use of ICT in the teaching process (62.1% and 57.3% respectively). The next most often mentioned problem is the availability of technologies at the school (20.3% and 19.7%).

The main driving engine behind the introduction of modern technologies in the education system, according to respondents, is the level of interest among teachers themselves (23.6% of teachers and 21.5% of computer teachers).

Data that were extracted from this survey largely correlate with data from the qualitative study when it comes to obstacles in this process and to factors which create a negative background for the use of ICT in education. Generally speaking, there is a chain of factors related to the reasons why teachers are not all that active in using ICT in the teaching process:

1) The Latvian government and its ministries have never developed a unified and long-term strategy for informatisation of education, one that would provide ongoing financing in pursuit of the relevant goals. It has been easy for the government to refuse additional financing for the LIIS project which is supposed to computerise Latvia's schools. According to the secretariat of the minister with special portfolio for E-governance, "these have been employees of the Computer Institute of the University of Latvia who have provided the vision, not employees of the Ministry of Education, as should have been the case. The initiative from the University of Latvia was very welcome, of course, but it is absolutely clear that the initiative now should come from the Ministry of Education, and it must draft the strategy. If the ministry is the one which is responsible for education policies in this country, and if those policies lead to the development of an informatisation strategy and the relevant projects, then there has to be ongoing financing for this process. The situation has been quite the opposite – the University of Latvia proposed a concrete project, and then it was developed in the way that the university managed it. There have been no initiatives on the part of the state, probably because the Ministry of Education has never had a specialist who focuses exclusively on school informatisation. The absence of a strategy as such illustrates the fact that no one has dealt with this matter.

2) When financing runs out, computers cannot be updated. The LIIS reports that "until 2003, the LIIS received around LVL 3 million a year, but now that sum is down to around LVL 300,000."

3) School administrators often lack an understanding about the importance of ICT in education: "If there are active people at a school, people who understand the meaning of ICT, then the school's level of informatisation is very good even under conditions of poverty. Those schools make use of various funds and public projects. If there are no leaders of that type at a school, then the school probably has no more than the three computers which all schools have to have for administrators." The bottom line is that many schools do not look for alternative sources of financing to update or modernise their equipment. This, in turn, means that computer classrooms which are already overburdened do not find that their workload is reduced, equipment becomes out-of-date, and often it cannot be put to intensive use. Then the ability of teachers of other subjects to use the

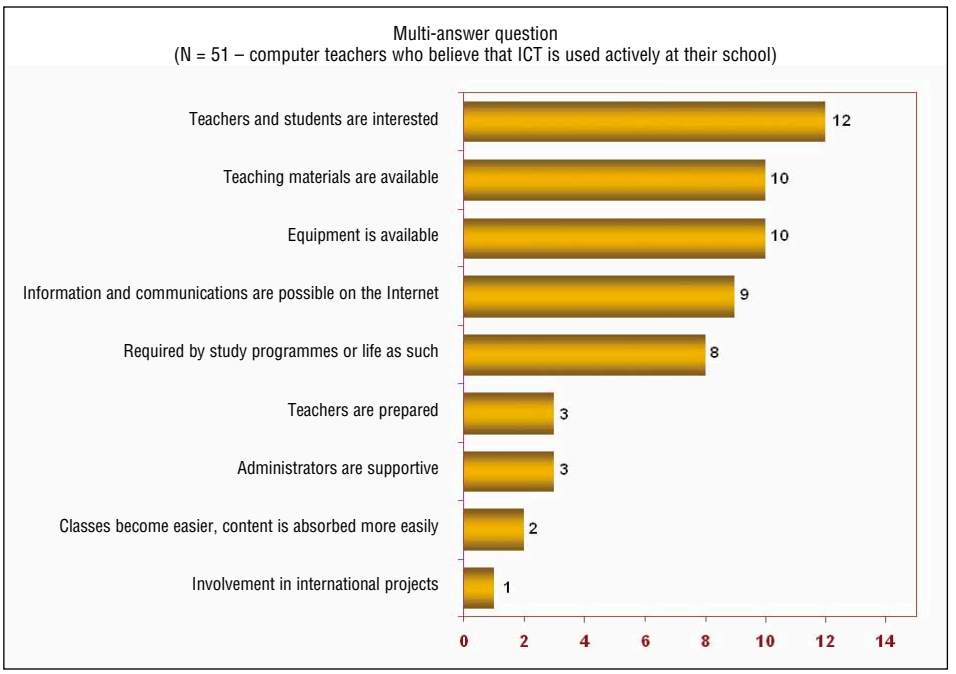


Figure 10. Factors which support the active use of ICT in schools

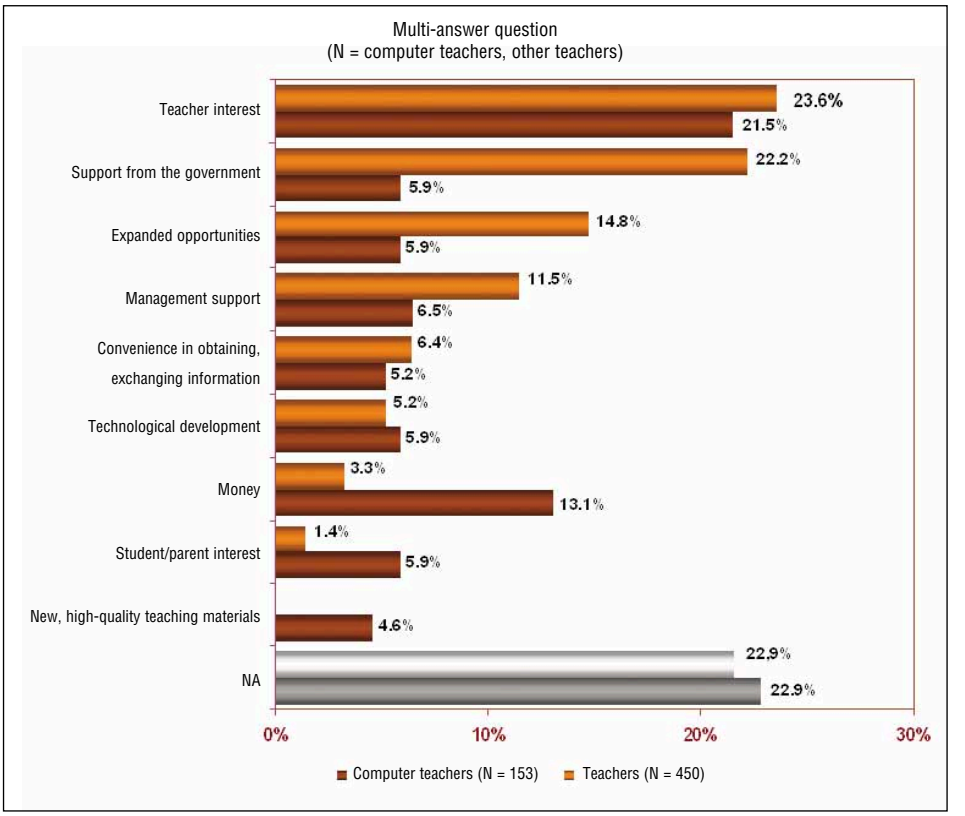


Figure 12. What do you think are the primary driving engines behind the use of ICT in schools

computer classroom in their own work disappears: "One problem is that there is just one computer classroom, and if it is a big school, then informatics classes are taught there all the time. The classroom is busy, and other teachers cannot use it."

4) Some teachers do not have a computer at home, because their salaries do not allow them to buy one: "In Sweden, a teacher has to work for no more than one month to earn enough money to buy a computer. We have to work for six months. That is why so few teachers have a computer at school – in those cases where the teacher has kids, the kids often force the teacher to buy the computer." It is also true that teachers have scant opportunities to use the computer at school, because the computer classroom is always busy. This means that teachers of other subjects can attend computer courses, but they cannot put their knowledge to use. They do not learn good computer skills, nor do they get into the habit of using ICT: "It would be ideal if each teacher had a computer, but for financial reasons, this is often impossible. There would be no problems if the computers were available, because then they would be used on an everyday basis. If the computer is used just a little bit, then skills do not develop. There is knowledge, but there are no skills."

5) Students often have newer computers at home, and they have better computer skills than teachers do. As was noted above, if a teacher finds that his or her skills go wanting, then the fear of appearing foolish in the eyes of the students is enhanced, and the teacher no longer wants to try to use ICT in the process.

The bottom line is that teachers don't have opportunities, which means that they do not have skills, which means that they are not convinced in their own abilities, which means that they have no psychological motivation for the use of ICT in the teaching process.

THE MEANING OF ICT IN EDUCATION

Those who took part in the survey (informatics teachers, other teachers, and university students who are hoping to become teachers) were asked to agree or disagree with several claims about the way in which ICT affects the teaching process.

Most respondents fully agreed that ICT use has much potential in terms of information and communications. In response to the claim that ICT helps students and teachers to find information, 85% and more of respondents agreed. At the same time, however, only 50% of respondents agreed that ICT promotes communications between students and teachers. Approximately one-half or fewer respondents believe that the use of computer technologies encourages students to learn and helps them to develop their critical thinking.

In a monthly public opinion survey in Latvia, parents of school age children were asked about factors which influence their decision on which school the child should attend. Parents were also asked about the importance of ICT in their children's education and life.

With respect to the choice of a school, parents were most likely to say that the proximity of the school to their home is of the greatest importance. Also mentioned were personal ideas about the quality of education and the school, as well as the issue of whether modern technologies are used in the teaching process. The first of these factors is entirely practical, the second is emotional and subjective, but the third is rational and objective in that it is focused on the ability of the child to learn skills that will eventually be of use in his or her career. This is confirmed by the attitude of parents vis-á-vis the use and study of modern technologies – most parents either fully or partly agreed with the claim that modern technologies are necessary in everyday life and at school, and that such technologies are of importance in terms of their children's future. Only 14 respondents (5.6%) said that there is no point in learning about modern technologies or that their children would not need such knowledge. ❑

This article is based on data from the Latvijas Fakti study "ICT Development in Education", 2004/2005.