Microsoft Partners in Learning Research:

INFORMATION COMMUNICATION TECHNOLOGIES DEVELOPMENT IN EDUCATION IN THE BALTIC COUNTRIES (2004-2005)

RESEARCH RESULTS

Research conducted by: **„Latvian Facts”**

and

The Social Research Laboratory at the Kaunas University of Technology in Lithuania

Research financed by: Microsoft

Research supported by: **Centre of Information Technologies of the Ministry of Education and Science of the Republic of Lithuania**

Ministry of Education and Science of the Republic of Latvia

Secretariat of Minister of special tasks on Electronic management matters of the Republic of Latvia

FOREWORD

Research INFORMATION COMMUNICATION TECHNOLOGIES DEVELOPMENT IN EDUCATION IN THE BALTIC COUNTRIES (2004-2005) is realized within the Microsoft Partners in Learning program according to the Memorandums of Understanding signed by the Ministries of Education in Baltic countries and Microsoft.

The objectives of the research is to evaluate and assess development of education quality and actual situation of technologies in schools, analyze impact of technologies in education process, as well as identify needs for development in general education schools in Estonia, Latvia, and Lithuania. Research covers three key conditions for information communication technology (ICT) development in the education: access to technologies, ICT skills and digital learning content.

Research INFORMATION COMMUNICATION TECHNOLOGIES DEVELOPMENT IN EDUCATION for the first time in Baltic countries provides comprehensive overview not only about ICT access and usage in education institutions, but also about main technical, emotional, and educational obstacles for successful ICT integration in teaching and learning – from experts', informatics teachers', other subject teachers' and children's point of views.

Research addresses education policy makers, as well as school leaders, headmasters, teachers, children, parents and other interested parties.

CONTENT

I. MAIN CONCLUSIONS 4
II. METHODOLOGICAL DESCRIPTION OF THE EMPIRIC STUDY 9
III. ANALYSIS OF THE RESULTS 11
1. INFORMATION COMUNICATION TEHNOLOGIES IN SCHOOL 11
1.1. Computerisation level at schools of the Baltic states 11
1.2. School technical maintenance in Latvia 13
1.3. School technical maintenance in Lithuania 17
1.4. School technical maintenance in Estonia 20
2. EVERYDAY PROBLEMS REGARDING THE ICT USAGE 23
3. ACCESS TO INFORMATION COMMUNICATIONS TECHNOLOGIES AND THEIR USAGE 25
3.1. Access to computer technologies 25
3.2. Usage of ICT in education 35
3.3. Supply and usage of digital teaching materials 68
4. TEACHERS' TRAINING 72
4.1. Attended courses and their evaluation 74
4.2. Financial sources of teachers' training 78
4.3. Readiness to use and intensity of using ICT in teaching/learning process 80
5. IMPLEMENTATION AND MANAGEMENT OF ICT IN EDUCATION 84
5.1. Teachers' involving in development of ICT in school 84
5.2. Hindrances and driving forces influencing the introduction of the of Information communication Technologies in education 86
6. SIGNIFICANCE OF INFORMATION COMMUNICATIONS TECHNOLOGIES IN EDUCATION 99
6.1. ICT at school – a factor facilitating the improvement of the quality of study process 99
6.2. ICT at school – the image factor when selecting a school 101

I. MAIN CONCLUSIONS

- In order to evaluate the computerization degree of the education system, usually two criteria are used – the number of pupils per one computer and the average number of computers at a school. Comparing the situation in the Baltic states, we can see that the best status is in Estonia, where on average at a school there are 27,1 computers and the number of pupils per one computer is 11,1. But the worst showings are in Lithuania – 16,3 and 19,6 respectively. Latvia with 20,9 computers at a school and with 13,9 pupils per one computer is in the middle.

- In the Baltic States each year there is a constantly growing average number of computers at a school, besides, the number of pupils per one computer is decreasing. However, this positive tendency only partly can be explained with the purchase of new computer equipment. Statistical showings are essentially influenced by the fact that each year in the Baltic States the number of pupils is decreasing.

- During the last years in the Baltic States there is a decrease in the amount of the funding granted from the state budget for the purchase of new computers and for the change of the old ones; therefore there is a risk, that the level achieved during the last decade will be gradually lost. Currently computer stocks are mainly supplemented and renewed with municipal funds. The lack of new computers not only hinders the usage of the latest software in training, but also is one of the main reasons, why mainly only computer classrooms are provided with computers.

- Although on the whole ICT are available at schools, still they are mainly concentrated in computer classrooms. But the computer classrooms are overburdened with IT classes, that is why teachers of other subjects quite often have few possibilities to use a school's computer stock for teaching their classes.

- In Latvia one of the technical factors, which are essentially influencing the fact that ICT are not sufficiently actively used in training, is the lack of multimedia projectors. Since multimedia projectors are relatively expensive, there are really few schools, which can afford to buy such equipment.

- Unfortunately, while developing IT education, premises for systematic violation of equal rights principle, and premises for open or latent discrimination occur. Such social good like IT at schools is distributed unevenly. First, there are rather contrasting urban – rural, school types, and gender differences. Second, there is a big unjustified contrast between partially favorable information culture, which focuses around the subject of computer science, and a poorer one, which is created around the rest of school subjects. Thus, at schools there are two contrasting and almost unrelated IT cultures. There exists a phenomenon that when teachers who do not teach computer science and want to get access to computers and to apply them in the process of teaching and learning, they encounter barriers.

- Outside IT classes, in other subjects IT technologies are mainly used "passively" (writing texts), and not "actively" (forming presentations; demonstrating simulations etc.). On the one hand, it can be explained with the fact that schools are short of digital training aids, but, on the other hand, teachers themselves are not sufficiently prepared, so that they on their own initiative could establish "technological" contents for their subjects. We should add that also regarding future teachers, although in their training digital study aids are used quite widely and they are relatively skilful computer users, still at universities they are not taught how to use information communications technologies (ICT), when teaching their subject.

- Public internet facilities (including school PCs) are more important for rural children than for urban children. Hypothetically we can assume that rural children relatively less often have a home computer and the Internet at home that is why it is important to preserve their access at school or other public places.

- During the study we have learned that teachers and those households, which have school age children, on average, are better equipped with computers than in a country in general. Still the fact that teachers have access also to computer at home, does not facilitate a more active usage of ICT in training process, since, on the one hand, unavailability of computer equipment at school is limited, but on the other hand, teachers do not feel sufficiently confident of their computer user's abilities and are afraid to become ridiculous in the eyes of their most skilful pupils. We should stress that pupils in training process much more actively use computers, the Internet and even PowerPoint presentations than teachers ask them to do – it means that young people perceive and integrate modern technologies more naturally than their teachers.

- In Latvia and Lithuania IT courses are more or less perceived as a privilege and not as a necessity, which should be available to every teacher. Besides, most teachers attend courses, which are not longer than four days, thus we can speak about the minimal training. Most probably basic knowledge is provided, but no wider and deeper skills are acquired.

- In Lithuania and Latvia the teachers tend to treat a computer as a mediator of information processes. Consequently, the computers are used in a certain direction – to present and receive information, in search of information and editing files. Opportunities to use computers for more delicate objectives, such as simulation and modeling of nature and society processes, and virtual surroundings for most teachers are hard to accept as the environment for research organization, as medium for creativity and education of critical thinking. Teachers are not inclined to agree that a computer can educate creativity in students.

- Future teachers are more confident of their computer users' skills than the working teachers; besides, they more often use ICT in their daily work. It makes us think that with the change of generations at schools many teachers' 'permanent' fear from modern technologies will be averted.

- The Estonian educational policy is at the beginning of the next important stage. There is an urgent need for a new state study program and curricula that integrates methodical use of ICT, its textbooks and other study materials. Since today the use of the ICT means in the study process mostly has been dependent on the personal enthusiasm of the teachers or the school management

- The vision most often is a ground to achieve the successful implementation of the set task. Unfortunately IT vision in Latvia and Lithuania still is not completely clear in many schools and even the managers themselves assess it quite skeptically. The fogginess of the vision could be determined by the low involvement of teachers in its planning and forming which is partly approved by the managers themselves.

- According to teachers, the main hindrances to integrate ICT in education are the insufficient number of computers, the lack of financing and new software, whereas the facilitating factors are: teachers' interest, national support and financial grants.

- Basing on the information obtained during the study, we can form the following causality of the passive usage of ICT: teachers' possibilities to use ICT daily in training are limited// schools have no new computers, because the state financing is not sufficient => at schools ICT are concentrated in computer classrooms => computer classrooms are overburdened with IT classes => teachers of other subjects have no possibilities to teach their classes using ICT => teachers do not form skills to work with ICT and a habit to ICT as a training aid => there is an increasing competence gap of the ICT usage between a teacher, who in his work does not use ICT, and a pupil, who regularly at home uses a computer => teachers strengthen their inferiority complex and lose the psychological motivation to use ICT in training process. Generalizing this causality, we can say that **the larger are the possibilities** to use ICT, **the larger is the wish** to use ICT in training.

- In Latvia the majority of the surveyed pupils' parents are sure that modern technologies are very important and significant for the future of their children, that is why skills for work with them shall be acquired daily, including those at school. However, the usage of computer technologies in training process is not the decisive factor, when selecting a school for a child – for parents it is more important that the education quality of the school is corresponding to their impression of good education and the school is located not far from home.

- Most IT teachers in Latvia and school headmasters in Lithuania have heard about *Microsoft* activities in education. In the audiences of pupils, future teachers and teachers the percentage of those who have heard about *Microsoft* educational projects is 30 to 50%.

  In Latvia the most popular *Microsoft* projects are the Internet portal for teachers *(www.skolotajs.lv*), where teachers can get a methodological support and exchange information, and the Internet homepage competition for schools *Zelta Skudra*.

  But in Lithuania the most popular projects are *Fresh Start for donated Computers*, within which the computers donated to schools get licensing of the *Microsoft* programs, and the *Innovative Teacher Competition*.

  In Estonia respondents have positively evaluated the software program licensing and the program *Virtuaalne õppetund* (Virtual Lesson) for Innovative Teacher competition.

  In all the Baltic States respondents see further co-operation prospects with *Microsoft* in the following areas: training teachers to work with ICT, donating software to schools, offering "subsidized" software to teachers, technically supporting teachers, which would help to strengthen the knowledge acquired in courses to work with ICT. A wish was expressed to receive a methodological support, which would allow using better the possibilities of the *Microsoft* software, when teaching specific subjects.

II. METHODOLOGICAL DESCRIPTION OF THE EMPIRIC STUDY

The research organized by the Microsoft in Baltic countries had several goals:

- To provide data on computerization and internetization at Latvia's, Lithuania's and Estonia's schools of general education, on computer and Internet usage habits;
- To clarify teachers' and principals' self-esteem regarding their computer skills and their usefulness, as well as the way of obtaining these skills;
- To clarify usage of software and computer labs at schools – both in the educational process and in the administrative work;
- To clarify the existing and the potential usage of Internet by teachers, pupils and school management (both reasons for using/ not using, its frequency and Internet access points);
- To measure teachers' readiness to use and integrate ICT in various educational processes;
- To identify what is the driving force of ICT in education;
- To identify the study parameters and criteria, which will help to assess the impact of ICT on education;
- To identify the criteria, which will help to develop and integrate ICT in education;
- To identify and assess government's priorities, the achieved and planned things to advance and develop ICT in education;
- To prepare a database of teachers, to identify the most innovative and active teachers.

In order to obtain the information necessary for the analysis, several empiric studies were conducted in all the three Baltic States. The whole research consisted of:

- Desk Research;
- Qualitative study, interviews with specialists of the Education and Science Ministry, who have competence to introduce information science in Latvia's educational establishments;
- Quantitative survey of target groups (including expert in-depth interviews).

In order to achieve the goals set it is planned to analyze opinions of the following target groups:

- Principals and teachers of secondary education establishments;
- Principals and teachers of comprehensive schools and of those subjected to various ministries:
  - Principals of schools/ vocational schools/ technical schools/ colleges;
  - Teachers of computer science;
  - Teachers of other subjects (not information science);
- Pupils of senior forms;
- Pupils' parents;
- Managers of structural units of the Education and Science Ministry, who are competent to introduce information science in the educational process in Latvia, Lithuania and Estonia (e.g., Latvian educational systems – LIIS; Information Technologies Department of the Education and Science Ministry);
- Heads of Latvia's, Lithuania's and Estonia's universities, which prepare teachers of information science other subject teachers
- Students studying the specialty of teachers of information science.

In the study conducted in Lithuania and Latvia a harmonized methodology of empiric studies and instrumentarium were used. In Estonia's case the analysis was based on the longitudinal study "Tiger in Focus", conducted from 2000 to 2004. Along with it in Estonia a qualitative study was conducted, and its methodological basis and results allow us to compare it with the studies conducted in the two other Baltic States. A detailed methodological description of all the empiric studies is added to this Report as an Appendix.

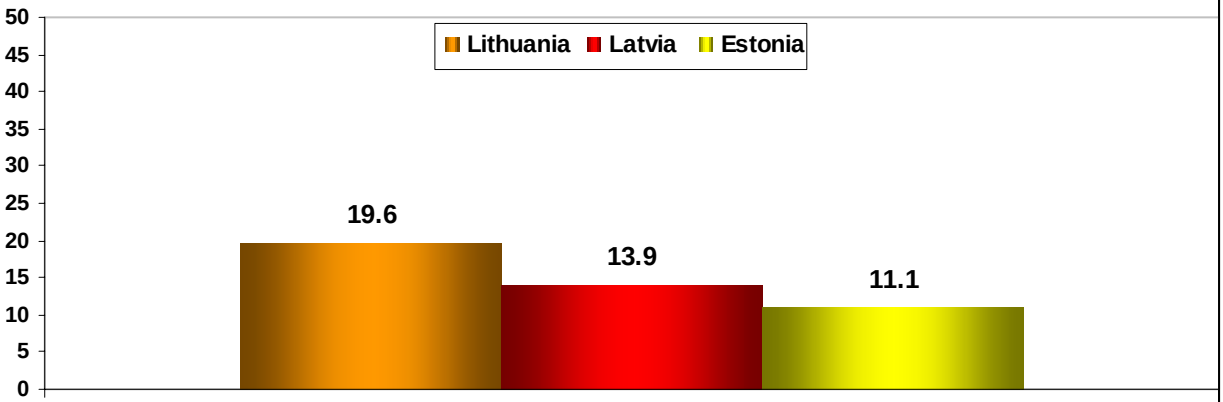
III. ANALYSIS OF THE RESULTS

1. INFORMATION COMUNICATION TEHNOLOGIES IN SCHOOL

1.1. Computerization level at schools of the Baltic States

Usually, in order to evaluate the computerization level of the educational system, as criteria are used the number of pupils per one computer and the average number of computers at school. Comparing the Baltic States by these criteria, it can be seen that the best situation is in Estonia with 11.1 pupils per one computer. In Lithuania this showing is the worst in the Baltic States – 19.6.

Level of computarization in school (Figure 1)



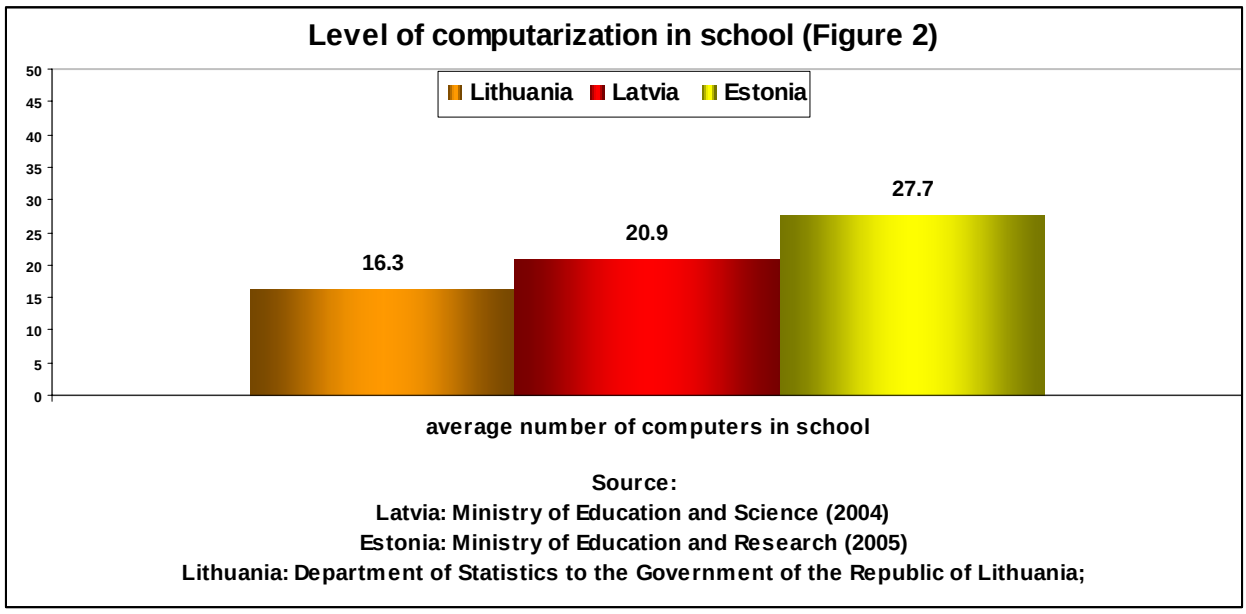
Source:
Latvia: Ministry of Education and Science (2004)
Estonia: Ministry of Education and Research (2005)
Lithuania: Department of Statistics to the Government of the Republic of Lithuania; Kaunas University of tehnology (2005)

In Latvia the number of pupils per one computer is decreasing every year – since 1996, when there were 95 pupils per one computer, the number of pupils has decreased almost 7 times. On the one hand, it has happened due to the expansion of the computer stock, but on the other hand, there is an essential decrease in the number of pupils (-30,312).

Dynamics of the ratio “pupil : computer” from 1996 to 2004 (source: LIIS and Ministry of Education and Science):

Year	Number of PC	Number of pupils	Number of pupils per one PC
1996	3 593	342 801	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**

Also comparing the Baltic states by the average number of computers at school, it can be seen that the best situation is in Estonia, whereas the worst – in Lithuania. In Estonia on average there are 27,7 computers at each school, in Latvia – 20,9, but in Lithuania – 16,3.



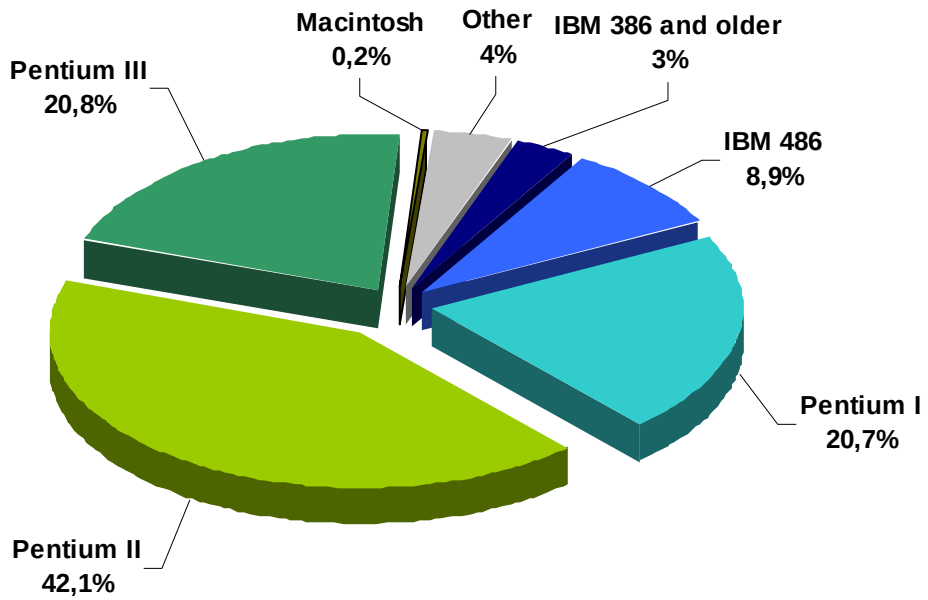
1.2. School technical maintenance in Latvia

According to data of the Ministry of Education and Science (MES) in 2004 in Latvia's educational establishments (990 schools) there were 20,774 computers (on average ~21 computers at one school), which is for 1,578 computers more than in 2003, when according to the data of Latvia's Education Computerization System (LIIS), at Latvia's schools there were 19,196 computers.

Type of school	Number of PC (2004; Ministry of Education and Science)	Number of PC per 100 pupils (2004; Ministry of Education and Science)	Number of PC (2003; The Informatization System of Latvian Education – LIIS)	Number of PC per 100 pupils (2003; The Informatization System of Latvian Education – LIIS)
primary school	352	4,5	291	3,1
elementary school	6448	9,1	5902	7,5
secondary school	12945	6,3	12049	5,6
special school	1029	13,8	954	9,7

The computers at educational establishments by their type and parameters are quite various, but in 83,6% of cases they are various computers of the Pentium type.

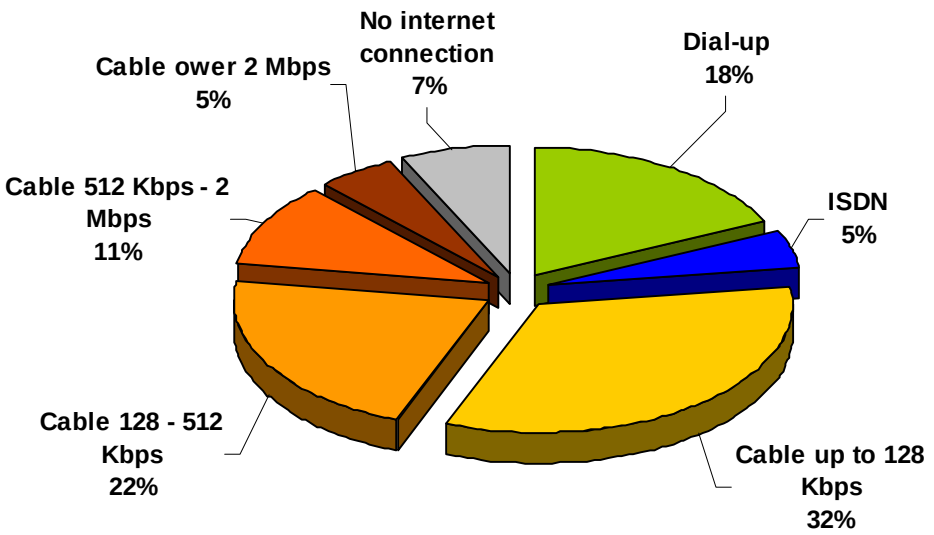
PC types in Latvian schools
(Ministry of Education and Science 2004)



In 2004, according to the MES data, at Latvia's schools there were 938 IT teachers (in 2003, according to the LIIS data, there were 1,145 IT teachers). 762 of them are with a higher teacher's education, but 176 – with education of another kind. 167 teachers have worked for less than 5 years, 157 – from 5 to 10 years, but 614 – from 10 and more years.

In 2004 at 178 schools there was the Internet dial-up connection (18%), 48 schools had ISDN (4,8%), 328 – up to 128 Kbps (33,1%), 213 – from 128 to512 Kbps (21,5%), 105 – from 512 to 2 Mbps (10,6%), 50 – more than 2 Mbps (5,1%). At 68 schools there is no Internet connection at all (6,9%).

Internet in Latvian schools
(Ministry of Education and Science 2004)



In total in the 153 educational establishments surveyed during the quantitative study there are 3,847 computers, most of them (74,1%; 2851) are located in computer classrooms, but the other ones are either in rooms of other subjects or at libraries, or in premises related to school administration. 63 (1,6%) computers are located in various other school premises – for example, at school's self-government; psychologist's, social assistance or speech therapist's room; at the information centre; at the canteen; at the boarding-room; at the room for rest etc. Most of school computers (85,5%; 3282) are connected in a network.

Only in two of the surveyed schools (Pociems and Litene elementary schools) there is no access to the Internet. At the other schools mainly they have the permanent

Internet connection (98,4%), although also dial-up is used (1,6%; 51 computers are connected). 85,1% of all the surveyed schools' computers are connected to the Internet. Most often the Internet connection speed is 128 to 512 Kbps (42,4%), only in 19,3% of schools the connection speed is exceeding 2Mbps.

On average in the surveyed schools there are almost 9 (8,87) computers per 100 pupils. But regarding the other computer facilities, the situation is as follows: projectors – 0,19; copy-machines – 0,74; scanners – 0,525; printers – 1,78. But if we observe the number of computers per 100 pupils by their parameters, the number of powerful and new computers per 100 pupils is scarce: computers with a processor exceeding Pentium 2 – 3,79; computers with RAM exceeding 128Mb – 1,18; computers with HDD exceeding 10Gb – 3,1.

During the qualitative study the surveyed experts evaluated the school maintenance with multimedia projectors as being insufficient. The main reason for the bad school maintenance with multimedia projectors is thought to be their high price. Since multimedia projectors are expensive (costing about 600 lats), then there are few schools, which can afford to buy it, but their absence reduces the ICT usage possibilities, since one cannot for the whole class simultaneously demonstrate pictures, simulations, formulas etc. (The Daugavpils district: *Projectors are a heavy topic, this problem has not been solved due to the lack of funding*; a MES clerk: *It is very rarely that pupils have access to such equipment. We could say that actually they don't have any. Even for universities sometimes it is problematic to provide teachers with these technologies. Definitely this equipment cannot be prior at schools, since often there is even no computer equipment to work with.*)

In most cases school maintenance with multimedia projectors depends on municipality's initiative, since until now the LIIS project has not envisaged any funding especially for the purchase of such facilities. For example, the Riga City Municipality has tried to solve this problem in two ways – buying 5 portable projectors, which are rented for Riga schools, when they have such a necessity; buying the *NetOp* software, which allows teacher to work in the net with all computers of the computer classroom. But the School Board of the Valmiera district, thanks to its friendship with Finnish and Swedish municipalities, has provided each secondary school of the district with a multimedia projector.

If school maintenance with computer equipment is evaluated by its percentage division by regions, populated places and school types, it can be seen that the largest percentage of computer equipment is in Riga and at district centers, at elementary schools (the only exception – at elementary schools there is the smallest percentage of more powerful computers of the youngest generation) and at small secondary schools, but the smallest percentage of computer equipment is in small towns and at large secondary schools.

But if school provision is analyzed by the number of units of computer equipment per 100 pupils, then on the whole, the best provided with computer equipment are pupils in the country and in small towns, as well as at elementary schools, but the worst – pupils of Riga, district centers and large secondary schools.

The obtained results reflect a regularity – although the largest percentage of computer equipment is observed in more populated places and at the largest schools, still it is available to a smaller percentage of pupils in comparison with the small rural schools, where there are fewer pupils (for example, at the Sala elementary school, where there are 37 computers per 65 pupils, the ratio 'pupil : computer' is 1,7:1, whereas at the Jēkabpils Secondary School Number 2, where there are 89 computers per 1,103 pupils, this ratio is 12,4:1).

We should add that the largest percentage of more powerful computers of the youngest generation is in Riga, where the municipality during the last years has actively purchased computer equipment for schools.

Results of the quantitative study confirms the assumption expressed during the qualitative study by the experts that in 95% of cases schools use Microsoft software (an IT teacher of a grammar school: *Usage of alternative programs is not possible in this situation of the labor market: if I at my school instead of Windows Office start working with Star Office, my pupil won't be competitive in the labor market, because everywhere he goes, Bill Gates will be ahead with his software. We have to be oriented to Windows based programs...*) – almost all school computers of the surveyed schools have Microsoft operating systems, just less than 1% of computers have Mac OS or Linux operating systems. Ten respondents also mentioned other operating systems, which were not included in the questionnaire; however, they all are Microsoft products: *Millennium; WIN ME; WIN NT; DOS; WIN 2003*.

1.3. School technical maintenance in Lithuania

According to the data of the Lithuanian Education and Science Ministry, at Lithuania's schools in 2004 there were 31,547 computers. Most of them are located in computer classrooms – 18,392 (58,3%). In rooms of other subjects there are only 2,827 computers (8,9%), but administration has 4,196 computers (13,3%).

The distribution of computers in the area at school (source: Lithuanian Education and Science Ministry)

	Year of study	
	2003/2004	**2004/2005**
Number of computers in special computing classrooms or in the room of computer studies	18052	18392
Number of computers in classrooms of different subjects or classrooms	2713	2827
Number of computers in the library and reading hall	3398	3441
Number of computers in the Teachers' room or other places for teachers	1118	1146
Number of computers in the administrative area	3973	4196
Number of computers in other places at school	1466	1545
Totally computers	**30720**	**31547**

About one third of existing computers have processors with less than 300 MHz, and this shows that schools are still possessing old-fashioned computers which should be renovated. Most computers (96%) have the Microsoft operating system. In separate cases also the Linux operating system is used.

The technical and programming profile of computers (source: Lithuanian Education and Science Ministry)

	Year of study	
	2003/2004	**2004/2005**
Number of computers with processors of 300 MHz	10195	10668
Number of computers with processors of 300 MHz and better	20525	20879
Number of computers with Microsoft operational systems	29504	30301
Number of computers with LINUX operational system	268	275

A relatively small number of computers are used to perform the functions of servers. The fact that servers are registered at schools by ICT specialists LINUX operational system spreads faster. However, Microsoft operational system is used more often to monitor servers and this can be explained that similar operational systems are coordinated better inside than different. Meanwhile from 534 schools with servers

127 servers have installed LINUX operational systems – this comprises about 24 % of all servers.

Servers and their operational systems

	Year of study		
	2002/2003	**2003/2004**	**2004/2005**
Number of servers (separate, to perform server functions for computers)	115	527	534
Number of servers, using Microsoft operational systems	172	384	388
Number of servers, using LINUX operational system	-	124	127

According to the data of the quantitative study, large grammar schools much more often have a wireless Internet connection and a radio link (83,3%) than the ordinary secondary schools (45,5%) and elementary schools (53,8%). The permanent cable Internet connection in 18,2% of the cases is at secondary schools, in 16,7% – at grammar schools and in 7,7% - at elementary schools. But dial-up, ISDN and ADSL are used only at elementary schools (modem – 26,9%; ISDN – 3,8%; ADSL – 7,7%) and at secondary schools (modem – 9,1%; ISDN – 4,5%; ADSL – 22,7%).

1.3.1. The purchase of computer equipment and software

The analysis of the sources of computer equipment' purchase showed that the main of them are centrally allocated finances of the state, national computerization programs etc. Comparing the schools in the village and city/town, the differences are noted while purchasing computer equipment, the big industry companies are in the third position according to the amount of funding, and in the cities/towns – parents and relatives of the students. Dividing the amounts of funding, according to the types of schools, one more even larger source of funding is noted, i.e. representatives of local business. They mostly fund the local gymnasiums (Table 1).

Table 1

What are the resources that allow your school to purchase computers? Who funds this?

		Centrally allocated finances of the state, national computerization programs etc	Finances of local municipality	Finances of big national (Lithuanian) business	Private foreign finances	Finances of local businessmen	Finances denoted by students' parents
You work in the school (the main workplace) which is...	**Basic**	92,6%	85,2%	11,1%	25,9%	0,0%	7,4%
	Secondary	90,9%	68,2%	9,1%	18,2%	9,1%	18,2%
	Gymnasium	84,6%	53,8%	0,0%	7,7%	23,1%	23,1%
Locality/administrative unit of your school is ...	**City**	94,3%	74,3%	8,6%	14,3%	5,7%	20,0%
	Town, village	85,2%	70,4%	7,4%	25,9%	11,1%	7,4%

There are fewer sources of funding the purchase of software. Some supporters that partly funded the purchase of computer equipment almost do not pay attention to software. The software is mostly funded by two main sources:

1. Centrally allocated finances of the state, national computerization programs etc.
2. Finances of local municipality

The distribution of funding sources shows that the main attention is paid to purchase computer equipment. The purchase of software is not so important in the schools (Table 2).

Table 2

What are the resources that allow your school to purchase computers software? Who funds this?

		Centrally allocated finances of the state, national computerization programs etc	Finances of local municipality	Finances of big national (Lithuanian) business	Private foreign finances	Finances of local businessmen	Finances denoted by students' parents
You work in the school (the main workplace) which is	**Basic**	88,9%	66,7%	3,7%	3,7%	0,0%	0,0%
	Secondary	77,3%	50,0%	9,1%	4,5%	4,5%	4,5%
	Gymnasium	84,6%	61,5%	7,7%	0,0%	7,7%	7,7%
Locality/administrative unit of your school is:	**City**	85,7%	54,3%	11,4%	0,0%	2,9%	5,7%
	Town, village	81,5%	66,7%	0,0%	7,4%	3,7%	0,0%

1.4. School technical maintenance in Estonia

According to the data of the Estonian Educational Information Systems, in March, 2005 in Estonia there were 17,181 computers, 4,316 (25,12%) of them – in the capital Tallinn but in the rest of Estonia – 12,865 (74,87%). In total there are 190,879 pupils in Estonia – 49,935 (26,16%) of them are in Tallinn, but in the rest of Estonia – 140,944 (73,83%).

9,458 computers of the total number of computers at Estonian schools are available to pupils, 5,096 – to teachers, but 1,871 are freely available at school libraries and Internet access points.

	count of PC in use of the teachers	***count of PC in use of pupils***	***count of PC in common use (libraries, Internet network point etc.)***	***count of PC in the schools in total***
Primary schools	258	478	105	780
Basic schools	1304	3046	572	4933
Secondary schools	3534	5934	1194	11468
Total	**5096**	**9458**	**1871**	**17181**

Source: EHIS (Estonian Educational Information Systems) 29.03.2005

By the opinion of all the experts, participating in the qualitative survey, computerization of schools has reached the rather good level. In Tallinn, for example, there are 13 students per a PC in average. However, the situation can differ significantly at schools. This number varies by different regions as well: at several schools in rural areas the situation is even better than at larger schools in the cities (*Much depends on the wealth of local governments. If the school is large and has little interest for computers, there may be one semi-computerized class and the number of students per computer could be between 70 and 80. In some smaller rural schools there may be few students, but a proper computer class*).

According to the data of Estonian Educational Information Systems, in total in Estonia's 620 school computer classrooms there are 9,100 computers. 550 schools have a permanent Internet connection, but 52 have a dial-up.

	count of PC in computer classes a	***Web- an mail-servers (not included into the count of workstations)***	***count of workstations, connected with Internet***	***Interneti permanent connection***	***Interneti dial-up service***
Primary schools	386	13	424	60	10
Basic schools	2899	85	4475	247	19
Secondary schools	5815	278	10108	243	23
Total	**9100**	**376**	**15007**	**550**	**52**

Source: EHIS (Estonian Educational Information Systems) 29.03.2005

By the opinion of experts, nearly all the schools (at least 98%) have the Internet access, mostly by online connection. Majority of PCs at schools are connected to the Internet. Tallinn schools are connected via the fiber optical cable (*Tallinn is super. We are able to monitor constantly how much and how often the Internet is being used by monitoring the situation at any time when the computers in schools go online, what is Internet traffic, etc*).

Majority of schools have 1-3 multimedia projectors, the 80 schools of Tallinn have 271 projectors today. By the opinion of the experts, this number is not enough to integrate ICT into the study process. The more active teachers in Tallinn think that what schools need today is not better PC classrooms, but more flexible systems involving laptops, the Internet connection (here also WiFi is an important criteria) and multimedia projectors in every classroom - all should be easily movable and mobile (teacher: *My understanding is that it is time to replace the computer class as such with the subject teacher's computer plus a multimedia projector*; expert from university: *There should be more multimedia projectors and teachers really want them. But one costs EEK 30,000* (around EUR 2,000*) so that every school has attempted to procure at least one since there are no funds to purchase more*).

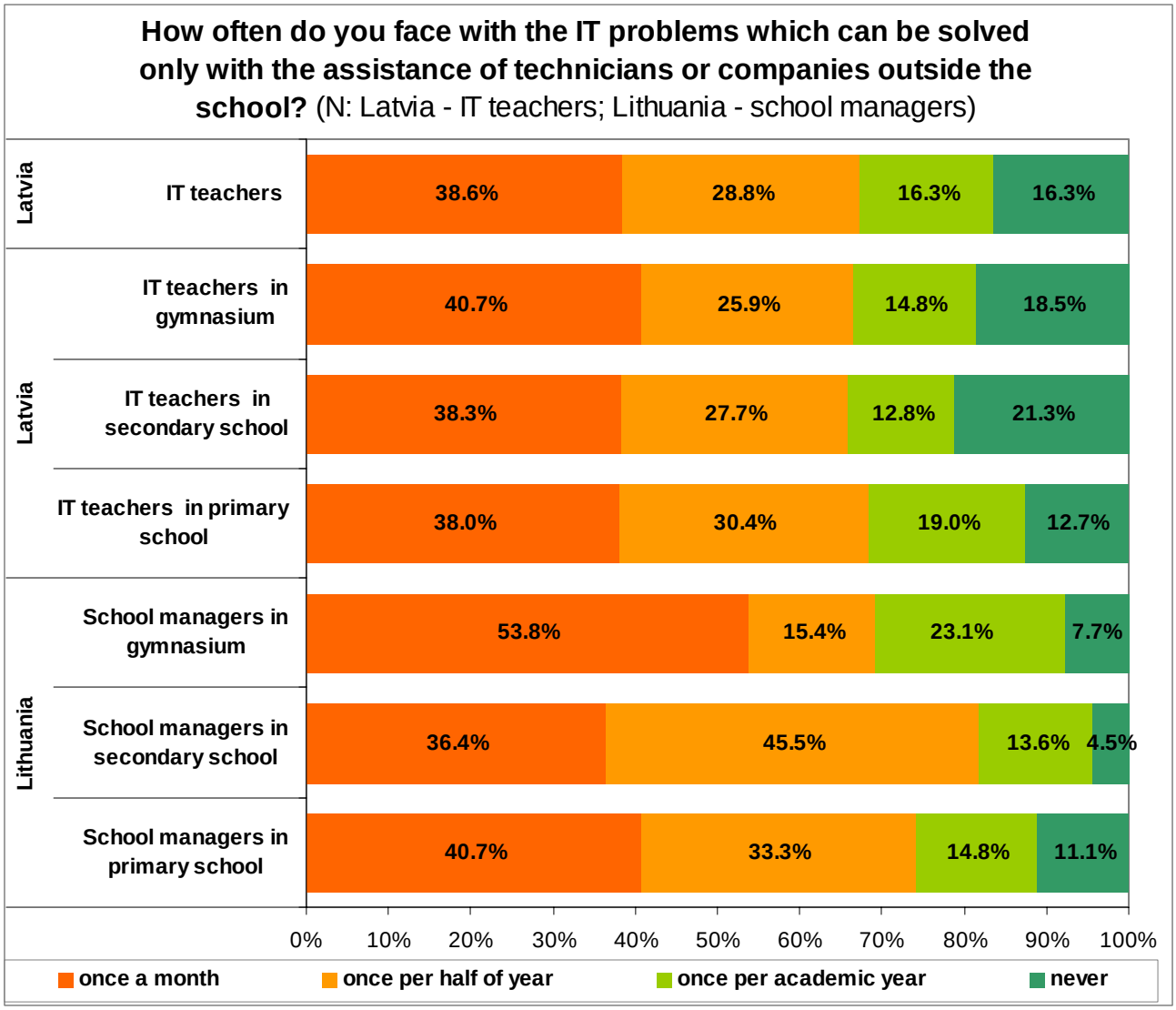
The age of computers in Estonia is quite various (teacher: *Speaking of the age of computers one can say that there are all sorts of PC-s. We have relatively new PC-s that also run on more modern operation systems. But I also know that in very many schools that have also older computers. PC-s with Pentium 166 CPU are not rare at all). Most computers some time ago were purchased with the support of Tiigrihüppe SA (the Tiger Leap Foundation*). Now the question what to do with the old equipment is becoming more and more topical, as well as how to change it with a new one (a university teacher: *I believe that the largest number of computers were purchased during last elections. If you take that a computer becomes obsolete in five years, most computers will soon run out of their useful life. If the new Tiger's Leap program fails to allocate state funding for renewal of hardware, we would be facing a huge problem in 2007*). Computers at many schools are no more suitable to work with modern software (teacher: *Generally, the computers in schools are very old by modern standards. The public tender is the one before the last tender. In some schools the computers are running on 16 MHz*).

Regarding software, experts have indicated that more than 90% of all the operating system used at schools is Microsoft products. In few schools they also use Linux and the free code programs – usually they are used parallel to Microsoft operating systems. Concerning software, in training the most often used ones are Word, Excel, and PowerPoint; in certain subjects - also Publisher, Corel Draw etc. Experts think that the largest problems of software are related to its expensiveness and changeability. (*Software is changing too fast and the old software does 99 percent of the job without purchasing any new gadgets. The fact that new software versions are coming to the market so fast is actually a major problem, for instance, in training courses. In my opinion, there is no need in schools to rapidly upgrade software since the educational system is not so receptive that it can sustain it. This is causing problems also in computer classes. Some schools in Tallinn have purchased software for whole classes while the others have not been able to do so. This creates a situation where in one class 3 computers may look the same while 3 others would look different than the third group of 3 computers*).

2. EVERYDAY PROBLEMS REGARDING THE ICT USAGE

Deputy headmasters (Lithuania) and IT teachers (Latvia) within the quantitative study were asked the following question: ***"How often do you face the IT problems which can be solved only with the assistance of technicians or companies outside the school?"***

In Latvia 38,6% of the surveyed IT teachers and deputy headmasters responsible for IT matters face ICT related problems once a month, about 45% - once a year or half a year, but 16,3% never experience such problems.

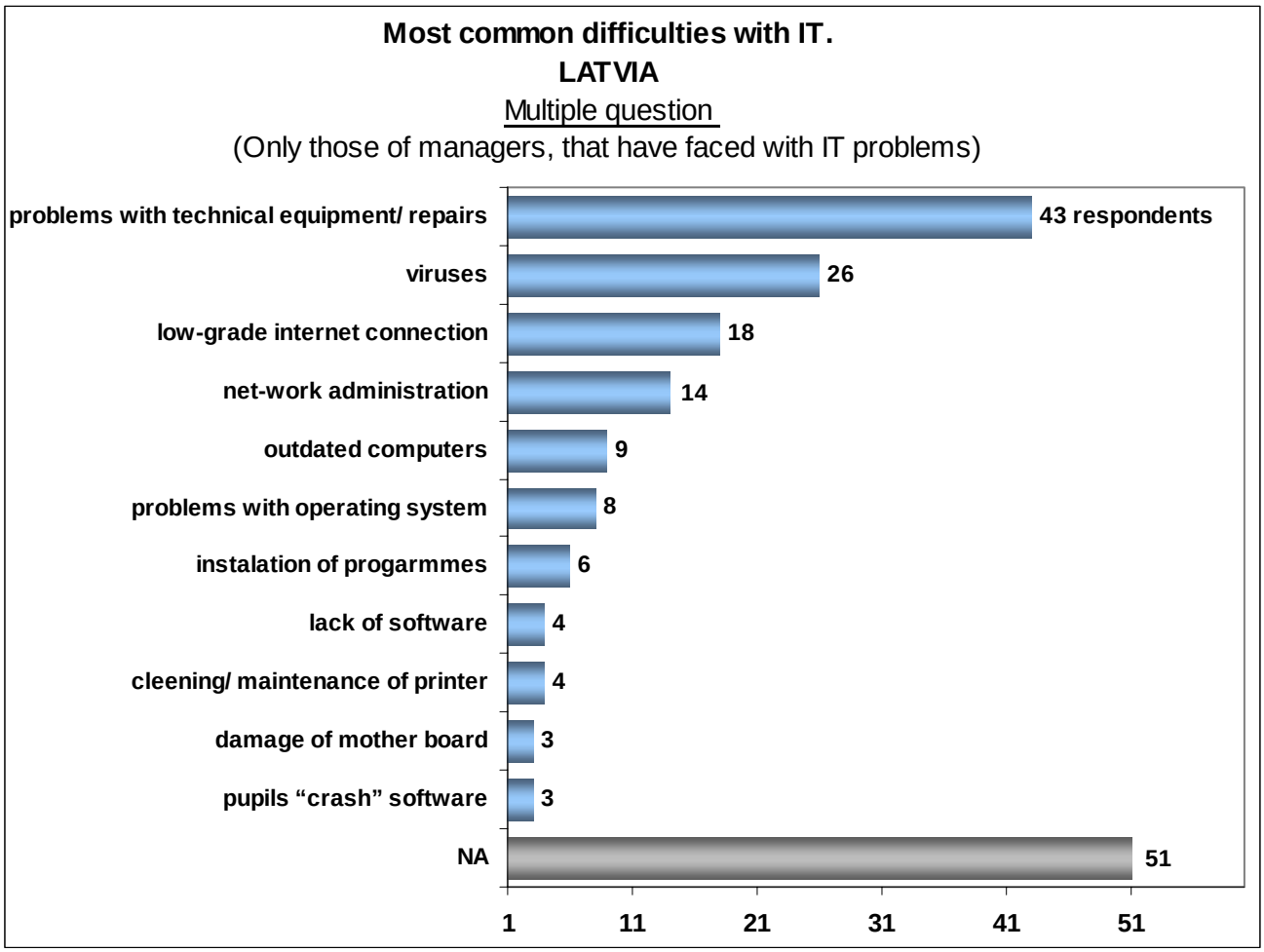


In Latvia the teachers, who regularly face computer equipment exploitation problems, most often work at a primary school, which is located in the rural area of Zemgale. But usually such problems are never faced by IT teachers in Riga and district centers.

When comparing the results in Lithuania and Latvia, we can see that every month ICT related problems more often are faced by teachers from large Lithuanian secondary schools and grammar schools. The basic schools try to solve the problems related to IT matters themselves. The managers of these schools indicated that 11,1 % of the schools do not apply to IT technician (if he is not an employee of the school) because of the problems in IT field, and most frequently they call IT technician from gymnasium to solve these problems. Being aware of situation in which IT extent is much bigger in gymnasiums, it could be assumed that this choice is determined by the wish to ensure the maintenance of IT and, consequently, improve the quality of exploitation. (Quantitative research, Lithuania)

IT teachers from Latvia were asked additionally to mention the problems, which would be related to IT.

The most widespread problems with ICT are related to repairing computer equipment (43 respondents), viruses (26) and a low-quality Internet connection (18). 21 IT teachers have faced problems related to software – disturbances in operating system; problems with program installation; pupils “destroying” a program, etc.



3. ACCESS TO INFORMATION COMMUNICATIONS TECHNOLOGIES AND THEIR USAGE

During the study the surveyed pupils, teachers, school IT teachers and deputy headmasters responsible for IT matters, as well as students – future teachers – were asked questions on the access to computer technologies at home and educational establishments or at work; computer usage intensity; access to the Internet resources and their usage in training process. Besides, respondents were asked to evaluate their confidence level regarding their ability to use ICT in training process.

3.1. Access to computer technologies

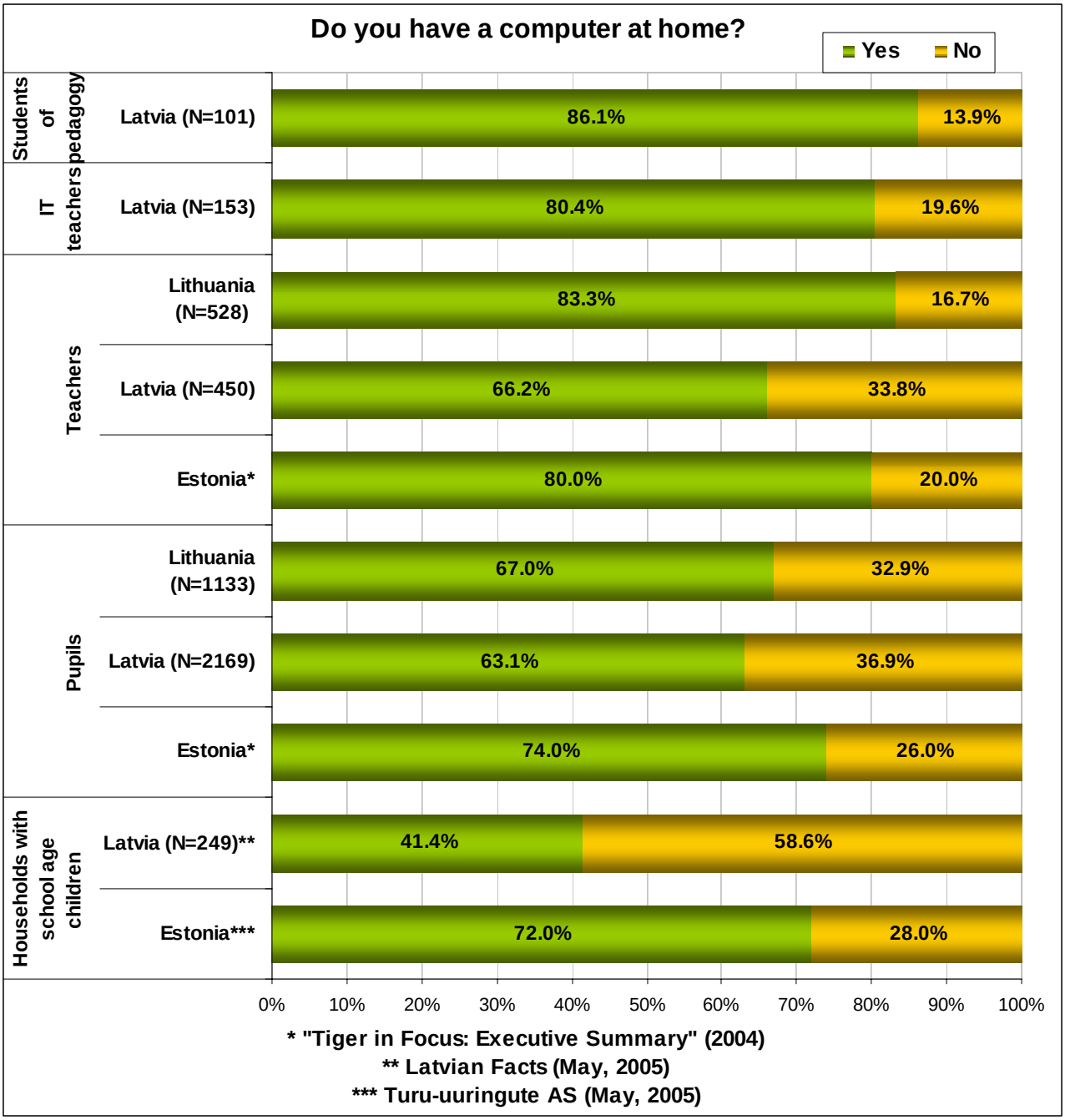
3.1.1. Access of PC's.

In all Baltic States home has become as important place to work with ICT as school for everybody – teachers, pupils and students. According to quantitative study results, more than half of pupils and teachers have access to home computers. For example, in Lithuania 83,3% of teachers and 67% of pupils have a computer at home, but in Latvia and Estonia these results are 66,2% and 63%, and 80% and 74% respectively.

In Latvia most often IT teachers (80,4%), as well as future teachers (86,1%) have computers at home. Also households with school age children on average more often have computers, whereas regarding the other households – the percentages are 41,4% and 29% respectively. Computerization level in the households with children of secondary school age is even higher – 54,4%. Such a tendency shows that, when children are becoming older, the necessity to use computer technologies increases, that is why families find possibilities to purchase a computer.

In Estonia 72% of households with children have a computer. Regarding Lithuania such data are not available.

The data are reflected more graphically in the Chart on the next page:

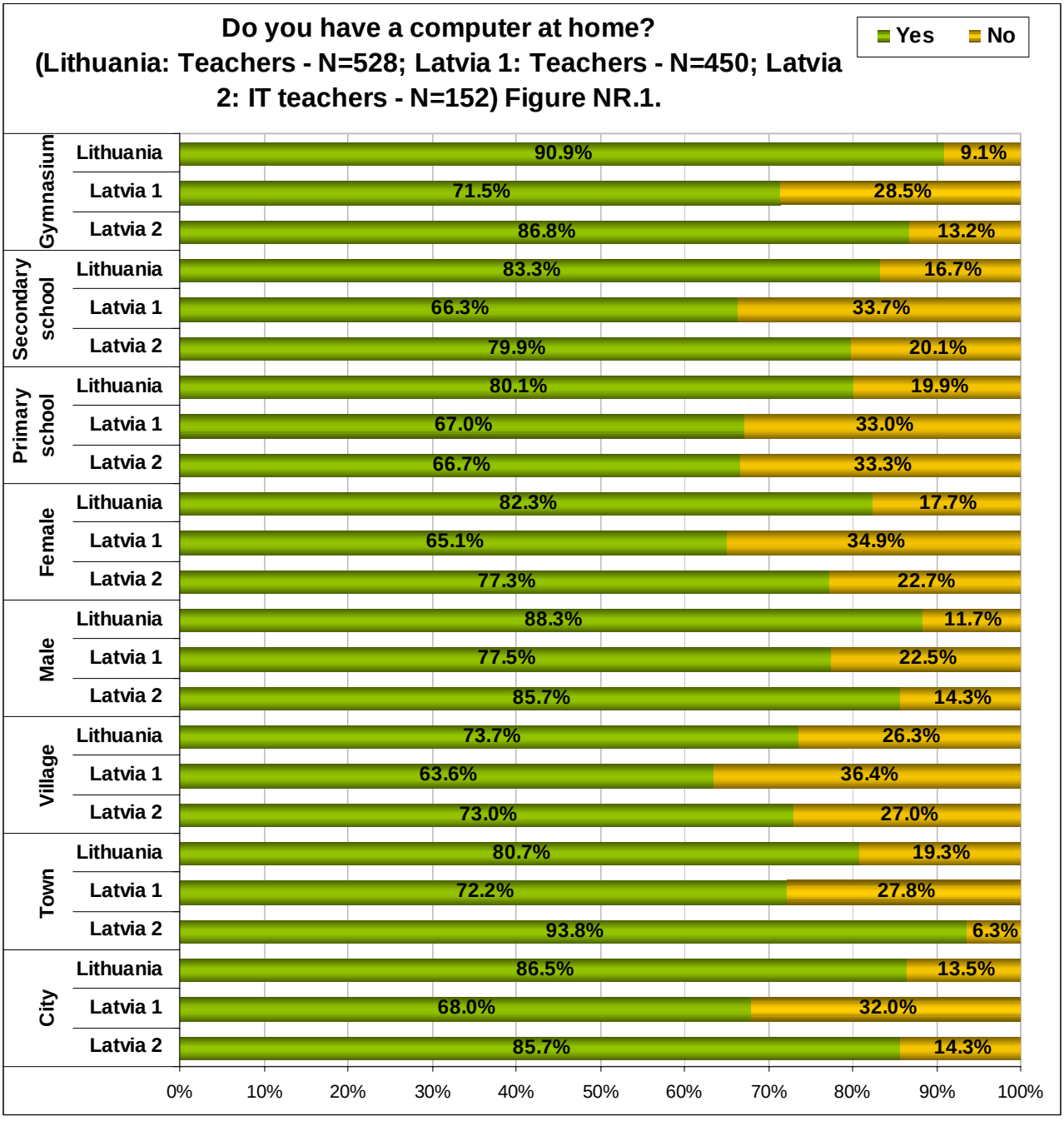


In Estonia, on average, teachers are better equipped with home PCs than students, whereas four years ago the situation was the reverse ("Tiger in Focus: Executive Summary" 2004). But according to quantitative study of 2005, in Latvia more often students-future teachers than teachers (see the previous Chart) have access to a computer at home.

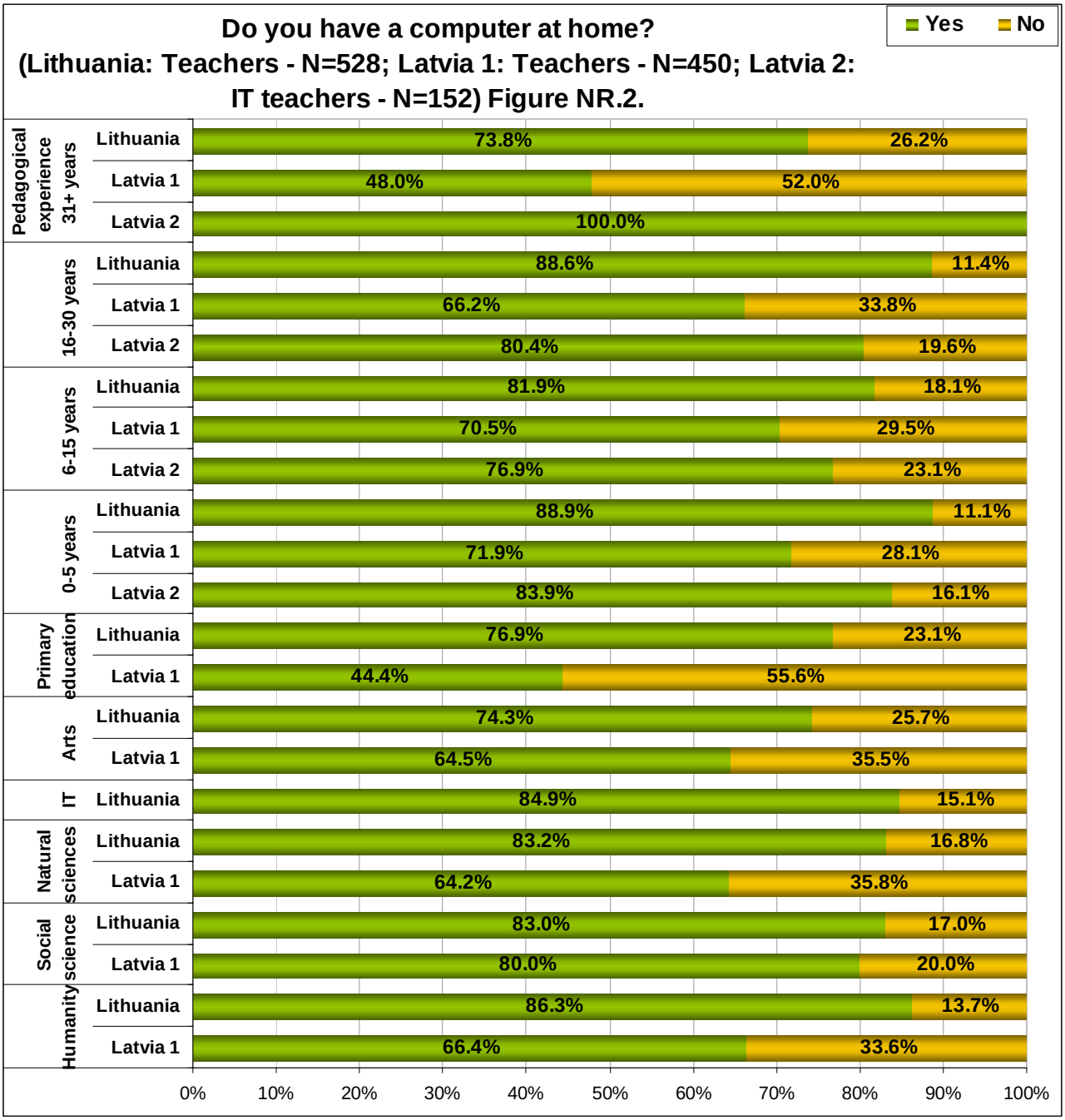
When analyzing the obtained data by socially demographic showings, we can observe the following tendencies:

Most often the ones who have home computers are

- male teachers;
- townspeople;
- teachers from large schools.

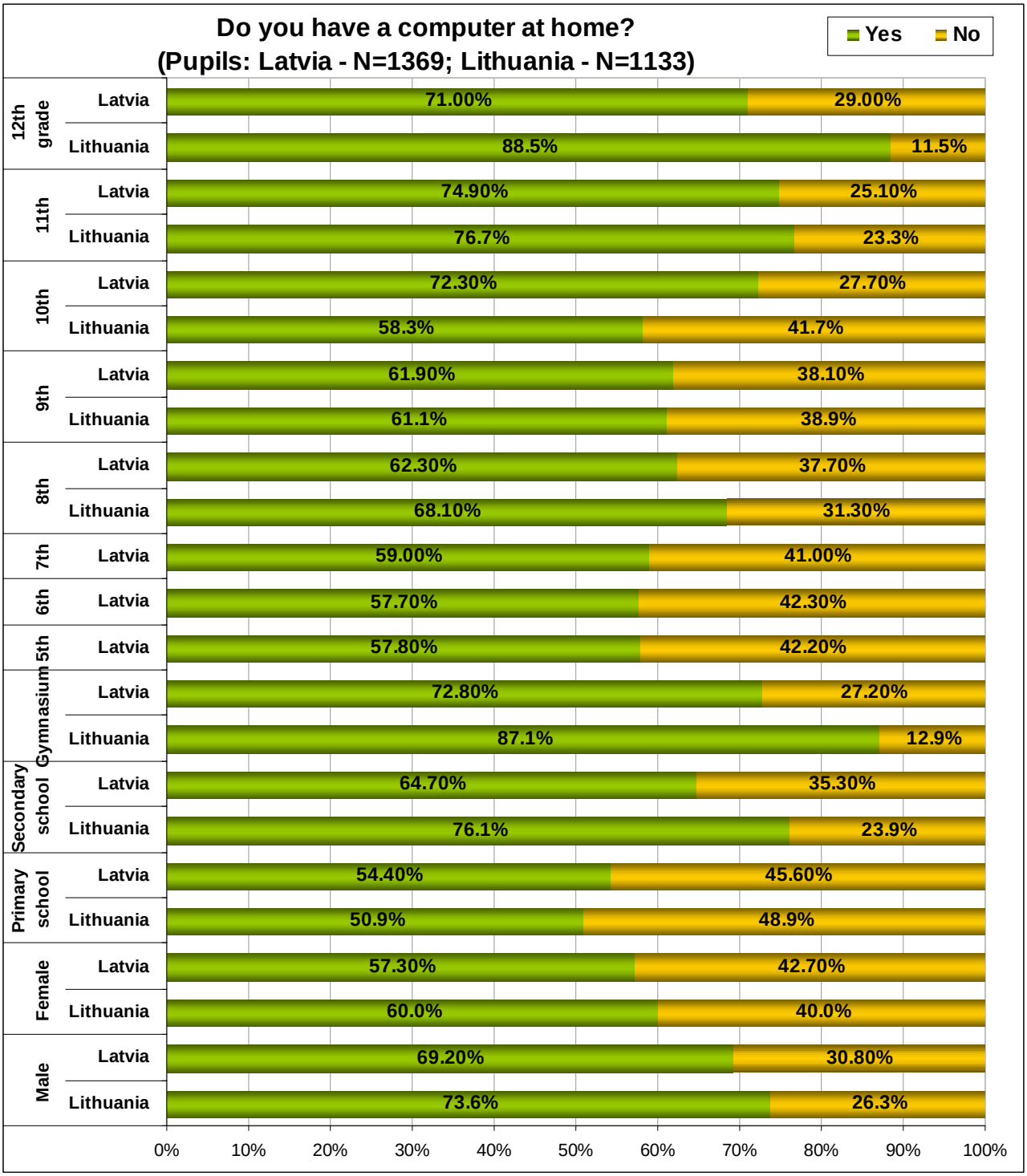


In Latvia home computers most often are owned by teachers of social sciences (80%), but less often – by elementary school teachers (44,4%), whereas in Lithuania – by teachers of the humanities (86,3%) and art teachers (74,3%). If we compare results among countries, then, irrespective of school subjects, Lithuania's teachers have a considerably higher computerization level in home (teachers of the humanities for 19,9% more than those in Latvia have home computers, for 19,0% more - teachers of natural sciences, and for 9,8% more - teachers of art). The only exception is the social sciences, where Latvia's teachers have almost caught up with their Lithuanian colleagues.



When analyzing the data on pupils both in Latvia and Lithuania, we can see that most often the ones who have computers at home are:

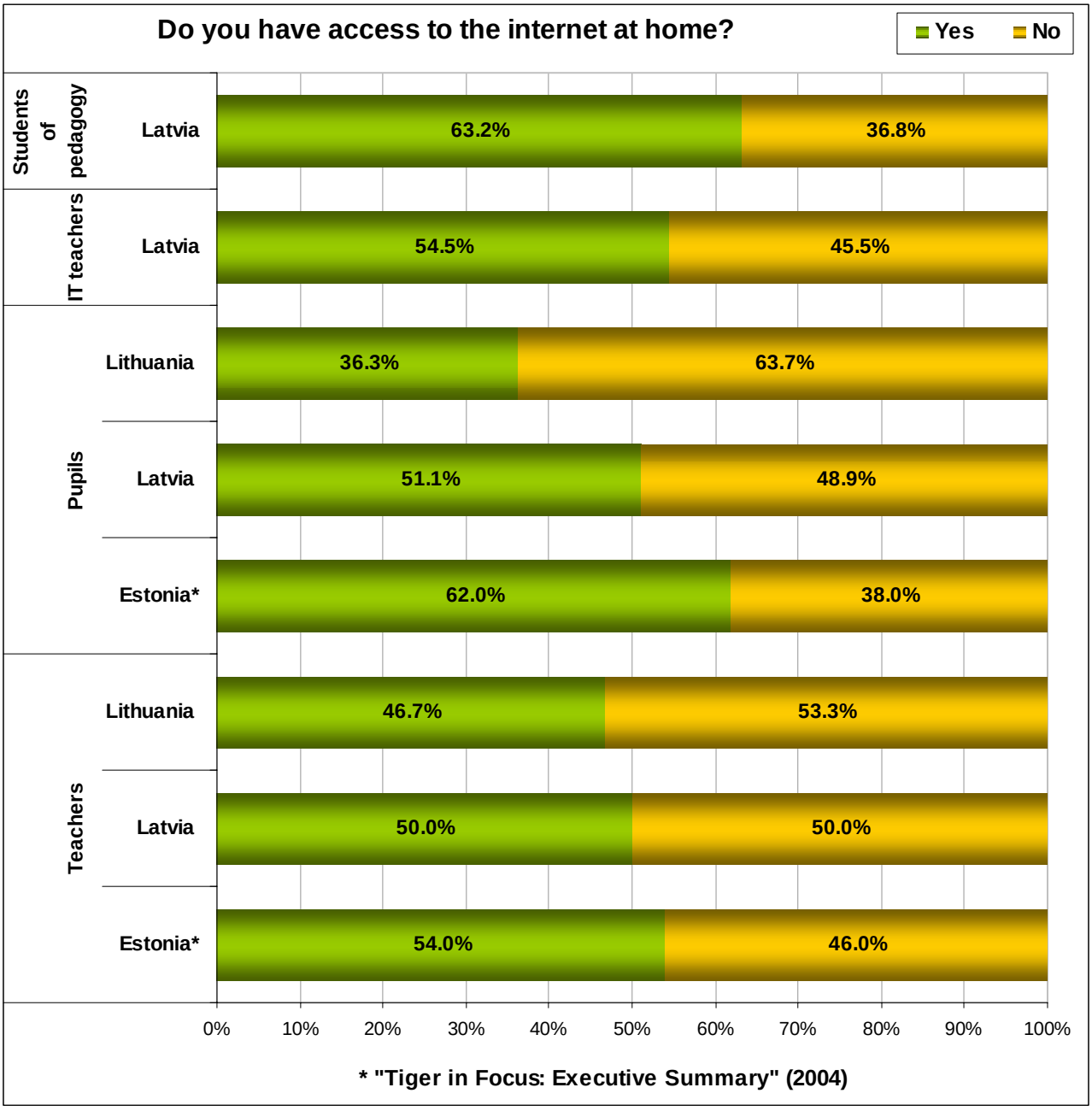
- boys;
- pupils from large schools;
- secondary school pupils.



We can assume that in senior forms pupils have an increasing necessity to have a computer at home, and their parents are trying to meet this necessity according to their possibilities.

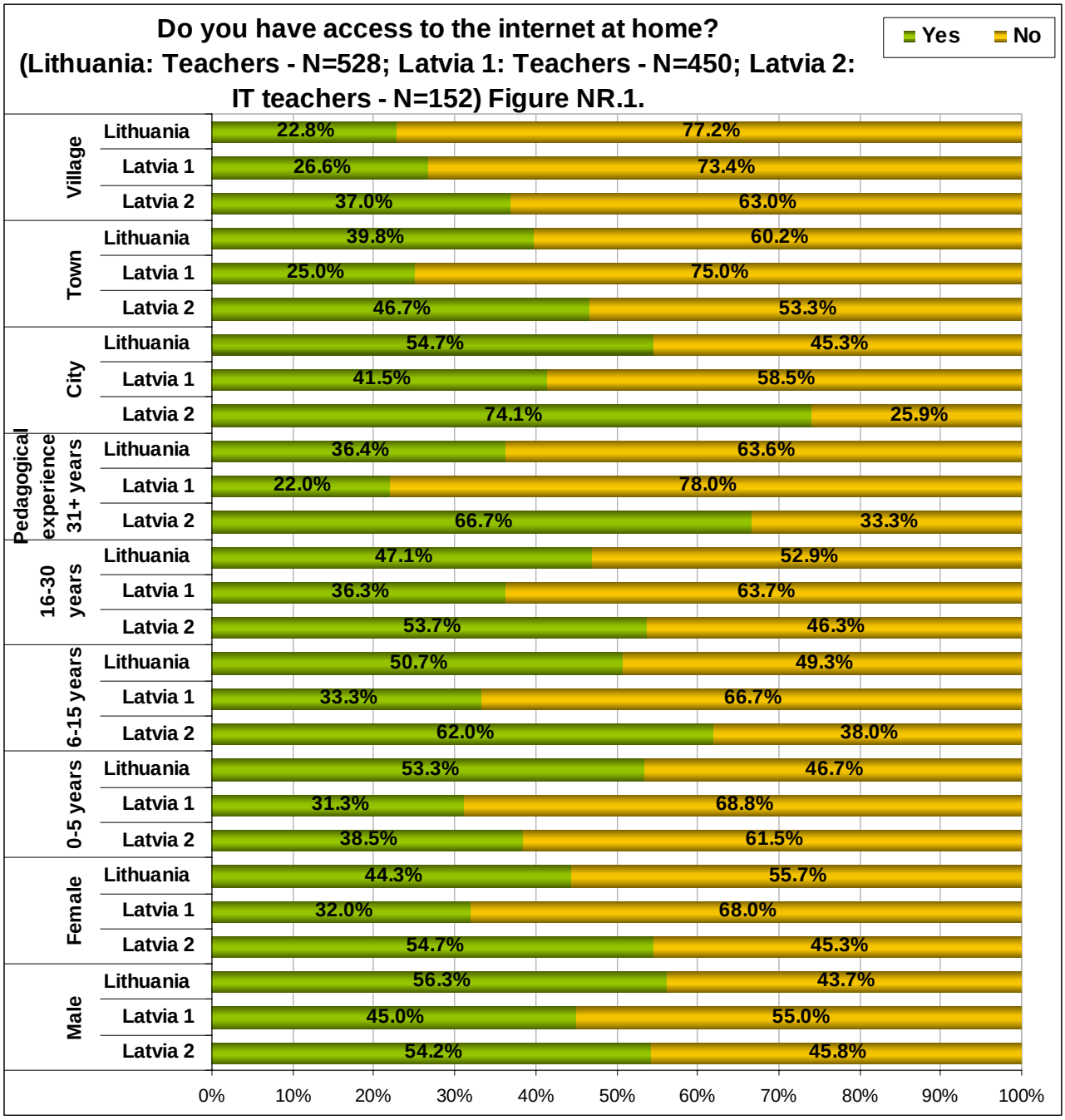
3.1.2. Access to Internet.

In Latvia at least half of the survey participants (50% of teachers, 51,1% of pupils, 54,4% of IT teachers, 63,2% of future teachers), who have indicated that they have a home computer, also have access to the Internet and almost all the Internet users have a permanent connection. In Lithuania 46,7% of teachers and 36,3% of pupils have the Internet connection; in Estonia the percentages are 54% and 62% respectively. In Lithuania 69,6% of teachers have the Internet with the permanent connection.

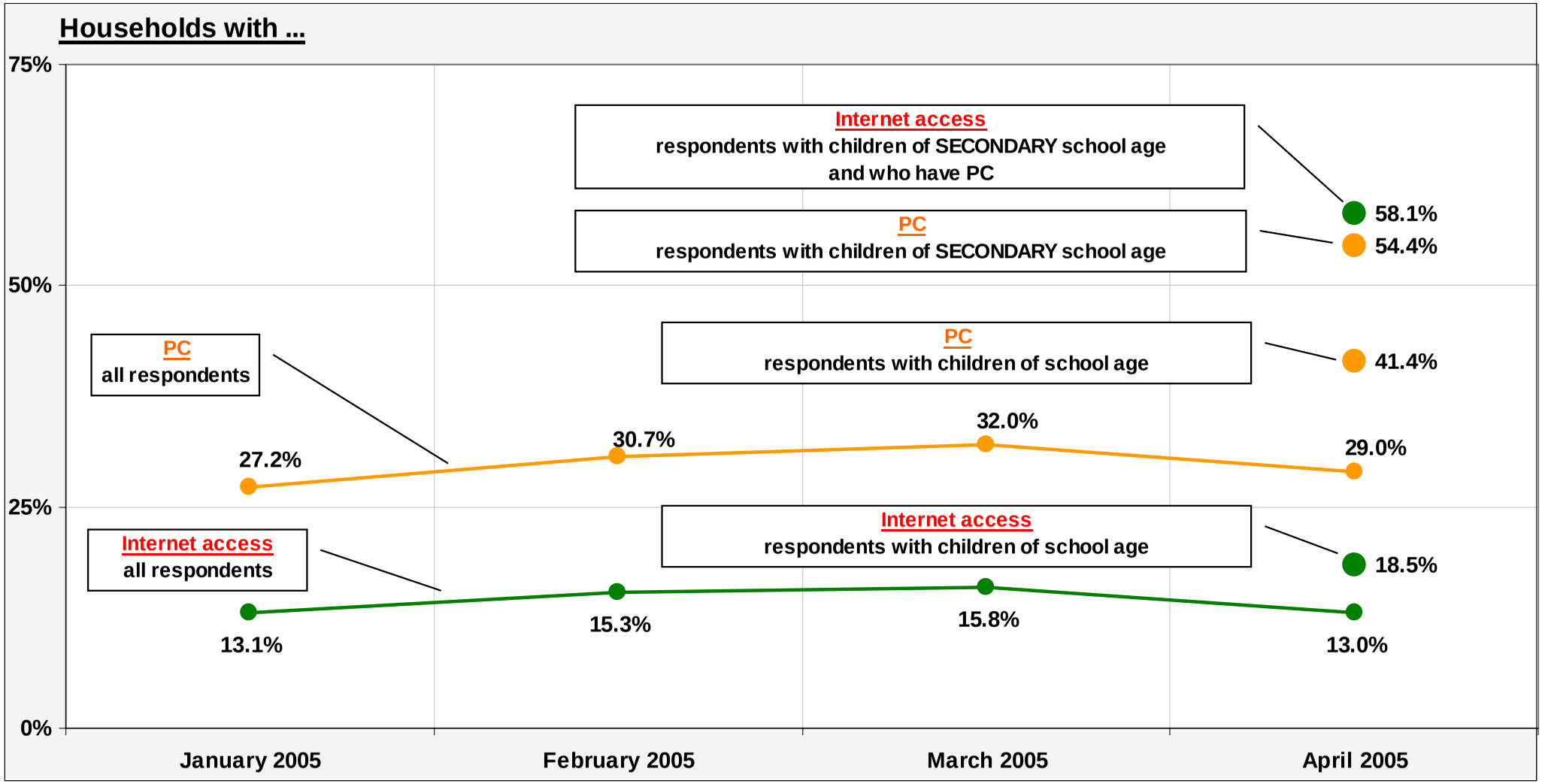


If computerization was highest in Estonia, followed by Lithuania, and the last position was taken by Latvia, then, speaking about the access to the Internet at home, Latvia pulls ahead of Lithuania, taking the second position.

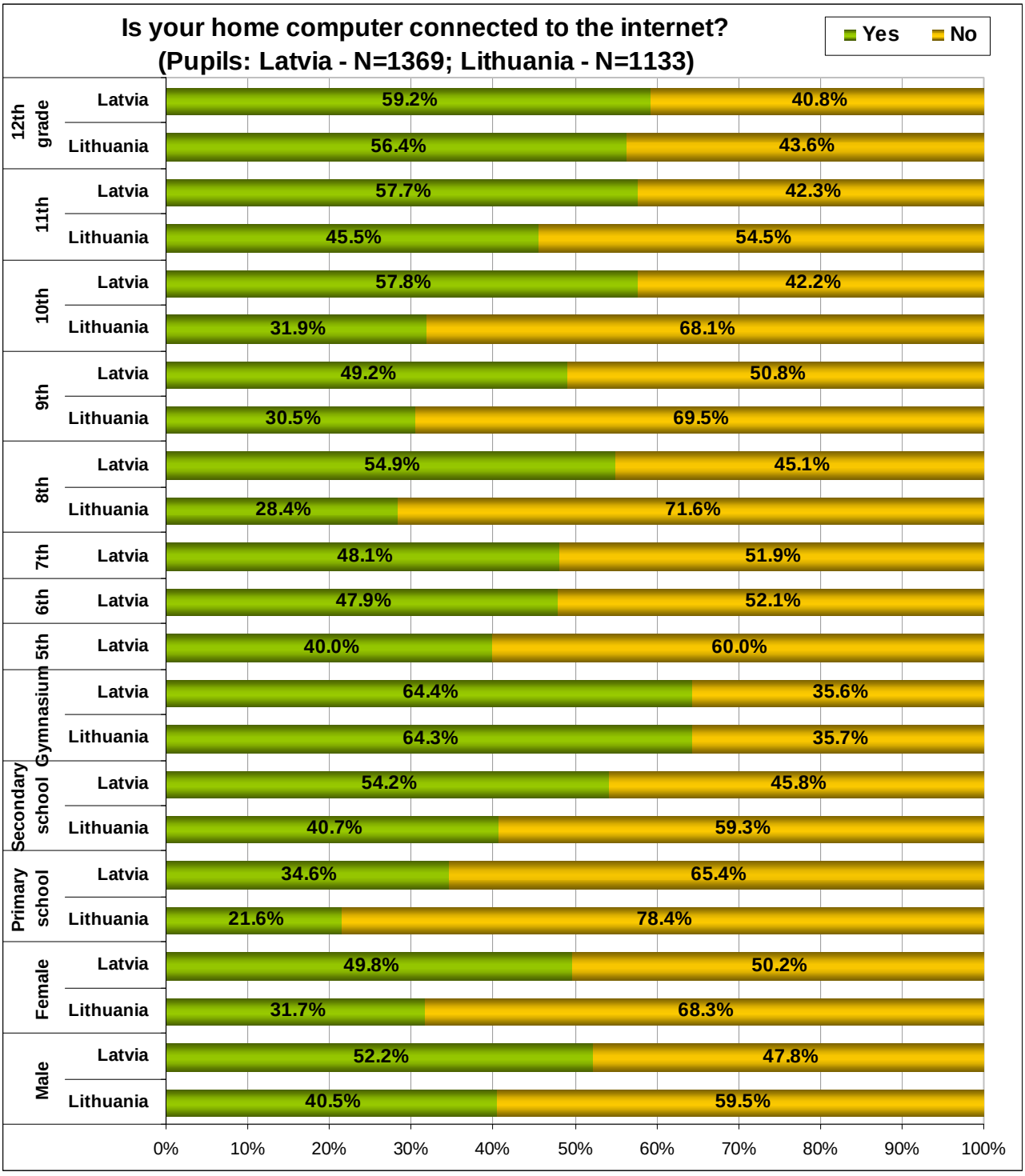
When analyzing the data by socially demographical showings, we can conclude that the Internet access in public places (at schools etc.) would be particularly topical for teachers of rural regions, because teachers, who live in the country, relatively less often have the Internet at home. The said tendency can be observed both in Latvia and in Lithuania. Most often the Internet is available for male teachers and city people.



Like in the case of computers, also in the case of the Internet, households with school age children more often have the Internet, compared to households with no school age children. On the whole, only 13% of Latvia's households have the Internet connection, whereas households with school age children have the Internet in 18,5% of cases, but those with secondary school age children – in 31,6% of cases. ("Latvian Facts", Omnibus surveys).



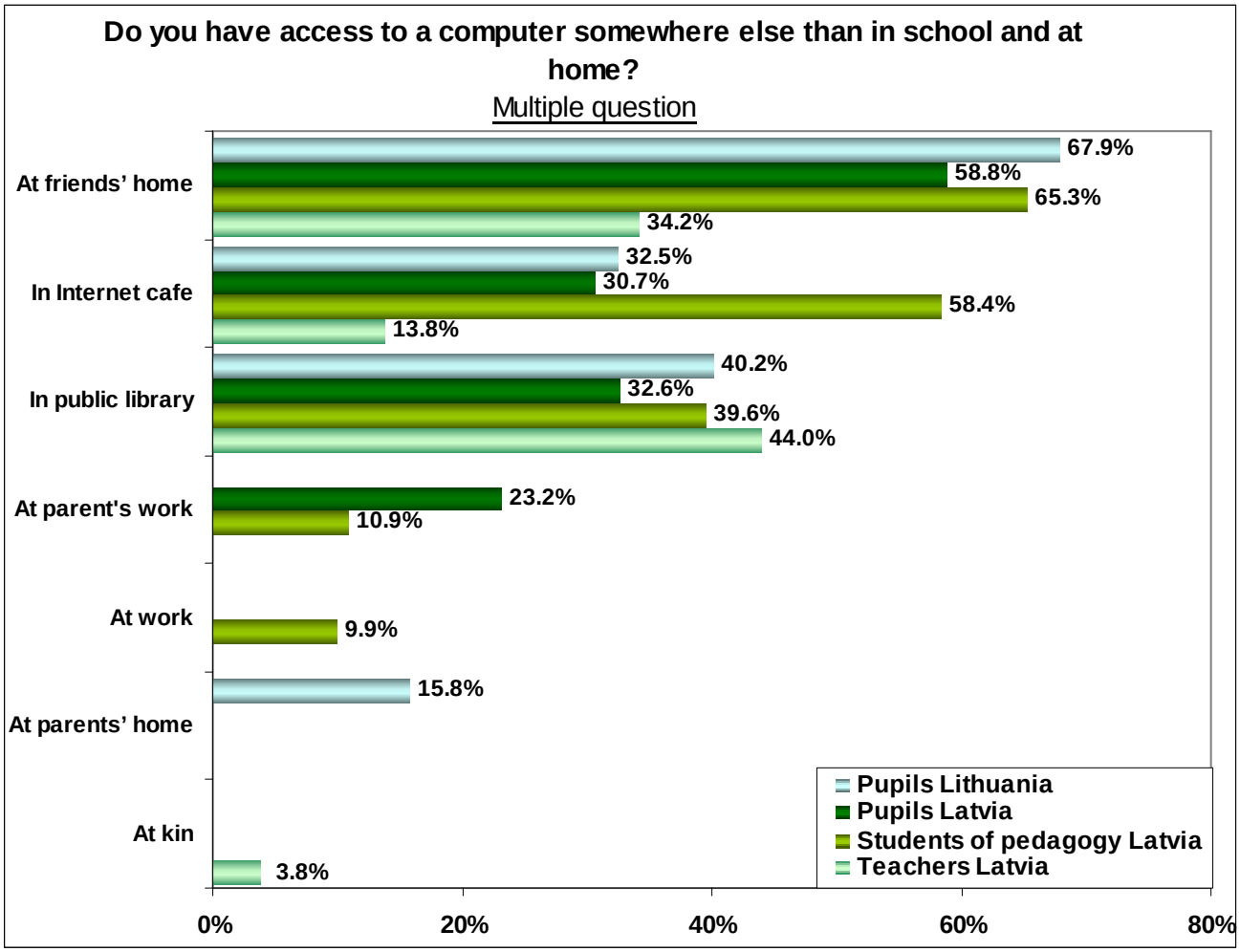
If we compare the above mentioned data on Latvia with the information obtained during the survey conducted in Lithuania, we can see that the tendency is the same: the older a pupil is, the more often the household would have a computer with the Internet connection. The Internet connection to a home computer more often is available to pupils of large schools and secondary schools, as well as to boys more often than to girls.



It should be indicated additionally that in Estonia public internet facilities (including school PCs) are more important for rural children than for urban children. ("Tiger in Focus: Executive Summary", 2004). Hypothetically we can assume that rural children relatively less often have a home computer and the Internet at home that is why it is important to preserve their access at school or other public places.

Access to computers outside home and school shall be evaluated as very high. In Latvia only 17,7% of the surveyed teachers have admitted that they have no access to computer. But the percentage of such pupils in Latvia was only 8,2%, in Lithuania – 8,3% and Estonia – 3%.

Most future teachers (65,3%) and pupils (58,8%) outside their home and educational institutions most often have access to computers when visiting their friends. But teachers, answering the question on access to computers, most often mentioned an alternative answer – 'a public library' (44,0%). Also Lithuanian pupils, as well as Latvians, most often outside their home have access to computers when visiting their friends (67,9%).



3.2. Usage of ICT in education

Respondents within the quantitative study in Latvia and Lithuania (teachers, future teachers and pupils) were asked the following question: ***"How often do you use a computer for educational or leisure needs?"***

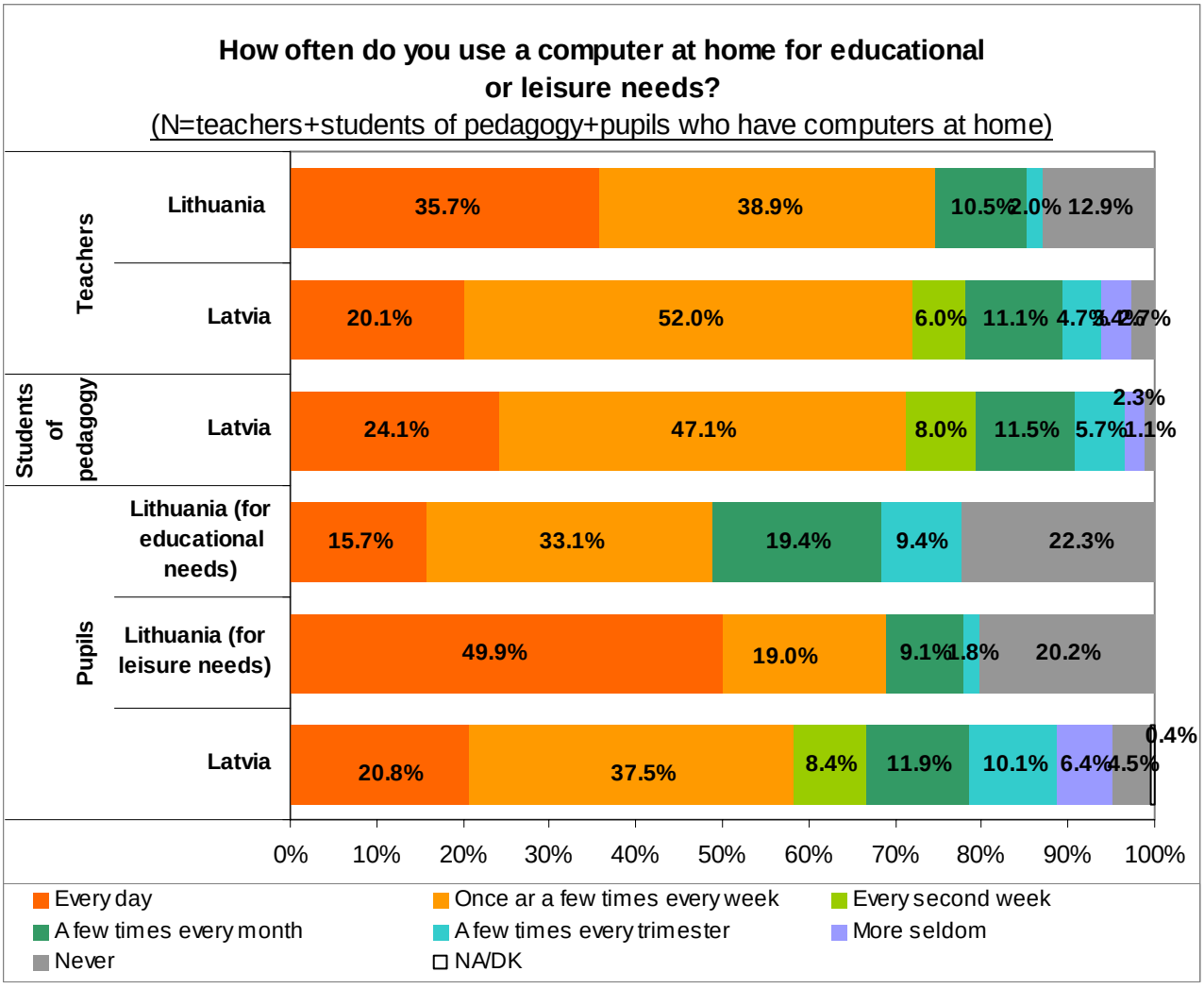
In Latvia most actively computers are used by future teachers: 73,3% use them both at school and university. A similar situation can be observed regarding approximately one third of the surveyed teachers and pupils.

The data obtained during the Estonian study ("Tiger in Focus: Executive Summary" 2004) show that the time spent on PCs in school remained at the previous level whereas out-of-school use of ICT increased significantly. It should be explained as follows: – the time that students spend learning with computers in the classroom depends on multiple factors. The study revealed that the number of computers, the supportive attitudes of students and teachers, and ICT competence are not enough to increase the implementation of ICT. The teaching regulations laid down by the national curriculum impose strict limits on the study process. As a result of a rigid curriculum the average amount of time per week that children use PCs in schools remained unchanged. At the same time out-of-school usage increased significantly. The portion of frequent users is higher among boys, but girls show are marked increase across all time-span categories when compared to the girls' data from survey 2000.

3.2.1. Usage of PC at home.

In Latvia computers during studies/ during the lesson preparation process every day, one or several times a week are used by more than half of the surveyed respondents – the provided answers are from 58,3% regarding pupils to 72,1% regarding teachers and to 71,2% regarding future teachers.

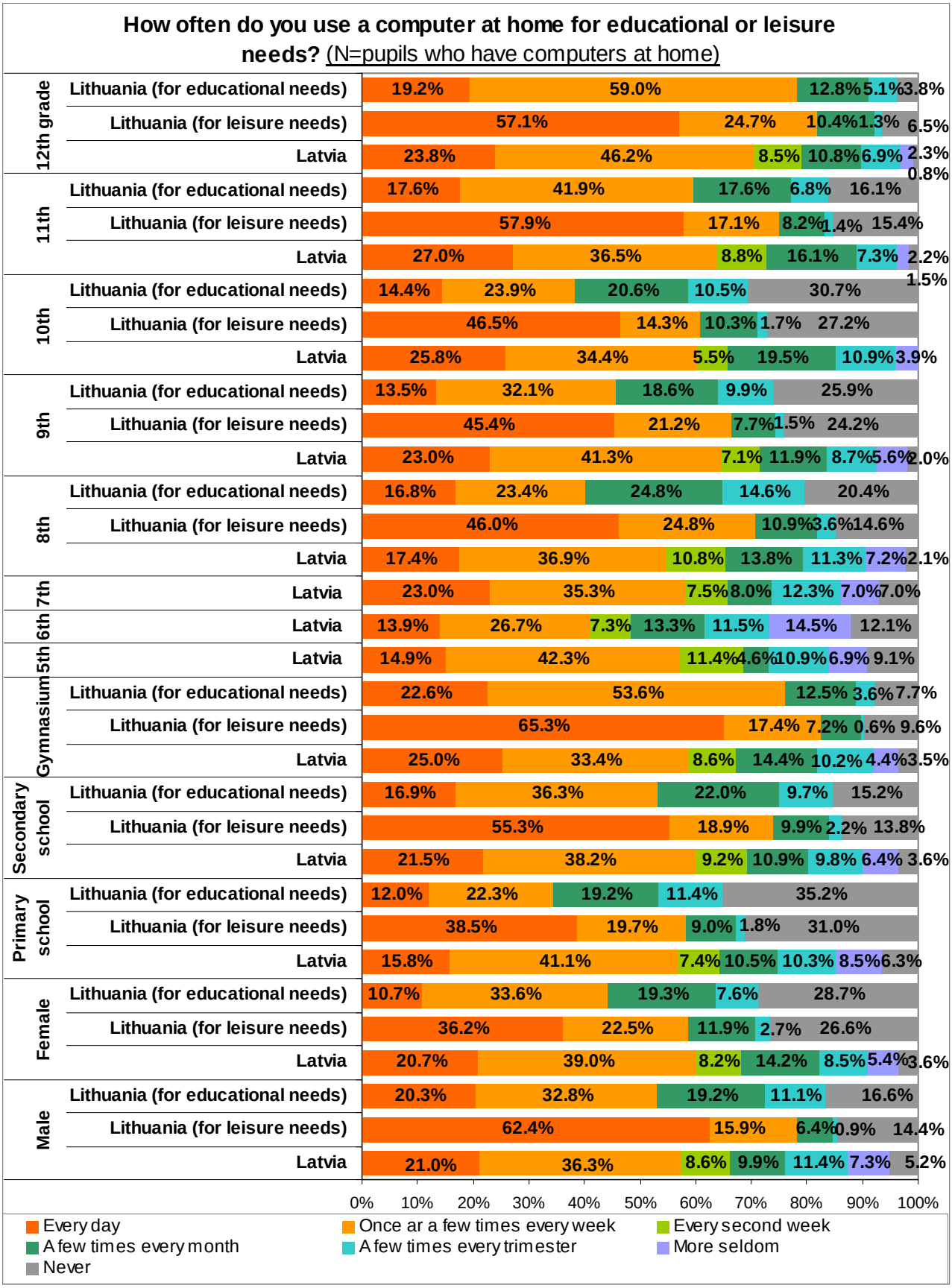
In Lithuania 74,6% of teachers regularly use computers at home, in order to prepare for their work. Pupils more often use home computers for entertainment and not for studies - 68,9% and 48,8% respectively.



Regarding pupils, more active computer users for studies both in Latvia and Lithuania are girls. But boys more often use computers for entertainment – see the Chart on the next page.

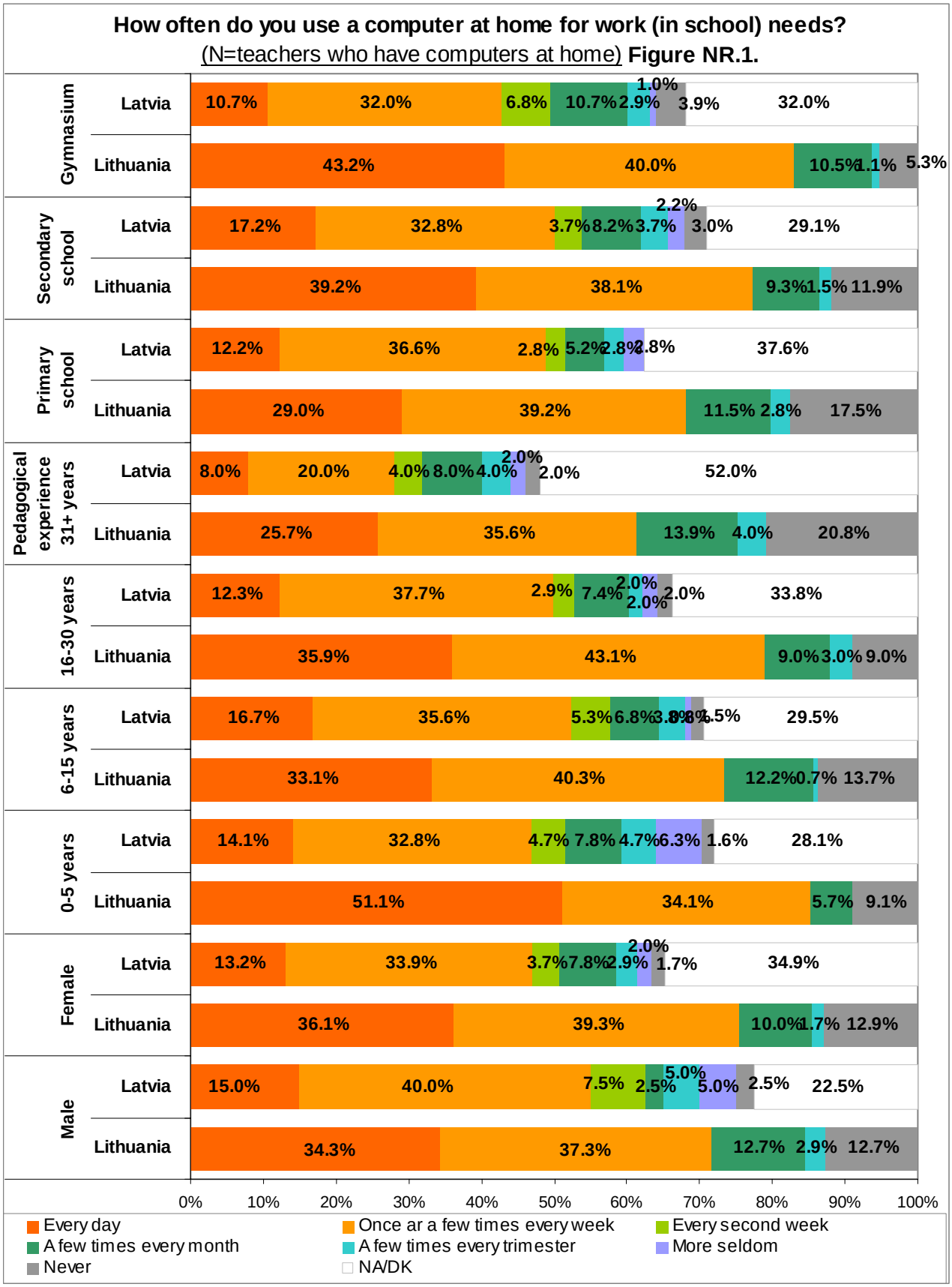
In Lithuania, starting with Form 10, there is a relatively increasing number of the pupils, who use computers for studies and not for having a rest or entertainment. Although even up to Form 12 there is a prevalence of the users, who use computers for entertainment, however, this prevalence with each Form is decreasing and reaching the last Form of secondary school, it has become quite small: only for 3,6% more is the number of the pupils, who at home use a computer for entertainment every day or one/ several times a week.

A computer at home is mostly used for educational needs by the students from gymnasiums, and it is least used for educational purposes by the students from basic schools. Being aware that students from gymnasiums have more computers than students from basic and secondary school, it could be claimed that the frequency of home computer's usage for educational needs directly proportional to the number of students having computers at home while comparing them according to the type of school, in which they learn. (Quantitative research, Lithuania)


How often do you use a computer at home for educational or leisure needs? (N=pupils who have computers at home)
12th grade
Lithuania (for educational needs) 19.2% 59.0% 12.8% 5.1% 3.8%
Lithuania (for leisure needs) 57.1% 24.7% 10.4% 1.3% 6.5%
Latvia 23.8% 46.2% 8.5% 10.8% 6.9% 2.3% 0.8%
11th
Lithuania (for educational needs) 17.6% 41.9% 17.6% 6.8% 16.1%
Lithuania (for leisure needs) 57.9% 17.1% 8.2% 1.4% 15.4%
Latvia 27.0% 36.5% 8.8% 16.1% 7.3% 2.2%
10th
Lithuania (for educational needs) 14.4% 23.9% 20.6% 10.5% 30.7%
Lithuania (for leisure needs) 46.5% 14.3% 10.3% 1.7% 27.2%
Latvia 25.8% 34.4% 5.5% 19.5% 10.9% 3.9% 1.5%
9th
Lithuania (for educational needs) 13.5% 32.1% 18.6% 9.9% 25.9%
Lithuania (for leisure needs) 45.4% 21.2% 7.7% 1.5% 24.2%
Latvia 23.0% 41.3% 7.1% 11.9% 8.7% 5.6% 2.0%
8th
Lithuania (for educational needs) 16.8% 23.4% 24.8% 14.6% 20.4%
Lithuania (for leisure needs) 46.0% 24.8% 10.9% 3.6% 14.6%
Latvia 17.4% 36.9% 10.8% 13.8% 11.3% 7.2% 2.1%
7th
Latvia 23.0% 35.3% 7.5% 8.0% 12.3% 7.0% 7.0%
6th
Latvia 13.9% 26.7% 7.3% 13.3% 11.5% 14.5% 12.1%
5th
Latvia 14.9% 42.3% 11.4% 4.6% 10.9% 6.9% 9.1%
Gymnasium
Lithuania (for educational needs) 22.6% 53.6% 12.5% 3.6% 7.7%
Lithuania (for leisure needs) 65.3% 17.4% 7.2% 0.6% 9.6%
Latvia 25.0% 33.4% 8.6% 14.4% 10.2% 4.4% 3.5%
Secondary school
Lithuania (for educational needs) 16.9% 36.3% 22.0% 9.7% 15.2%
Lithuania (for leisure needs) 55.3% 18.9% 9.9% 2.2% 13.8%
Latvia 21.5% 38.2% 9.2% 10.9% 9.8% 6.4% 3.6%
Primary school
Lithuania (for educational needs) 12.0% 22.3% 19.2% 11.4% 35.2%
Lithuania (for leisure needs) 38.5% 19.7% 9.0% 1.8% 31.0%
Latvia 15.8% 41.1% 7.4% 10.5% 10.3% 8.5% 6.3%
Female
Lithuania (for educational needs) 10.7% 33.6% 19.3% 7.6% 28.7%
Lithuania (for leisure needs) 36.2% 22.5% 11.9% 2.7% 26.6%
Latvia 20.7% 39.0% 8.2% 14.2% 8.5% 5.4% 3.6%
Male
Lithuania (for educational needs) 20.3% 32.8% 19.2% 11.1% 16.6%
Lithuania (for leisure needs) 62.4% 15.9% 6.4% 0.9% 14.4%
Latvia 21.0% 36.3% 8.6% 9.9% 11.4% 7.3% 5.2%
0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%
Every day
Once ar a few times every week
Every second week
A few times every month
A few times every trimester
More seldom
Never

In Latvia for the lesson preparation at home computers more often are used by male teachers and teachers from secondary school with 0-5 years of pedagogical experience, but in Lithuania – by female teachers from gymnasium with 6-15 years of experience.

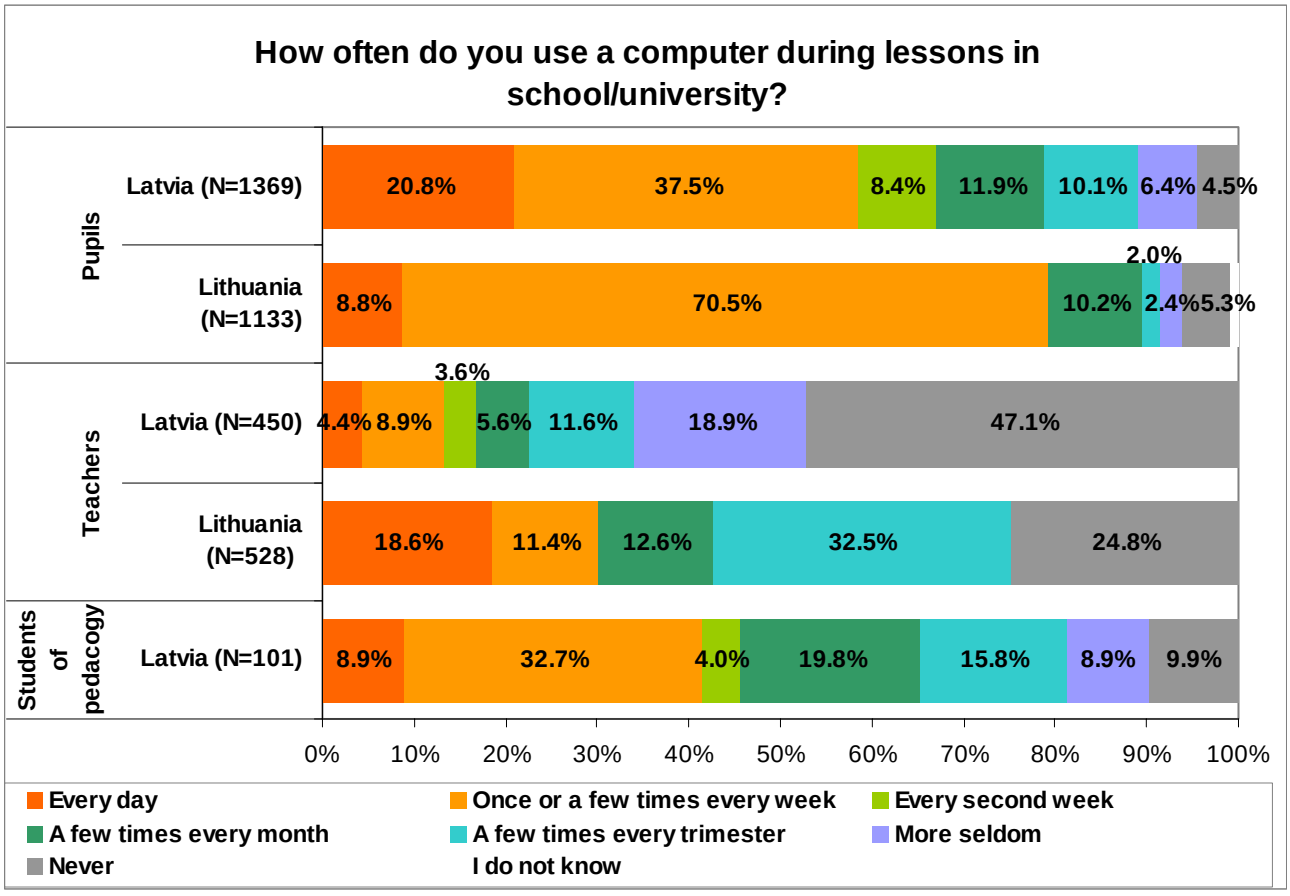
How often do you use a computer at home for work (in school) needs?
(N=teachers who have computers at home) **Figure NR.1.**



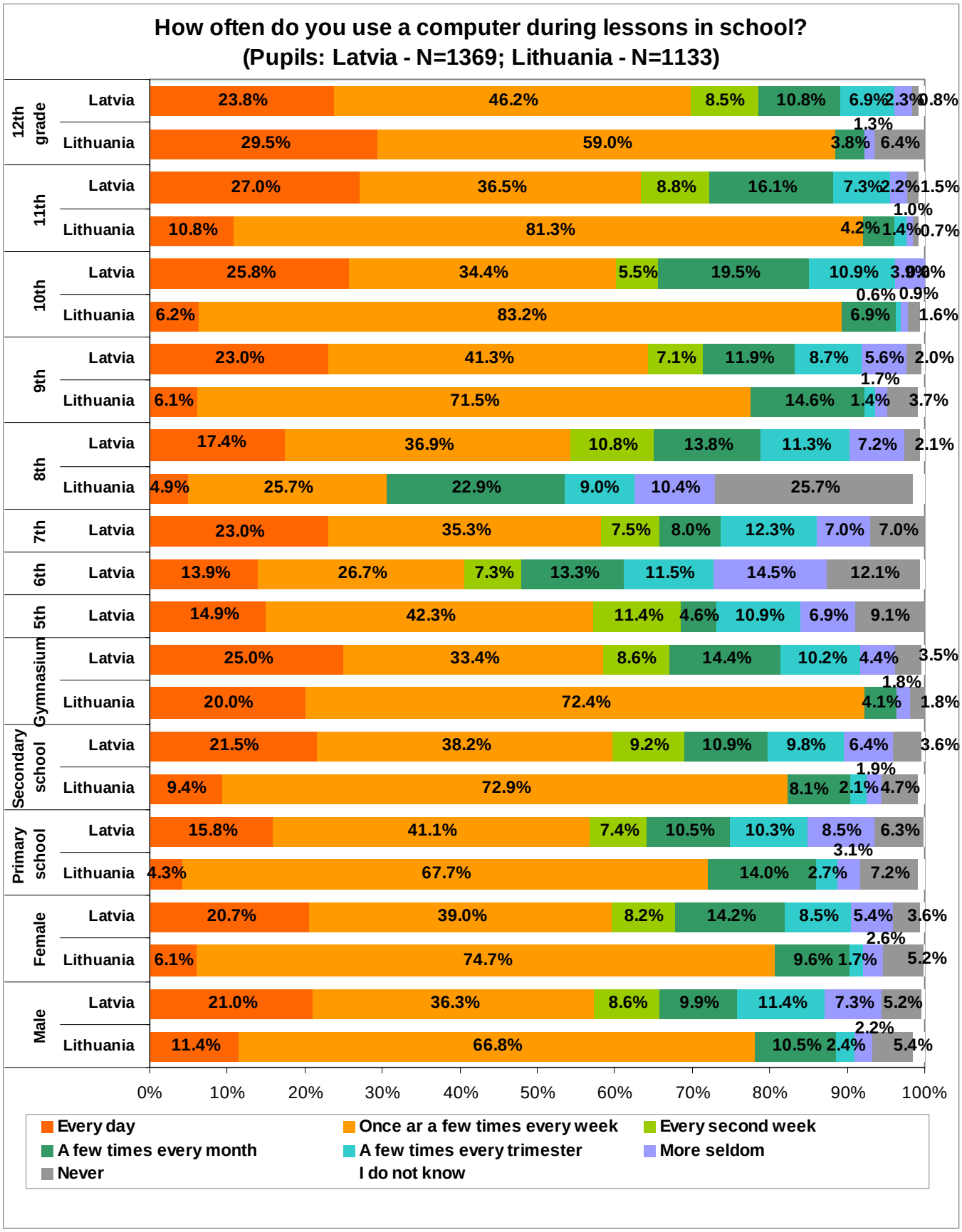
3.2.2. Usage of PC in school and university.

Both in Latvia and Lithuania pupils most often use computers in order to prepare for the humanities, they are followed by the sciences, most of which are related to learning IT. A similar situation can be observed regarding the Internet usage by pupils.

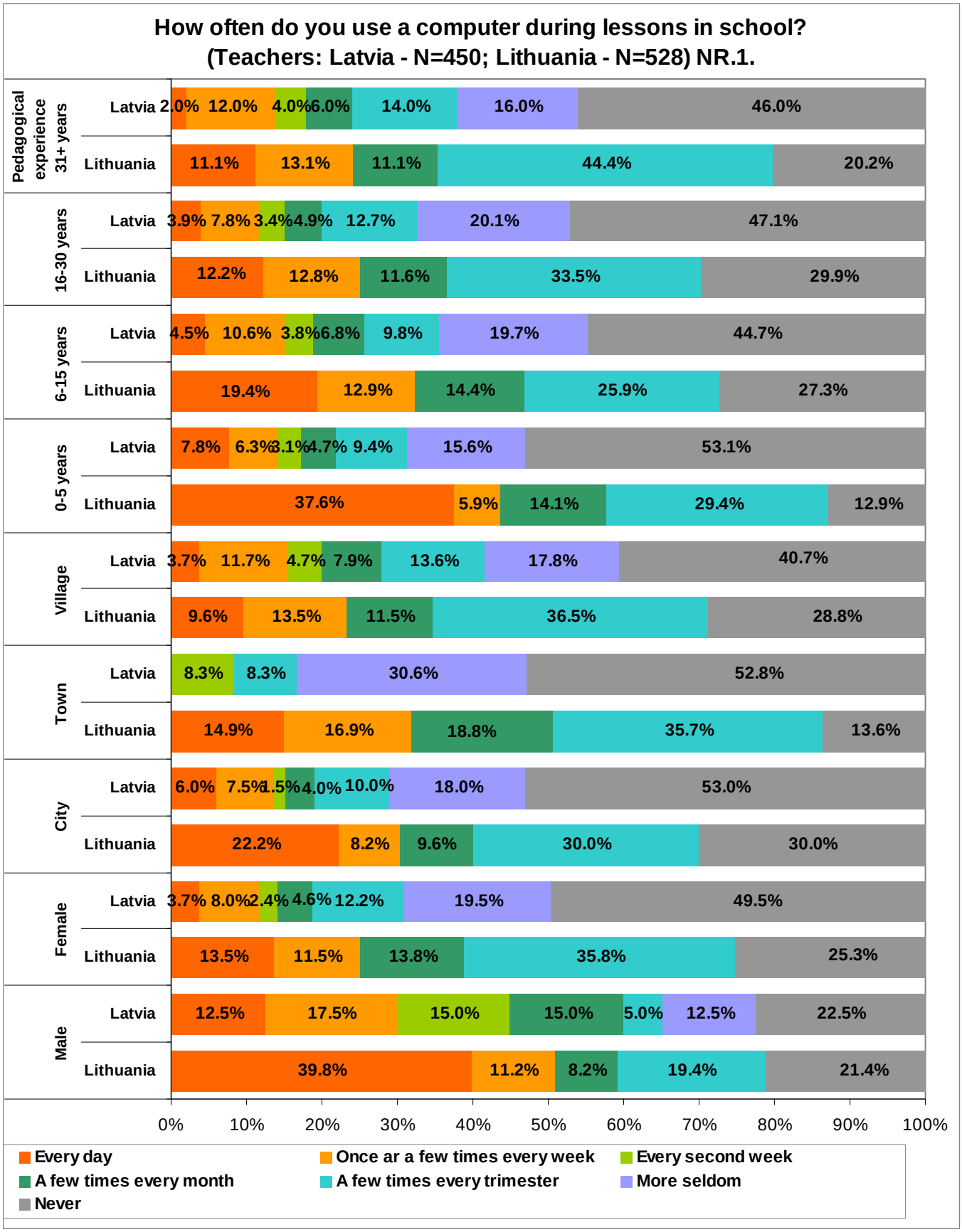
During classes or lectures computers are regularly used by 79,3% of pupils in Lithuania and by 58,3% in Latvia. The percentages regarding teachers are 30% and 13,3% respectively. Future teachers in Latvia during lectures regularly use computers in 41,6% of cases.



Both in Latvia and Lithuania regarding pupils a more active computer usage during classes can be observed in the oldest forms and in the largest schools, as well as speaking about girls.

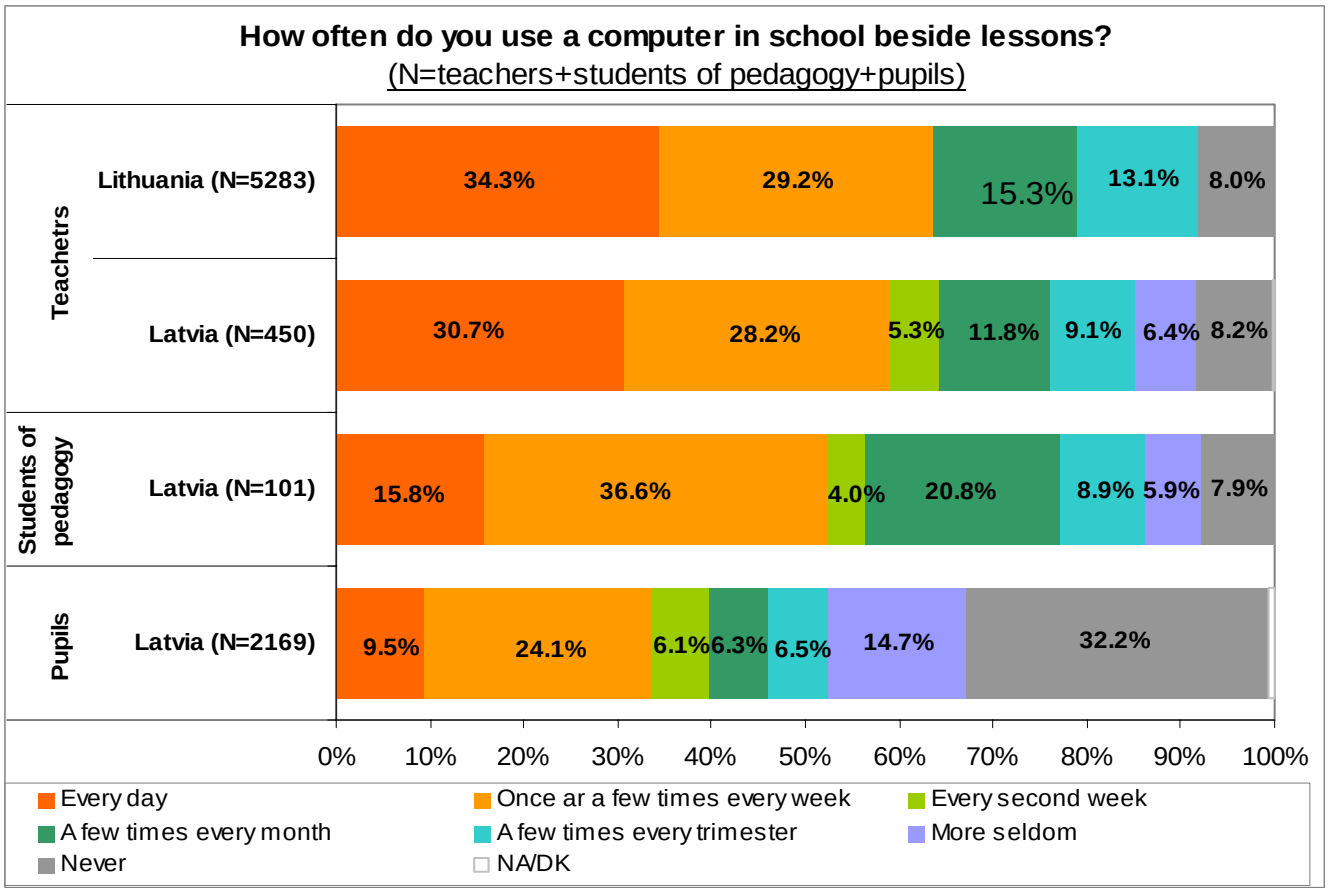


Male teachers much more often than female teachers use a computer during lessons at school – it is proven by the data obtained during the Latvia's and Lithuania's quantitative studies:



Latvian and Lithuanian schools are more or less provided with computers; therefore, pedagogues who even do not have a computer at home have possibility to work with it at school.

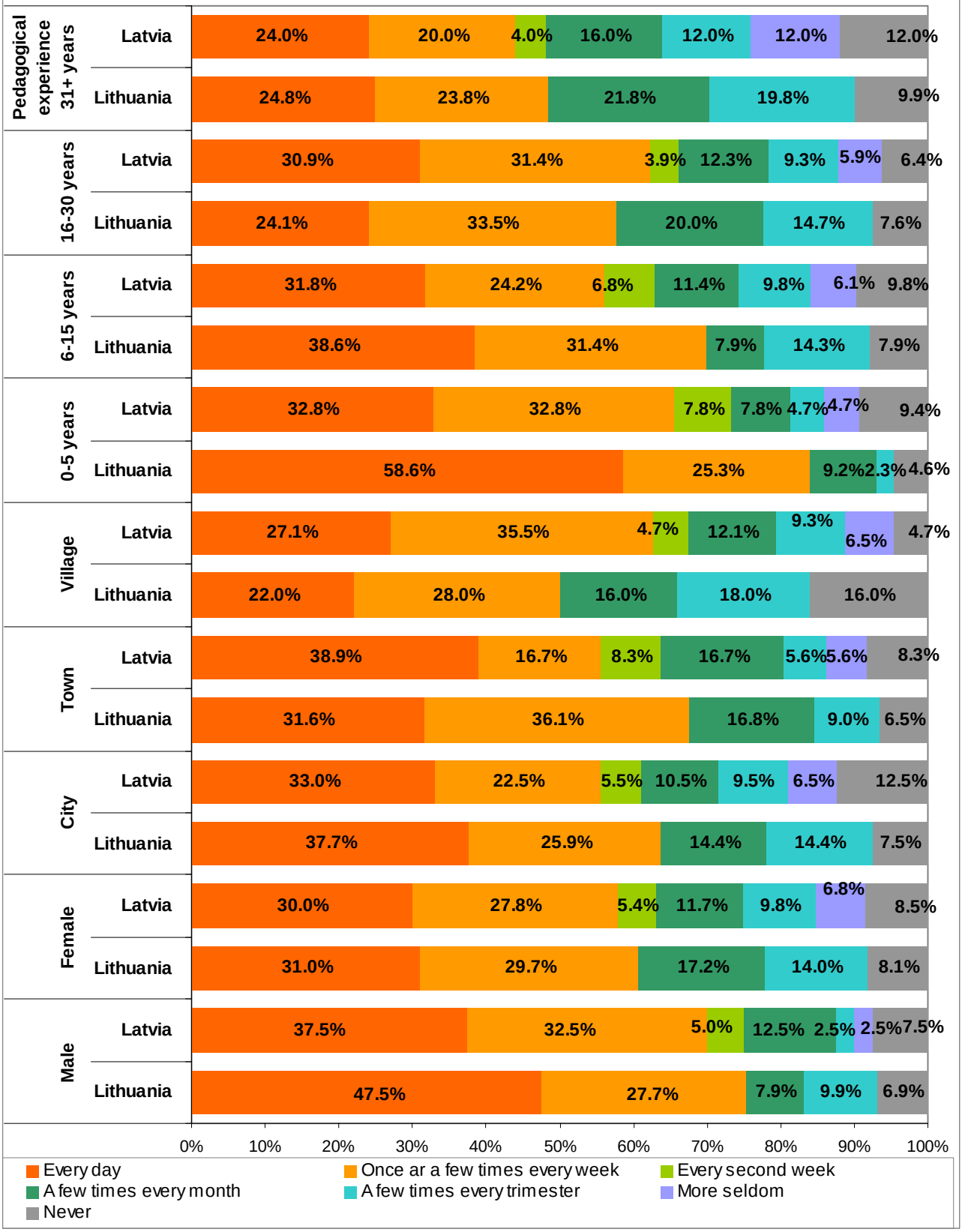
Outside classes school computers are used by teachers much more actively than during classes (in Latvia - 58,9%; +45,6%; in Lithuania – 63,5%; +33,5%). In Latvia also future teachers are active at using computers between lectures – 52,5%. But Latvia's pupils outside classes use school computers much less often than during classes – 33,6% (-24,7%).



In the study conducted in Estonia ("Tiger in Focus": Executive Summary, 2004) a different methodology was used, that is why it would not be correct to compare the obtained data with the Latvia's and Lithuania's results. However, it is worth to mark illustratively the main findings of the Estonia's study that school computers have become more accessible to pupils beside lessons. 47% of pupils can use computers after class, although they must obtain permission for this. Without permission 32% of pupils can access computers during breaks and 42% after class. Findings revealed that access is more strictly controlled in Russian-speaking- schools, where 67% of pupils must ask for special permission. Over the four-year period, students in Estonian urban schools became less interested in the option of using school computers, while in Russian-speaking schools the opposite trend was observed. In rural schools pupils remain very interested in using computers outside class-time – only 9% expressed no interest in this.

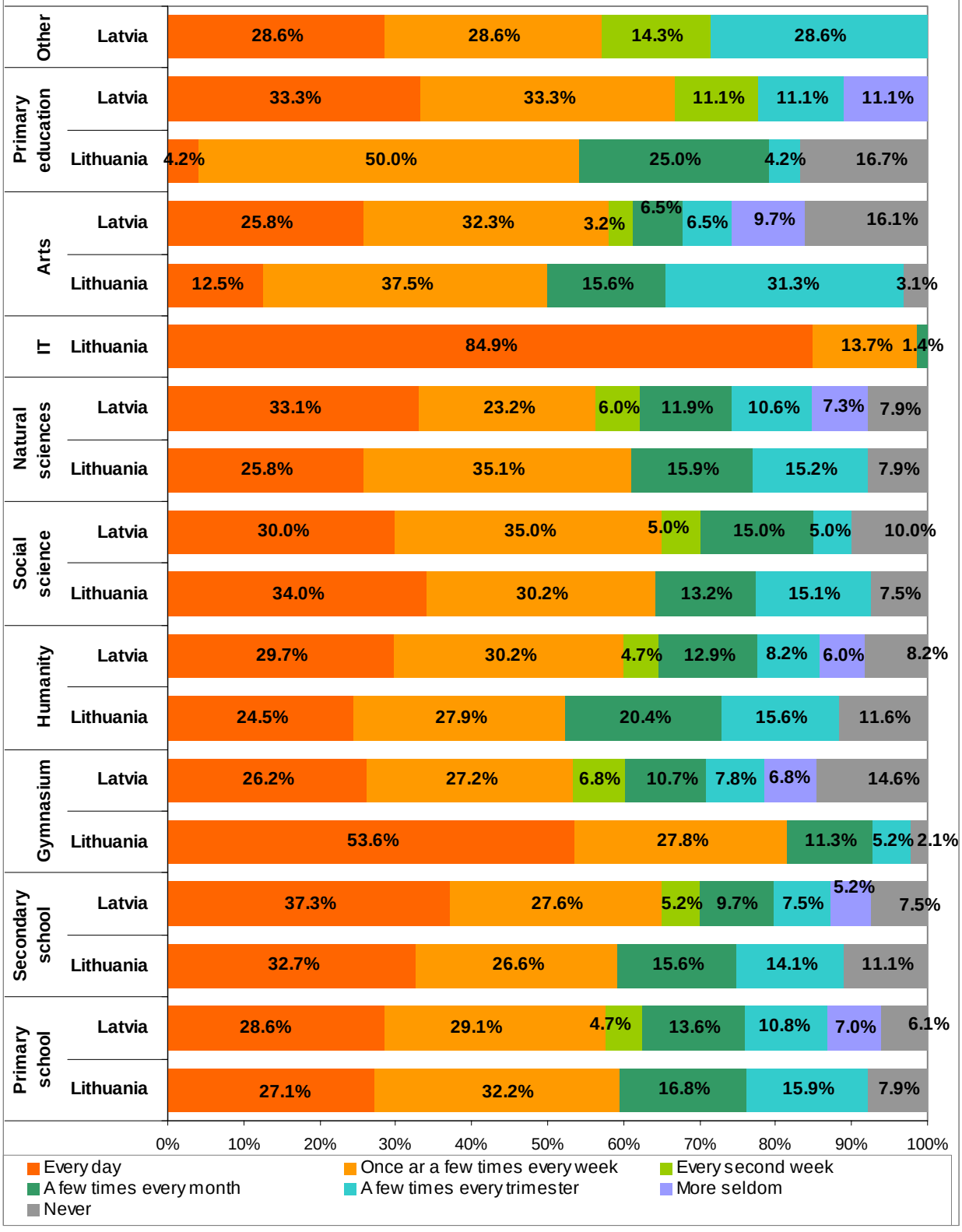
Junior and male teachers use computer beside lessons more often than elder ones. Quite evident differences between the residents of town and city and residents of village are noted on this point in Lithuania. A computer is used every day or several times a week by 50 percent of teachers from village while this number for the resident of city and town respectively comprises 63 and 68 percent. (see the Chart on the next page)

How often do you use a computer in school beside lessons?
(N=teachers) **Figure NR.1.**



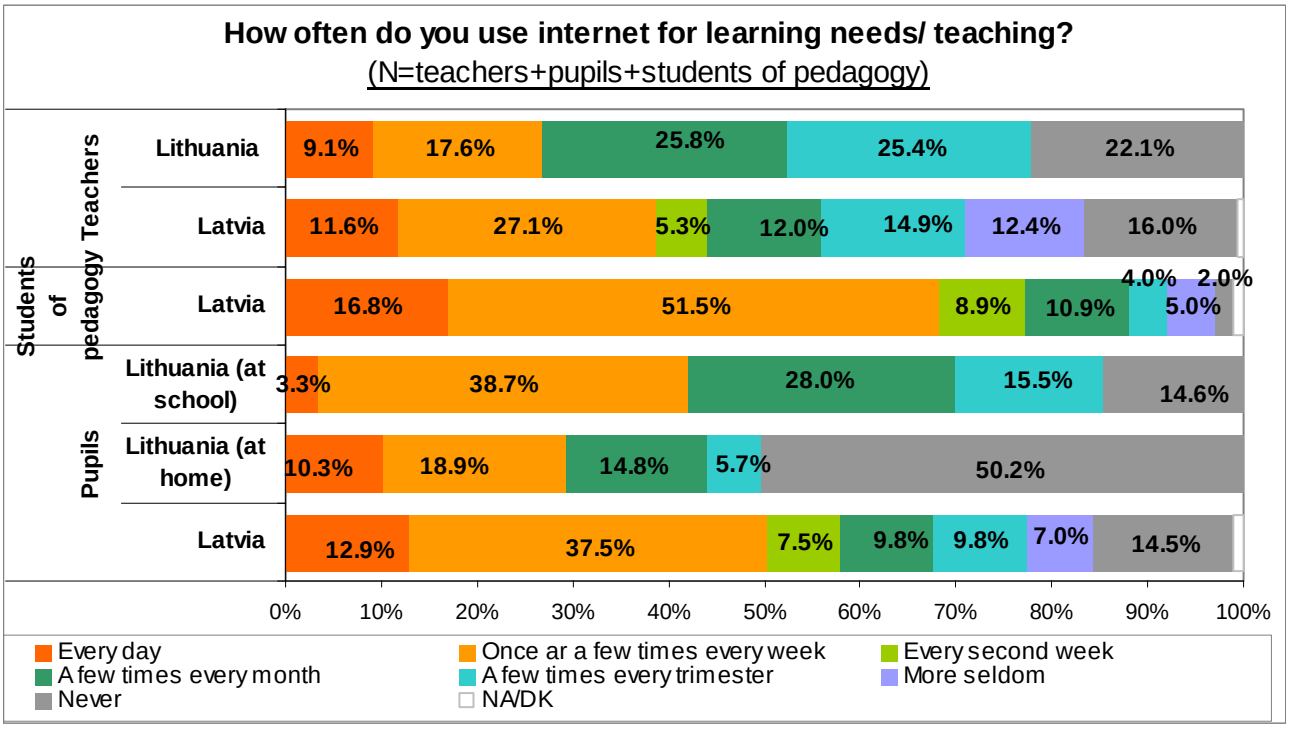
Computers at school beside the lessons are more often used by teachers of informatics (Lithuania), social sciences (Latvia) and more seldom by specialists of basic education (Lithuania). The usage of school computers of beside lessons depends on the type of school. In Lithuania teachers working in gymnasiums use computers more often than teachers of basic and secondary schools.

How often do you use a computer in school beside lessons?
(N=teachers) **Figure NR.2.**



3.2.3. Usage of Internet.

In Latvia 68,3% of future teachers and 50,4% of pupils regularly (every day or several days a week) use the Internet for their studies at school, university or home. In Lithuania pupils regularly use the Internet at school (42%), but 29,2% – at home. Teachers in Latvia and Lithuania regularly use the Internet for studies in 38,7% and 26,7% of cases respectively.



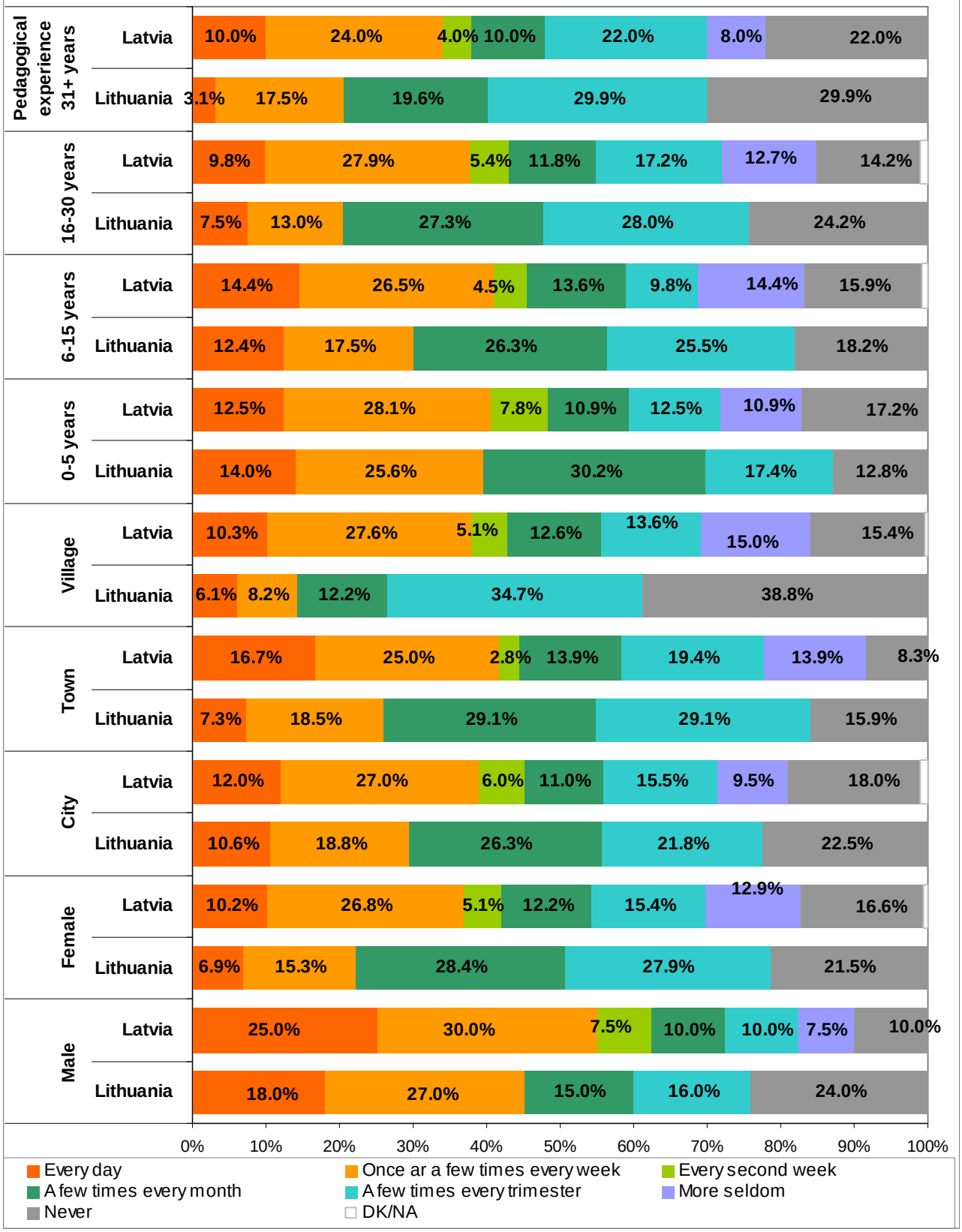
It should be noted that the Internet usage in teaching is one of the research's questions, which are mostly determined by the social-demographic factors.

Internet is used in teaching more (see the Chart on the next page):

- by junior teachers having less experience of pedagogical work;
- more by the teachers from city (Lithuania) or town (Latvia) than the teachers from village;
- more by male than female teachers.

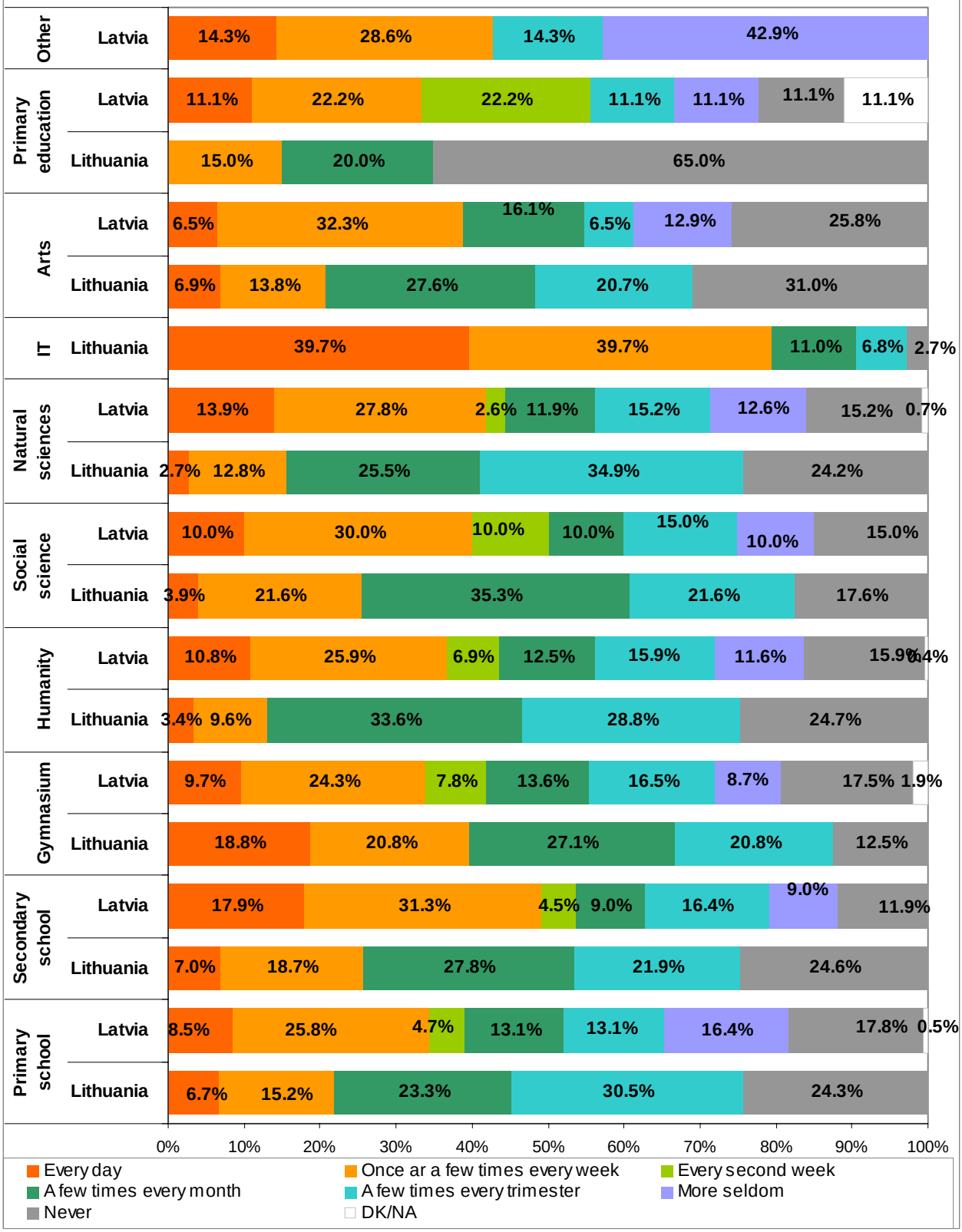
-

How often do you use the internet in teaching?
(N=teachers who have computers at home) **Figure NR.1.**



It should be noted that Internet in teaching is used more by teachers working in gymnasiums (Lithuania) or secondary schools (Latvia) than the teachers working in primary schools. The Internet is most widely used by the teachers of informatics (Lithuania); and of social as well as natural sciences (Latvia).

How often do you use the internet in teaching?
(N=teachers who have computers at home) **Figure NR.2.**

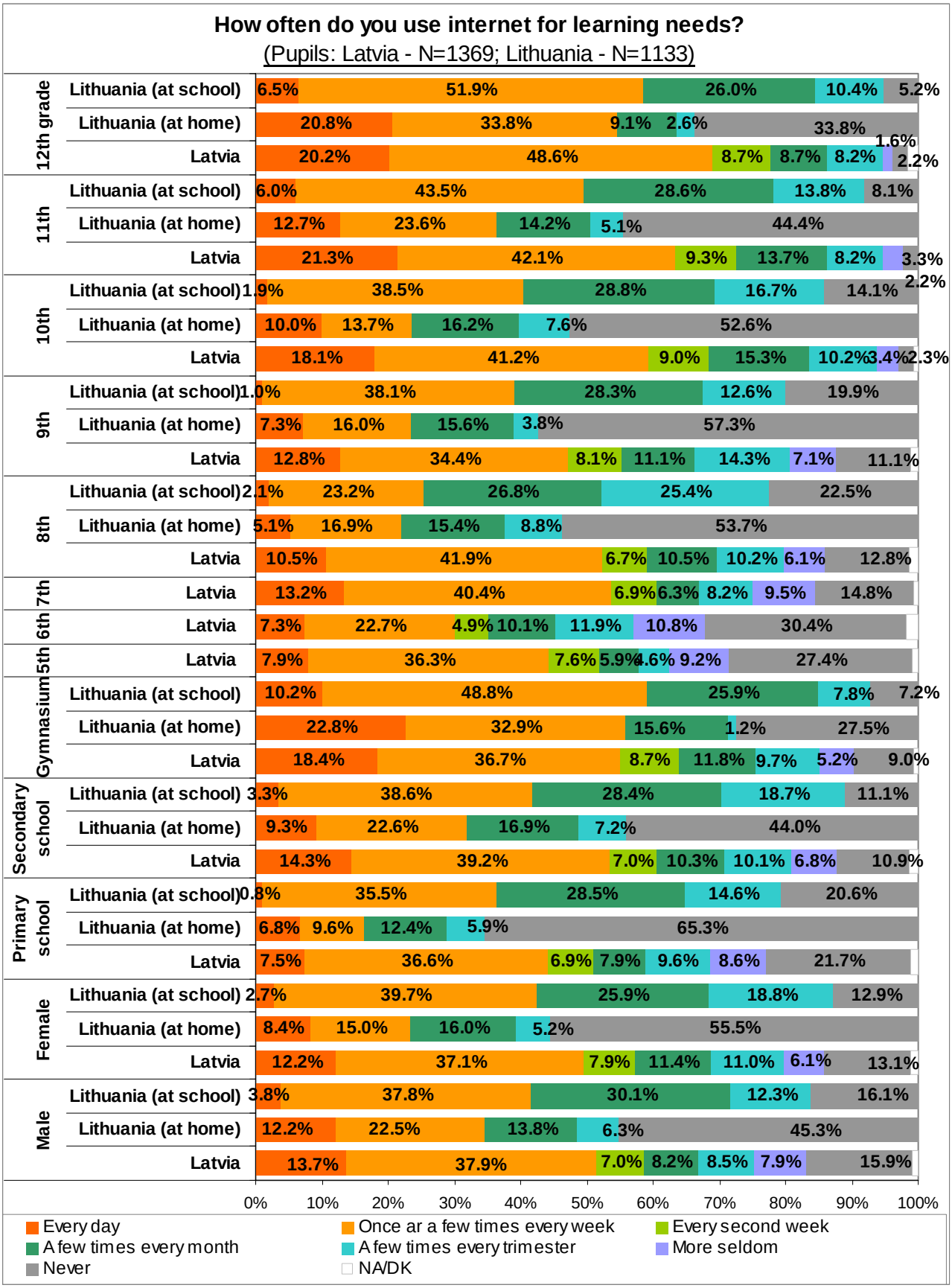


In pupils audience Internet for learning is mostly used in the city and it is used least in village since the number of computers and the number of Internet access in village are also less than in a city/town.

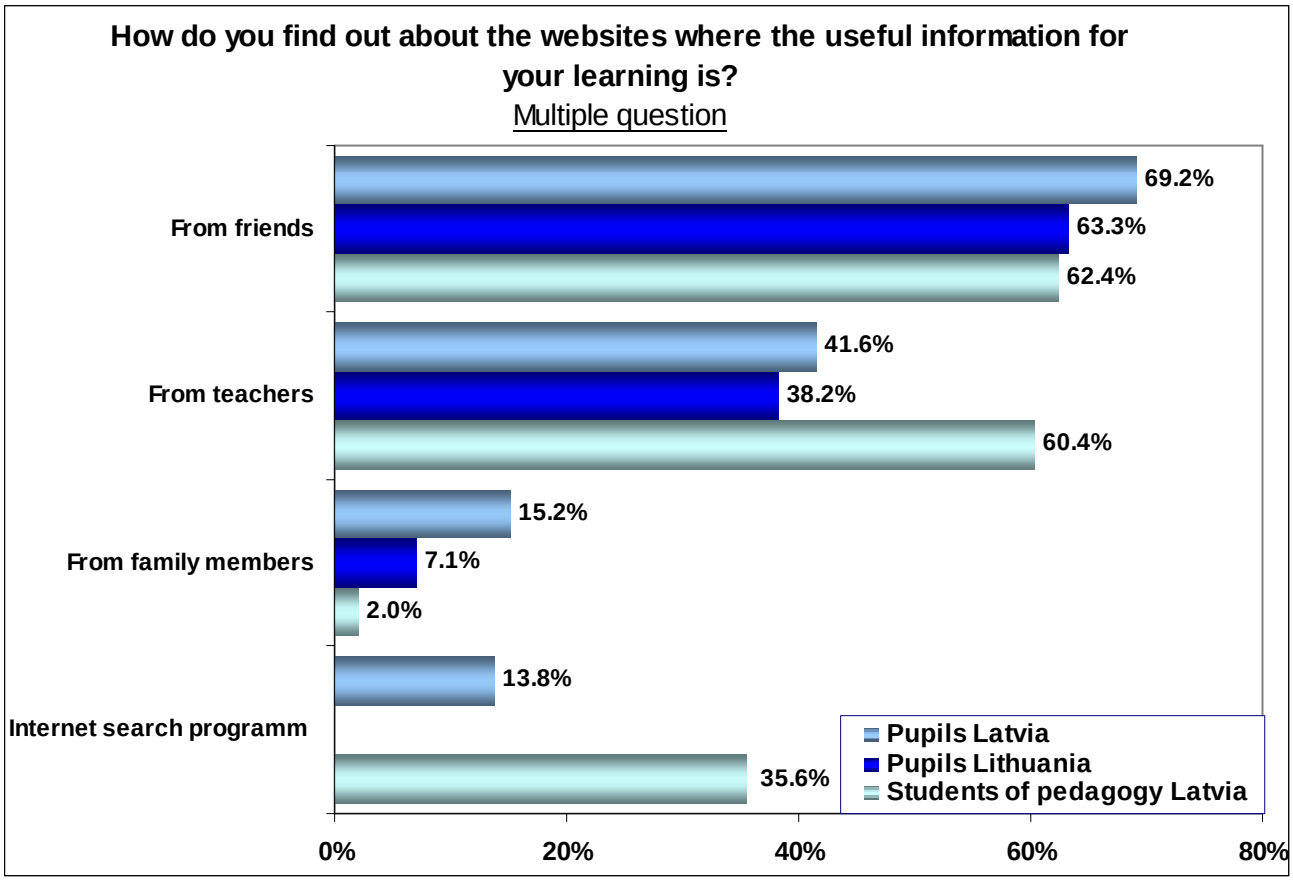
In Lithuania the usage of computer during the lessons depends on the grade of a pupil. The pupils use computers mostly during the lessons of informatics. Informatics is scheduled in the plans of teaching as a compulsory subject in grades from 9 to 11. However, it is optional in the 8th grade, therefore, computers are used less frequently. The usage of a computer in the 12th grade decreases since informatics is used only by those who are going to pass the exam of informatics.

The Chart on the next page shows how pupils use a computer at home for educational needs. It should be noted that although the informatics is not studied in the 8th grade in Lithuania, pupils use a computer in similar manner as in 9th and 10th grade, where informatics is already studied. A home computer is started to be used more intensively for educational needs in the 11th and 12th grades.

In Latvia, starting from Form 9, there is a constantly increasing number of the pupils, who use the Internet for educational needs (see the Chart on the next page).

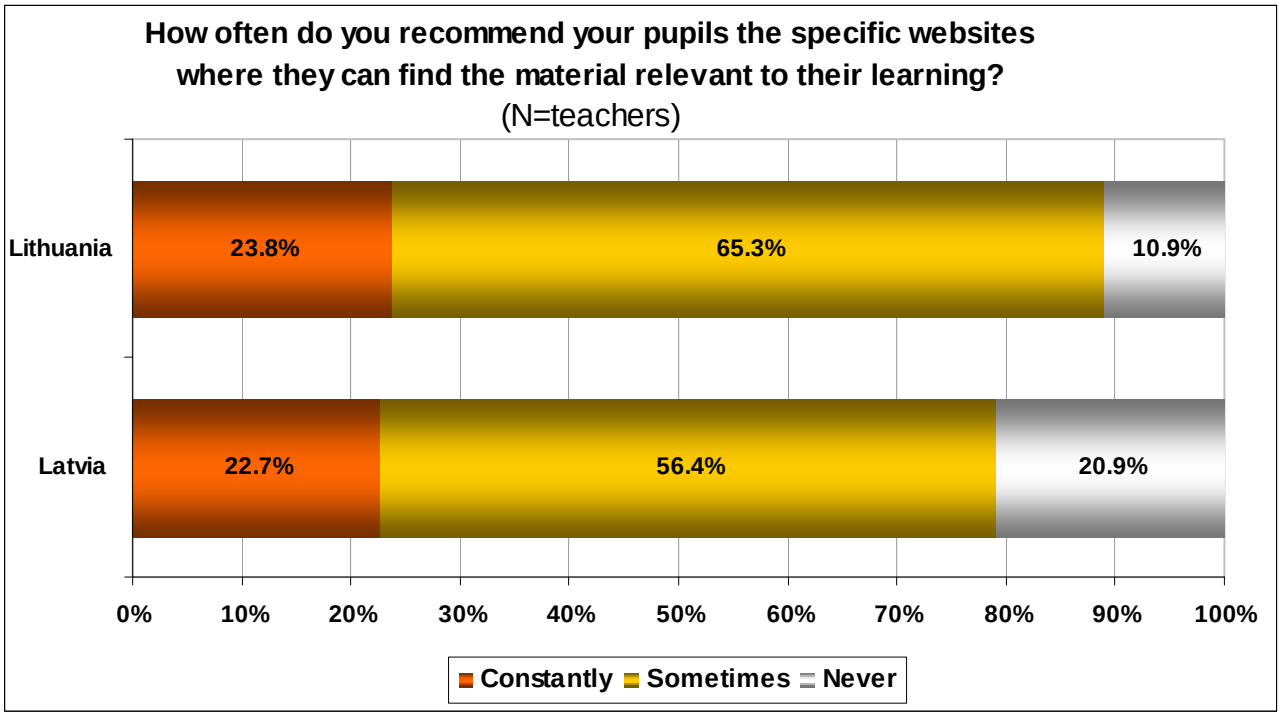

How often do you use internet for learning needs?
(Pupils: Latvia - N=1369; Lithuania - N=1133)
12th grade
Lithuania (at school) 6.5% 51.9% 26.0% 10.4% 5.2%
Lithuania (at home) 20.8% 33.8% 9.1% 2.6% 33.8%
Latvia 20.2% 48.6% 8.7% 8.7% 8.2% 1.6% 2.2%
11th
Lithuania (at school) 6.0% 43.5% 28.6% 13.8% 8.1%
Lithuania (at home) 12.7% 23.6% 14.2% 5.1% 44.4%
Latvia 21.3% 42.1% 9.3% 13.7% 8.2% 3.3%
10th
Lithuania (at school) 1.9% 38.5% 28.8% 16.7% 14.1% 2.2%
Lithuania (at home) 10.0% 13.7% 16.2% 7.6% 52.6%
Latvia 18.1% 41.2% 9.0% 15.3% 10.2% 3.4% 2.3%
9th
Lithuania (at school) 1.0% 38.1% 28.3% 12.6% 19.9%
Lithuania (at home) 7.3% 16.0% 15.6% 3.8% 57.3%
Latvia 12.8% 34.4% 8.1% 11.1% 14.3% 7.1% 11.1%
8th
Lithuania (at school) 2.1% 23.2% 26.8% 25.4% 22.5%
Lithuania (at home) 5.1% 16.9% 15.4% 8.8% 53.7%
Latvia 10.5% 41.9% 6.7% 10.5% 10.2% 6.1% 12.8%
7th
Latvia 13.2% 40.4% 6.9% 6.3% 8.2% 9.5% 14.8%
6th
Latvia 7.3% 22.7% 4.9% 10.1% 11.9% 10.8% 30.4%
5th
Latvia 7.9% 36.3% 7.6% 5.9% 4.6% 9.2% 27.4%
Gymnasium
Lithuania (at school) 10.2% 48.8% 25.9% 7.8% 7.2%
Lithuania (at home) 22.8% 32.9% 15.6% 1.2% 27.5%
Latvia 18.4% 36.7% 8.7% 11.8% 9.7% 5.2% 9.0%
Secondary school
Lithuania (at school) 3.3% 38.6% 28.4% 18.7% 11.1%
Lithuania (at home) 9.3% 22.6% 16.9% 7.2% 44.0%
Latvia 14.3% 39.2% 7.0% 10.3% 10.1% 6.8% 10.9%
Primary school
Lithuania (at school) 0.8% 35.5% 28.5% 14.6% 20.6%
Lithuania (at home) 6.8% 9.6% 12.4% 5.9% 65.3%
Latvia 7.5% 36.6% 6.9% 7.9% 9.6% 8.6% 21.7%
Female
Lithuania (at school) 2.7% 39.7% 25.9% 18.8% 12.9%
Lithuania (at home) 8.4% 15.0% 16.0% 5.2% 55.5%
Latvia 12.2% 37.1% 7.9% 11.4% 11.0% 6.1% 13.1%
Male
Lithuania (at school) 3.8% 37.8% 30.1% 12.3% 16.1%
Lithuania (at home) 12.2% 22.5% 13.8% 6.3% 45.3%
Latvia 13.7% 37.9% 7.0% 8.2% 8.5% 7.9% 15.9%
0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%
Every day
Once ar a few times every week
Every second week
A few times every month
A few times every trimester
More seldom
Never
NA/DK

When asked on how respondents learn about the Internet homepages, where they can obtain the necessary information for their studies, they as an information source most often mentioned their friends (69,2% of pupils in Latvia, 63,3% - in Lithuania and 62,4% of future teachers in Latvia). Approximately one third of students admit that they look for the necessary information themselves, using the Internet browsers (pupils in Latvia – only 13,8%), whereas family members are a more significant source of information in the case of pupils.



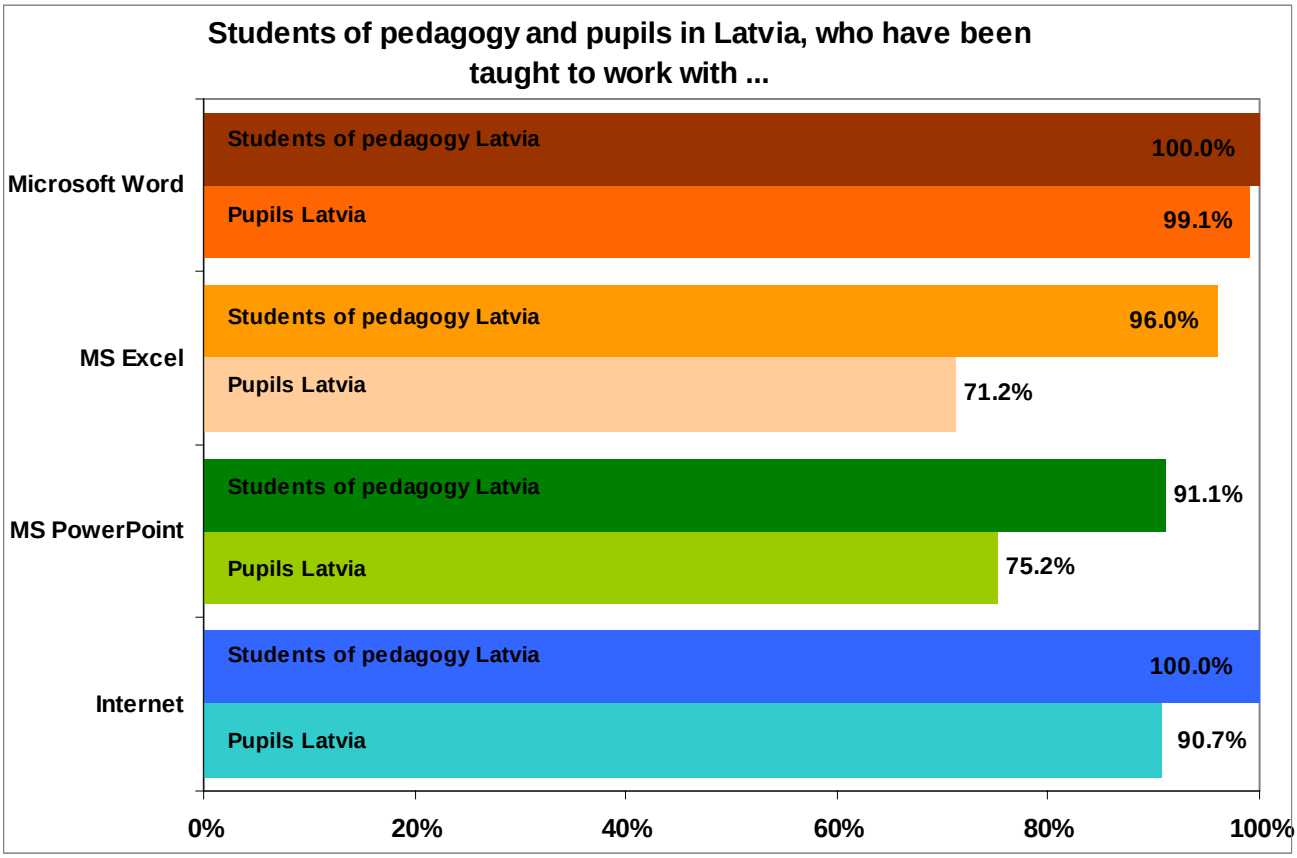
The boys find out about the useful websites for learning from elsewhere (other websites and alike) more frequently than girls who find out this information from teachers and friends (Quantitative research Lithuania).

A stable second position regarding the provision of information on the Internet homepages, in the opinion of future teachers and pupils, is taken by teachers and university teachers (60,4% and 41,6% in Latvia respectively and 38,2% (pupils) Lithuania). Teachers themselves also admit that they regularly (Lithuania – 23,8%; Latvia 22,7%) or at least sometimes (Lithuania – 65,3%; Latvia 56,4%) recommend their pupils to use the necessary Internet resources.



3.2.4. Usage of programs in education

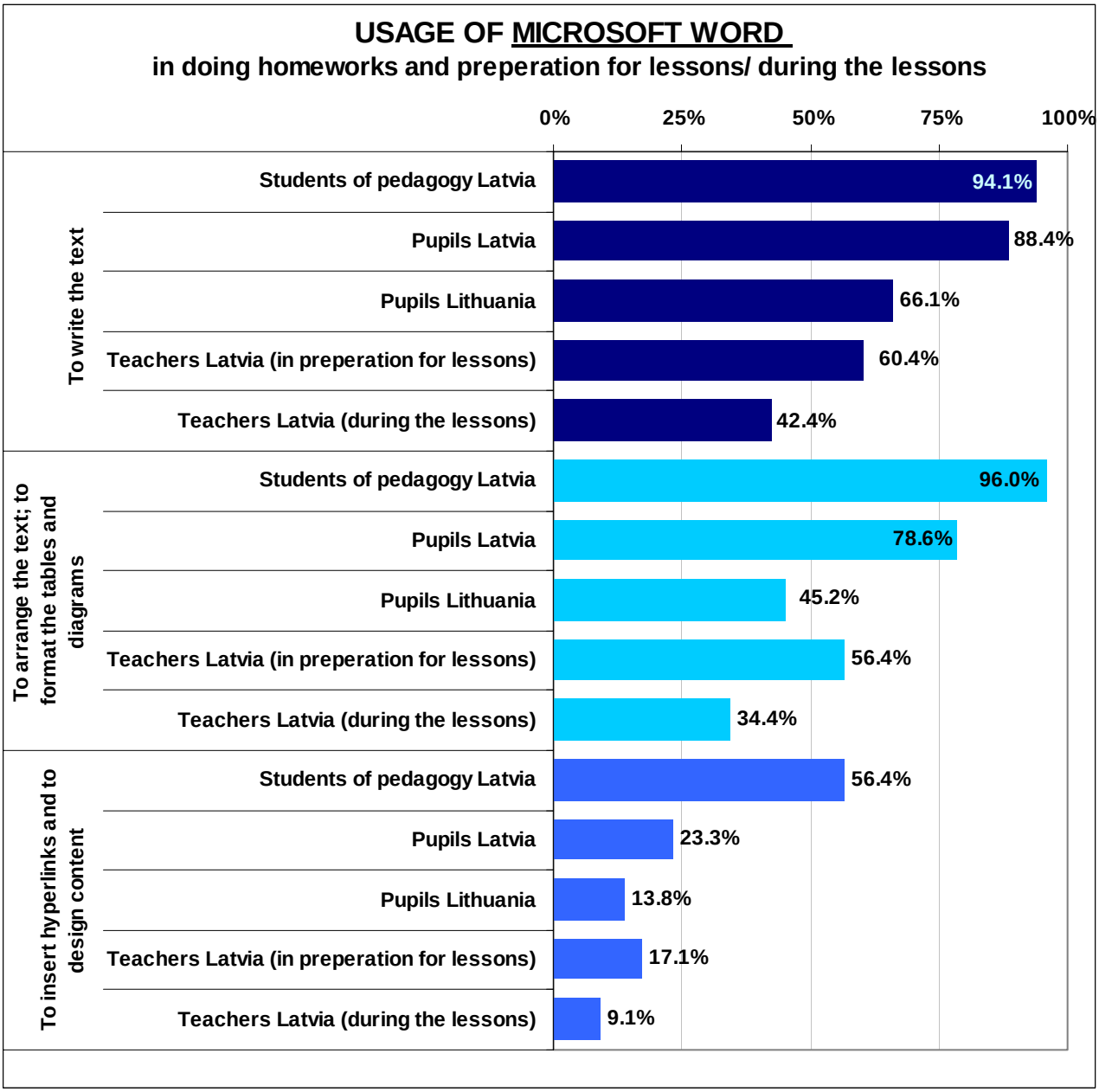
In Latvia the majority of the surveyed pupils and future teachers admitted that they have been taught to work with basic Microsoft software – MS Word, MS Excel and MS PowerPoint, as well as with the Internet. Pupils' training level to a larger (Excel, PowerPoint) or smaller extent (Word, Internets) falls behind that of future teachers regarding all the showings.

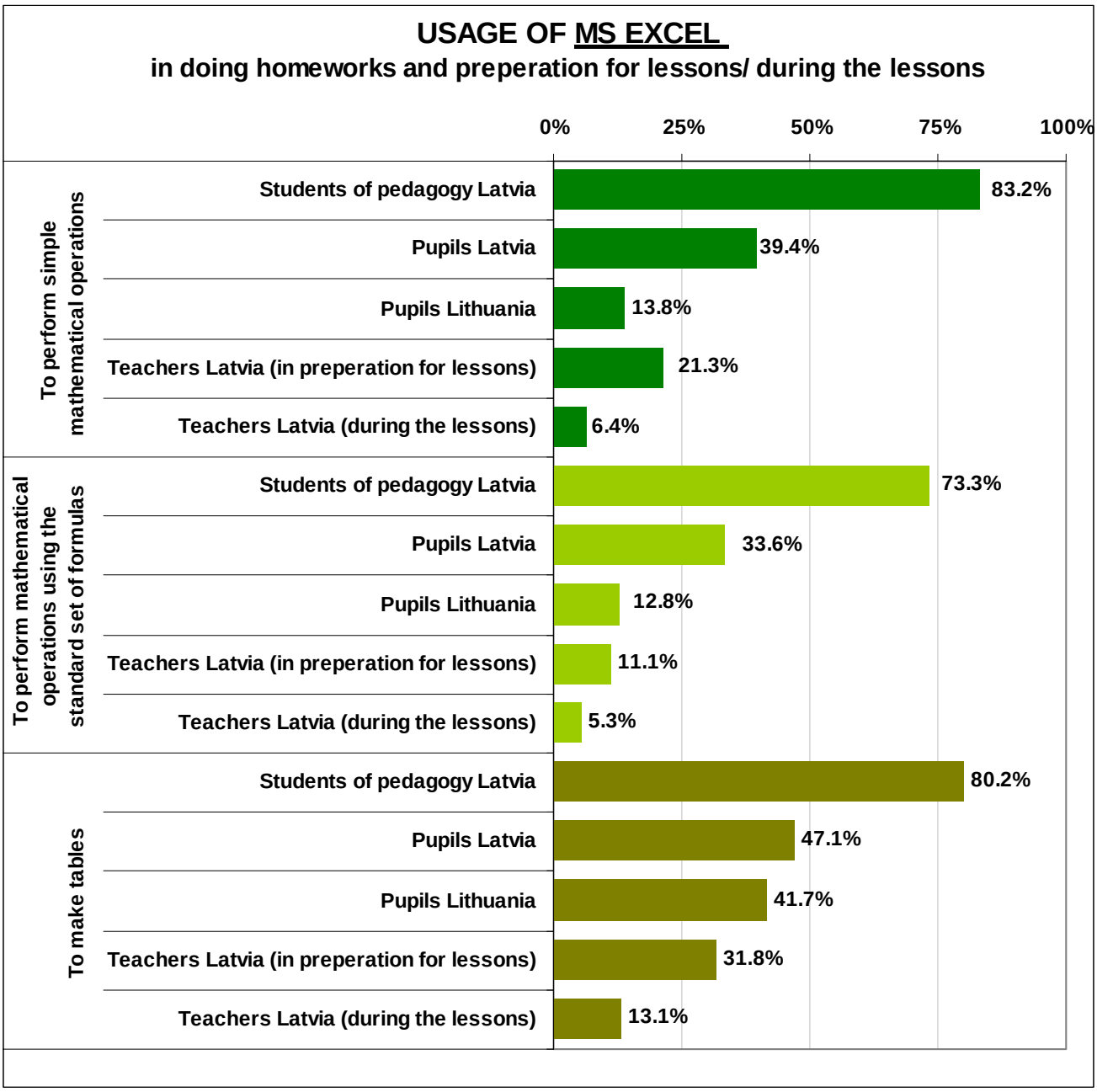


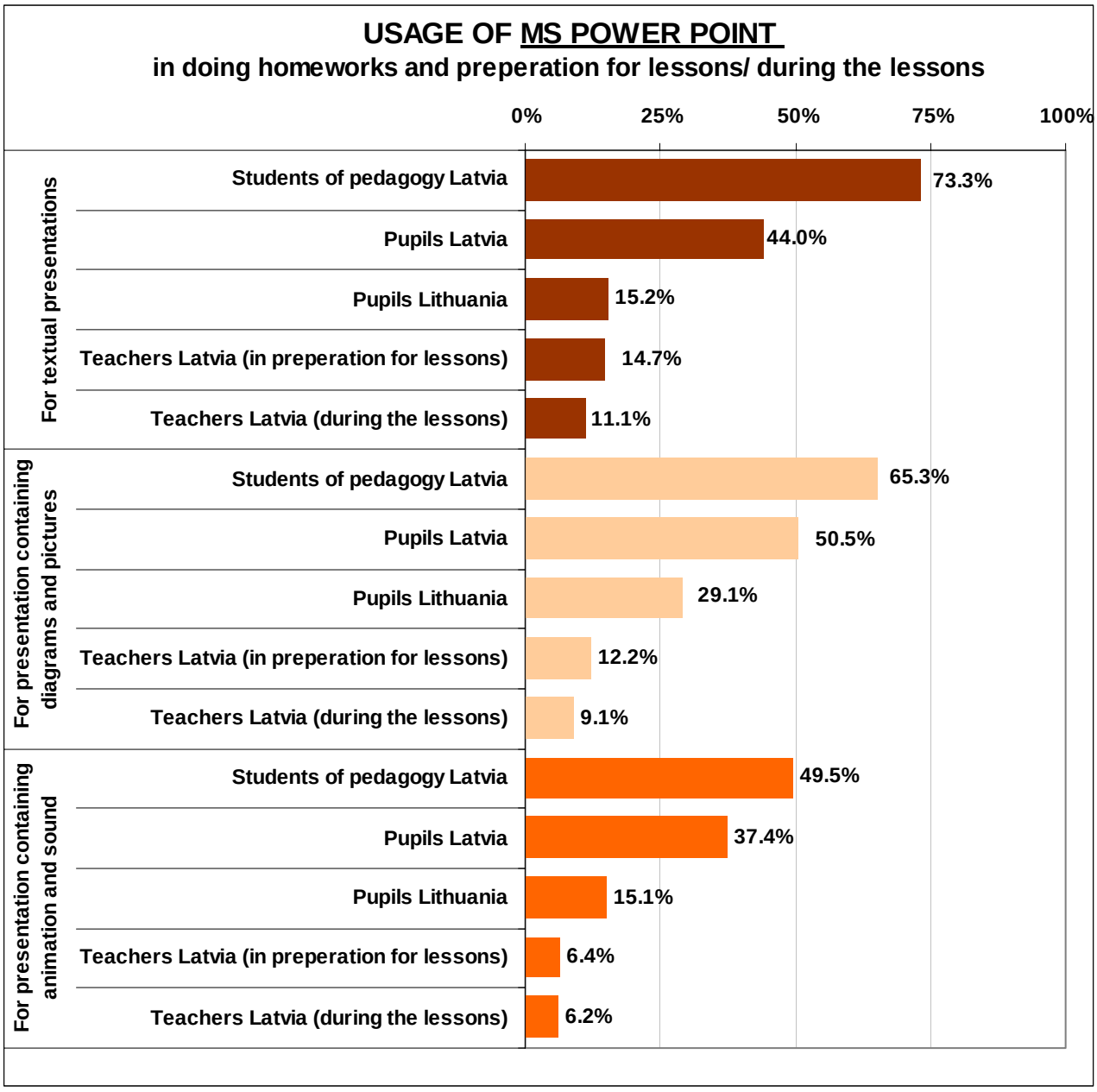
In Latvia regarding all questions on the performance of certain activities in the environment of basic Microsoft programs and in the Internet definite leaders are the future teachers, who most often use various technological possibilities and solutions in training process.

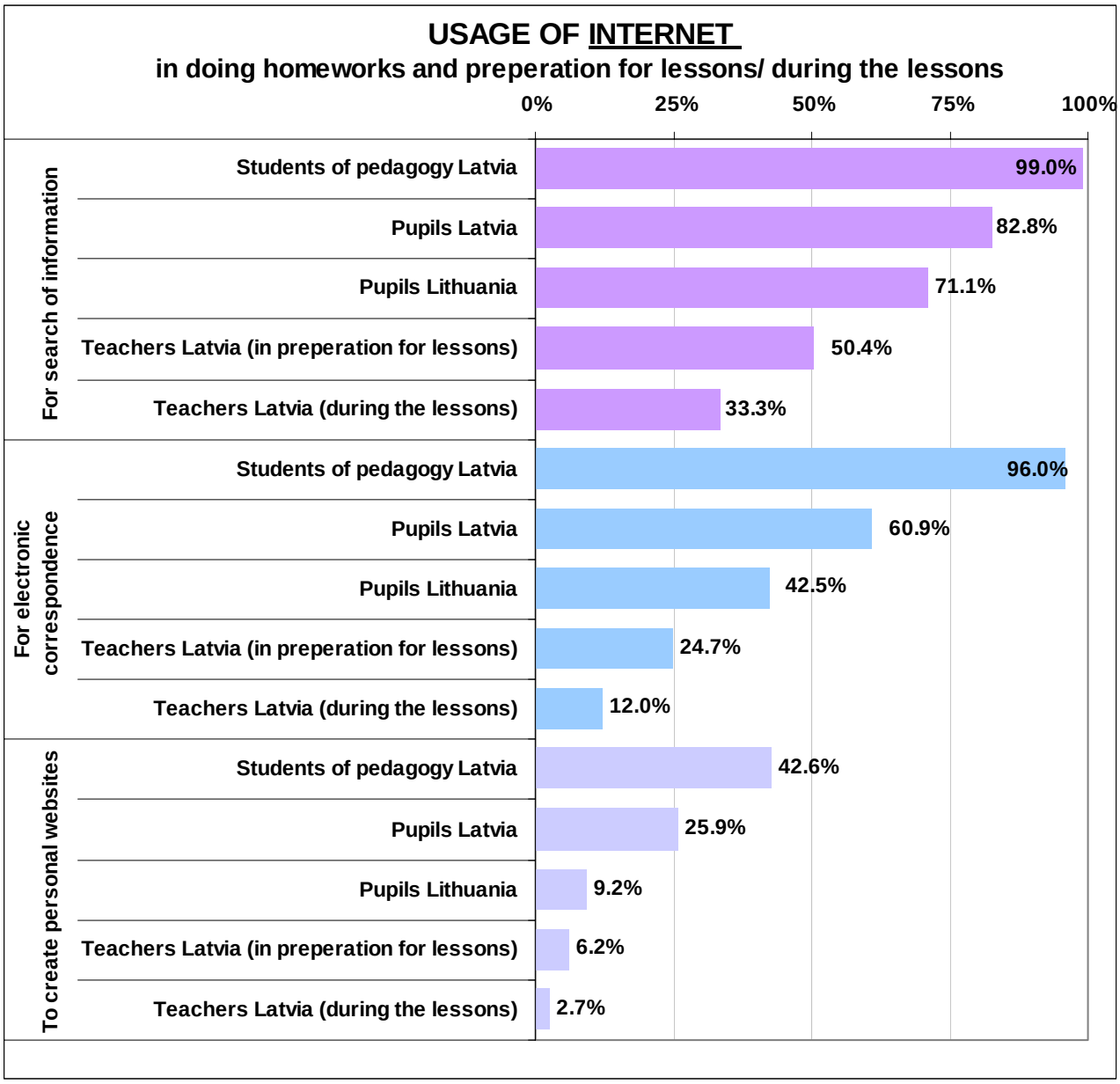
When comparing pupils' answers in Latvia and in Lithuania, we can see that the possibilities, provided by software, more actively are used by Latvia's pupils.

Regarding software usage, teachers in Latvia essentially fall behind not only future teachers but also their pupils. The said tendency is repeating, both when speaking about MS Word, MS Excel, MS PowerPoint and the Internet. It means that students and also pupils rather perceive the ICT usage in training process as a suitable and a natural phenomenon.

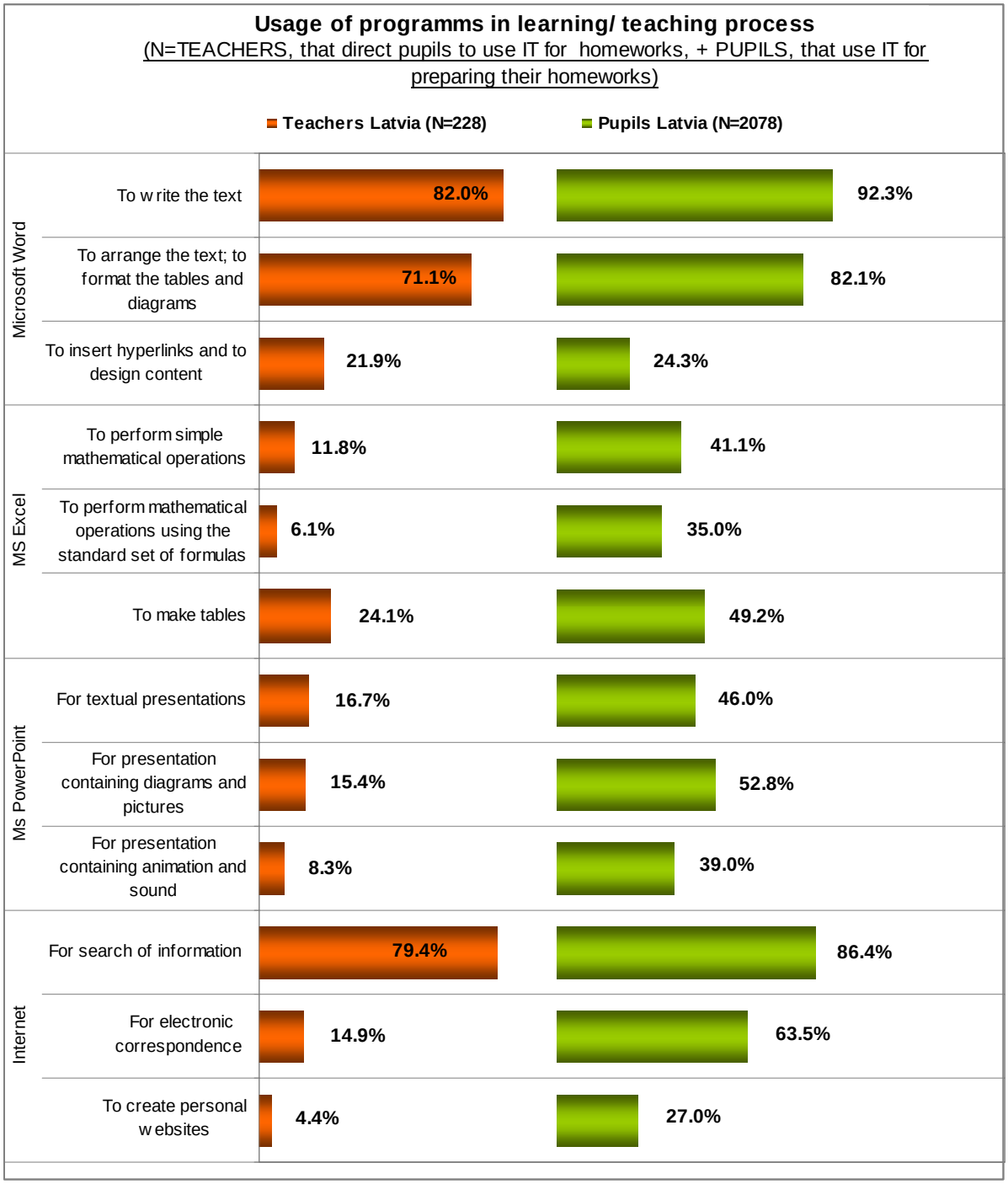



USAGE OF MS EXCEL
in doing homeworks and preperation for lessons/ during the lessons
0%
25%
50%
75%
100%
To perform simple mathematical operations
Students of pedagogy Latvia
83.2%
Pupils Latvia
39.4%
Pupils Lithuania
13.8%
Teachers Latvia (in preperation for lessons)
21.3%
Teachers Latvia (during the lessons)
6.4%
To perform mathematical operations using the standard set of formulas
Students of pedagogy Latvia
73.3%
Pupils Latvia
33.6%
Pupils Lithuania
12.8%
Teachers Latvia (in preperation for lessons)
11.1%
Teachers Latvia (during the lessons)
5.3%
To make tables
Students of pedagogy Latvia
80.2%
Pupils Latvia
47.1%
Pupils Lithuania
41.7%
Teachers Latvia (in preperation for lessons)
31.8%
Teachers Latvia (during the lessons)
13.1%


USAGE OF MS POWER POINT
in doing homeworks and preperation for lessons/ during the lessons
0%
25%
50%
75%
100%
For textual presentations
Students of pedagogy Latvia
73.3%
Pupils Latvia
44.0%
Pupils Lithuania
15.2%
Teachers Latvia (in preperation for lessons)
14.7%
Teachers Latvia (during the lessons)
11.1%
For presentation containing diagrams and pictures
Students of pedagogy Latvia
65.3%
Pupils Latvia
50.5%
Pupils Lithuania
29.1%
Teachers Latvia (in preperation for lessons)
12.2%
Teachers Latvia (during the lessons)
9.1%
For presentation containing animation and sound
Students of pedagogy Latvia
49.5%
Pupils Latvia
37.4%
Pupils Lithuania
15.1%
Teachers Latvia (in preperation for lessons)
6.4%
Teachers Latvia (during the lessons)
6.2%


USAGE OF INTERNET
in doing homeworks and preperation for lessons/ during the lessons
0%
25%
50%
75%
100%
For search of information
Students of pedagogy Latvia
99.0%
Pupils Latvia
82.8%
Pupils Lithuania
71.1%
Teachers Latvia (in preperation for lessons)
50.4%
Teachers Latvia (during the lessons)
33.3%
For electronic correspondence
Students of pedagogy Latvia
96.0%
Pupils Latvia
60.9%
Pupils Lithuania
42.5%
Teachers Latvia (in preperation for lessons)
24.7%
Teachers Latvia (during the lessons)
12.0%
To create personal websites
Students of pedagogy Latvia
42.6%
Pupils Latvia
25.9%
Pupils Lithuania
9.2%
Teachers Latvia (in preperation for lessons)
6.2%
Teachers Latvia (during the lessons)
2.7%

An interesting situation can be observed, if we compare data on the teachers, who for the preparation of homework makes pupils use ICT, and data on the pupils, who use ICT in the homework preparation process. We can conclude that teachers less often make pupils use computer technologies than the pupils use them themselves. Software usage from pupils' side is partly voluntary – in accordance with their own will – not waiting for teachers' requirements or recommendations. It is possible that pupils are more used to computer technologies and to their usage than their teachers. An additional explanation also could be as follows: not always it is possible to ensure that all pupils have access to a computer, that is why teachers cannot set categorical requirements regarding program usage.

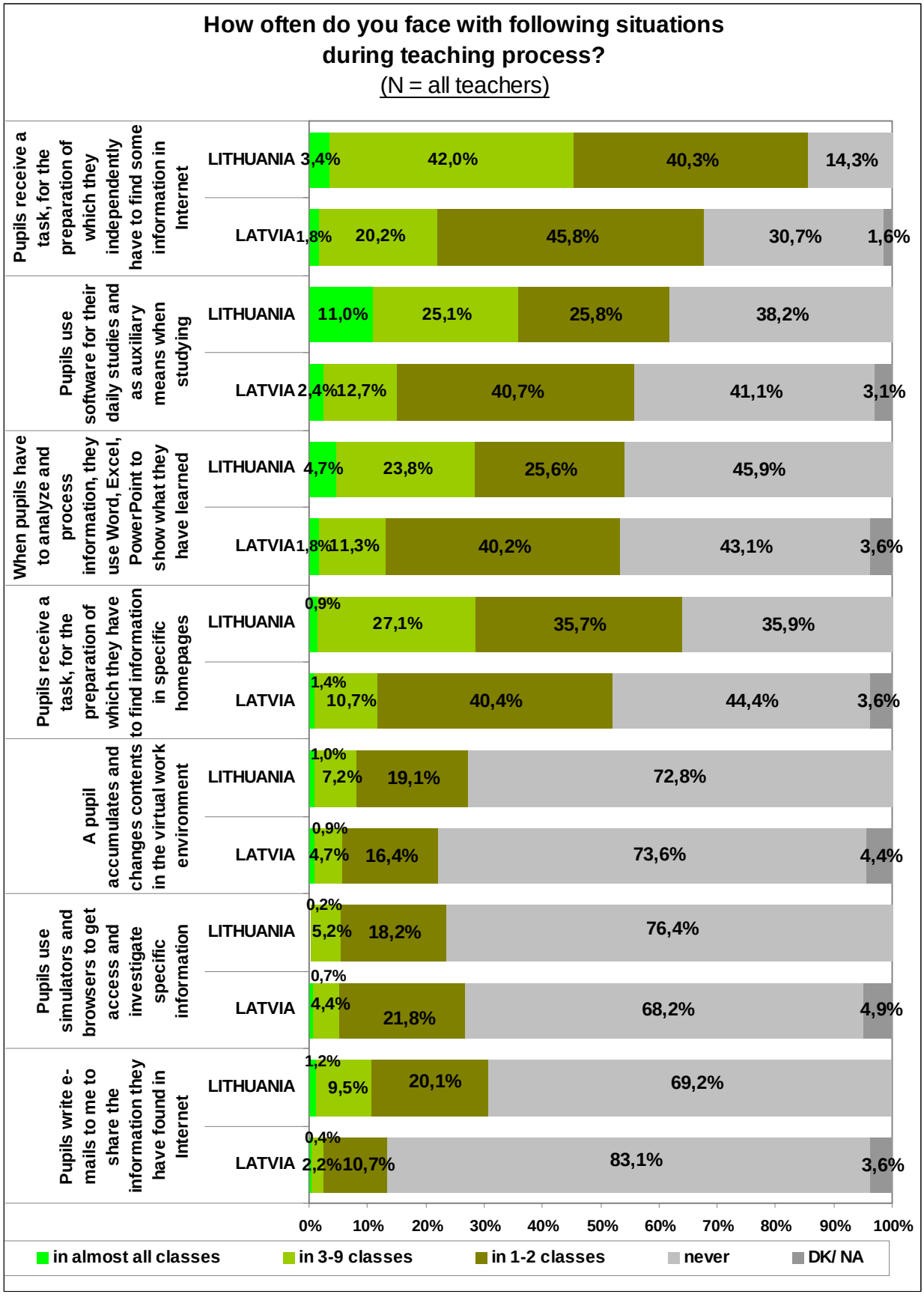


Both in Latvia and Lithuania several situations were described for the surveyed teachers and they were asked to evaluate how often in the particular school year they have faced them. The following Chart shows teachers' answers.

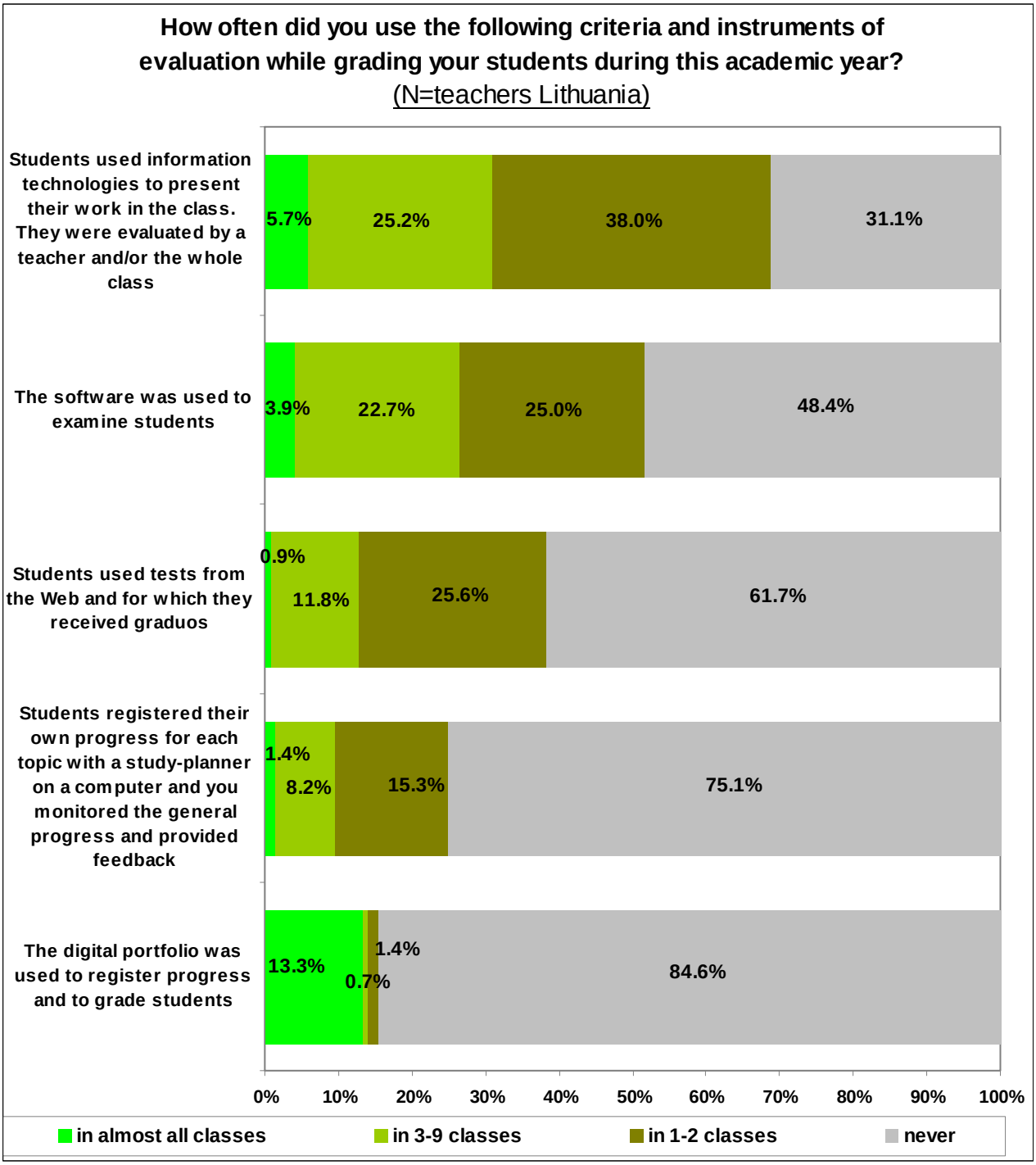
We can see that as soon as a situation is presented, when a pupil is asked to work with complicated technologies (for example, *A pupil accumulates and changes contents in the virtual work environment* or *Pupils use simulators and browsers to get access and investigate specific information*), there is a considerable increase in the number of the teachers, who never face the relevant situation.

Besides, very scarce is the feedback from pupils, using e-mail to share the information on materials found on the Internet. A large part of teachers (83,1% in Latvia and 68,2% in Lithuania) in this school year have not had such kind of experience.

A computer is mostly used to search for information. It should be noted that teachers tend to provide students the assignments of search without giving them the addresses of particular websites. The least part of teachers used a computer for experiments, the stimulation of experiments, students' research. Thus, a computer is used rather as a mediator of information transfer processes than the instrument of research or instrument of knowledge construction. We can conclude that in ICT field just the very minimum is being done and computer technologies are rather used passively and not actively.


How often do you face with following situations during teaching process?
(N = all teachers)
Pupils receive a task, for the preparation of which they independently have to find some information in Internet
LITHUANIA 3,4% 42,0% 40,3% 14,3%
LATVIA 1,8% 20,2% 45,8% 30,7% 1,6%
Pupils use software for their daily studies and as auxiliary means when studying
LITHUANIA 11,0% 25,1% 25,8% 38,2%
LATVIA 2,4% 12,7% 40,7% 41,1% 3,1%
When pupils have to analyze and process information, they use Word, Excel, PowerPoint to show what they have learned
LITHUANIA 4,7% 23,8% 25,6% 45,9%
LATVIA 1,8% 11,3% 40,2% 43,1% 3,6%
Pupils receive a task, for the preparation of which they have to find information in specific homepages
LITHUANIA 0,9% 27,1% 35,7% 35,9%
LATVIA 1,4% 10,7% 40,4% 44,4% 3,6%
A pupil accumulates and changes contents in the virtual work environment
LITHUANIA 1,0% 7,2% 19,1% 72,8%
LATVIA 0,9% 4,7% 16,4% 73,6% 4,4%
Pupils use simulators and browsers to get access and investigate specific information
LITHUANIA 0,2% 5,2% 18,2% 76,4%
LATVIA 0,7% 4,4% 21,8% 68,2% 4,9%
Pupils write e-mails to me to share the information they have found in Internet
LITHUANIA 1,2% 9,5% 20,1% 69,2%
LATVIA 0,4% 2,2% 10,7% 83,1% 3,6%
0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%
in almost all classes
in 3-9 classes
in 1-2 classes
never
DK/ NA

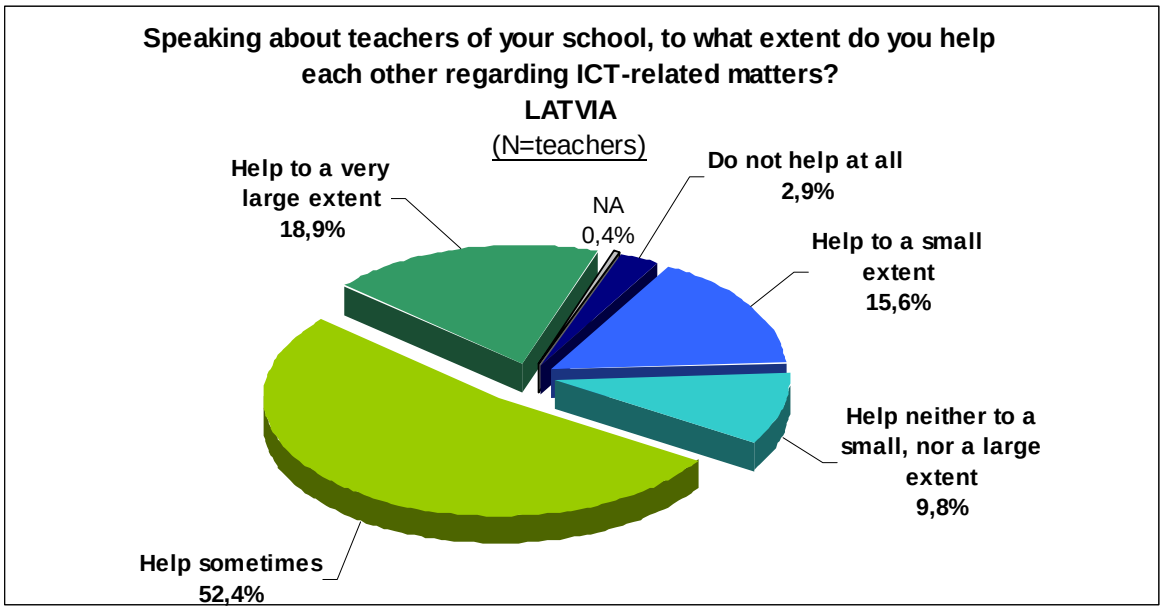
In Lithuania teachers were asked on how often in this school year they have used specific criteria or instruments, in order to evaluate their pupils' results. In this school year on the whole most often teachers have asked pupils to present their work publicly in the classroom, in order to receive both teacher's and classmates' evaluation (this method was used in 68,9% of cases). But least often (in total in 15,4% of cases in this school year) respondents have used a digital portfolio, in order to register pupils' results. At the same time its usage is extreme – teachers either use it in every class (13,3%) or do not use it at all (84,6%).



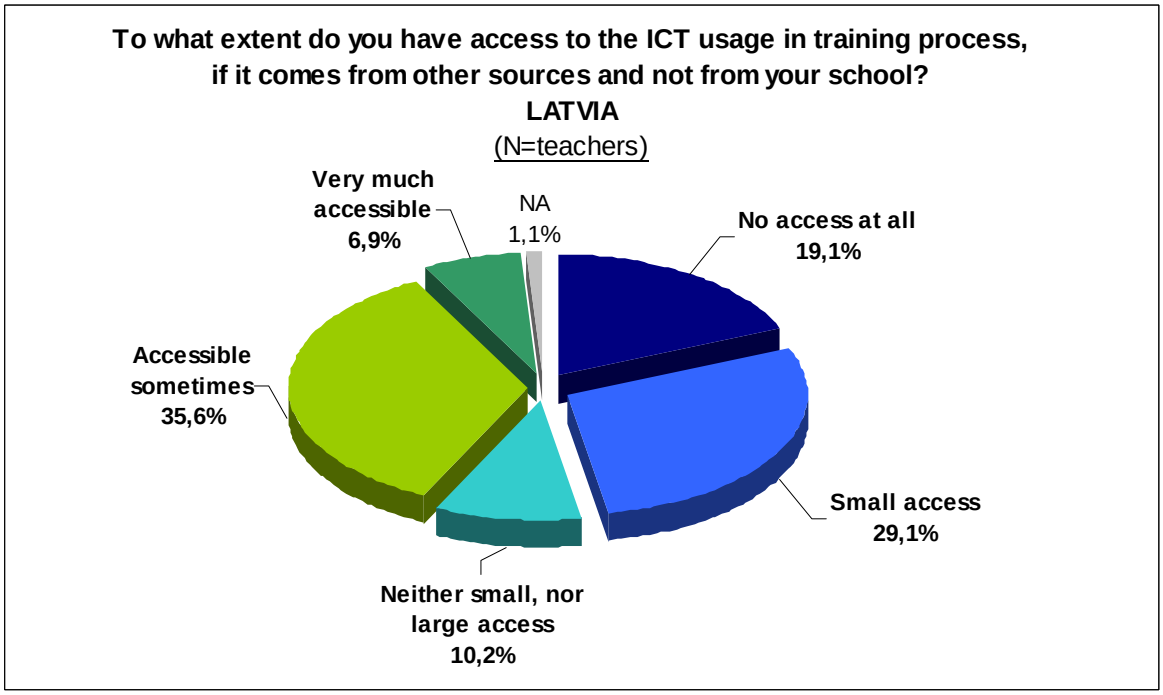
3.2.5. Support of ICT in education.

3.2.5.1. Support of teachers in Latvia

Almost three fourths of Latvia's teachers (71,3%) admit that they more or less help each other regarding ICT related matters.



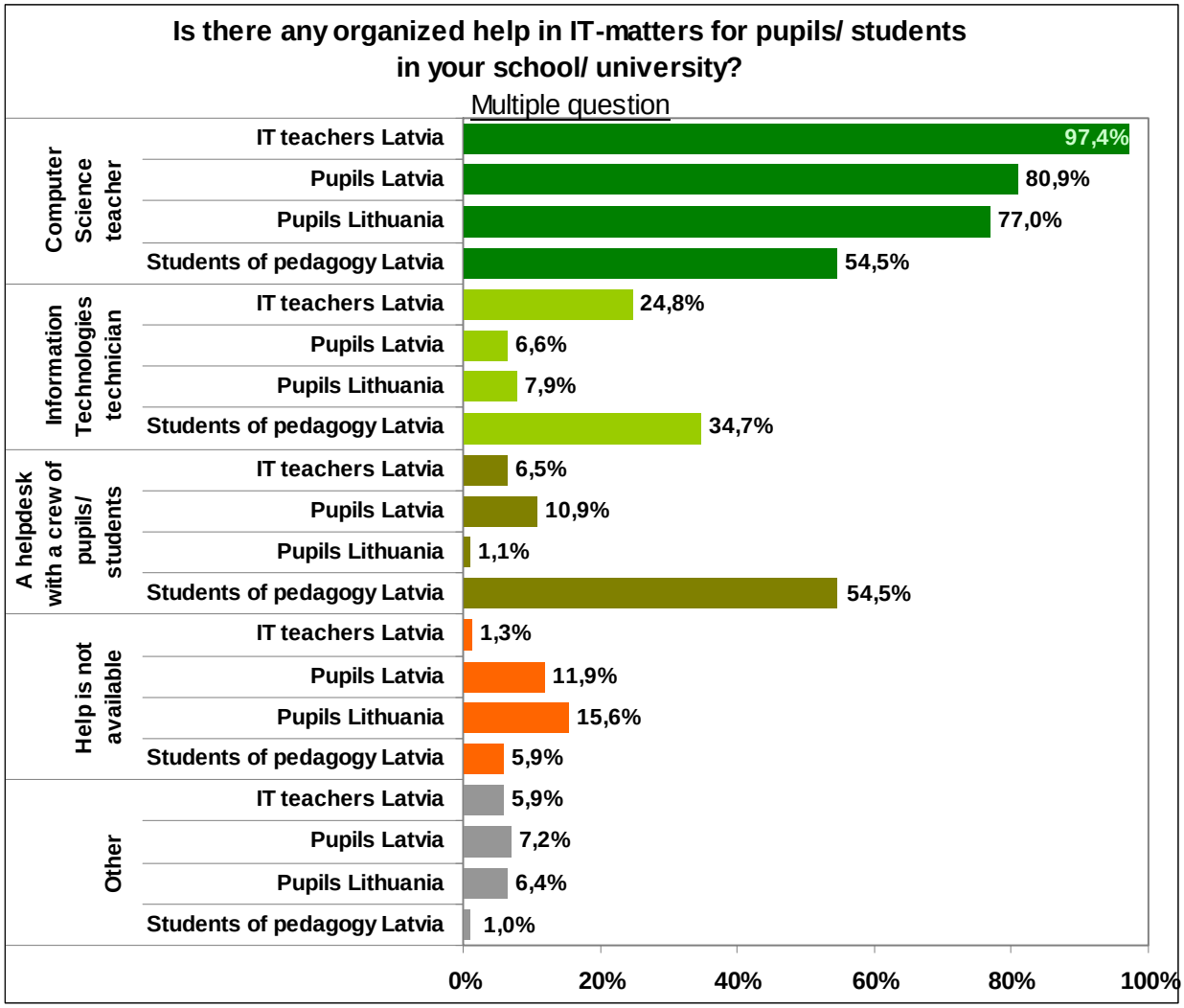
At the same time almost half of teachers (48,2%) have also indicated that they do not have a support for the ICT usage in the study process outside their school's team. Such results most probably show that in the case of ICT problems schools mainly look for a solution, relying on their own resources and not looking for an external assistance.



3.2.5.2. Support of pupils in Latvia and Lithuania.

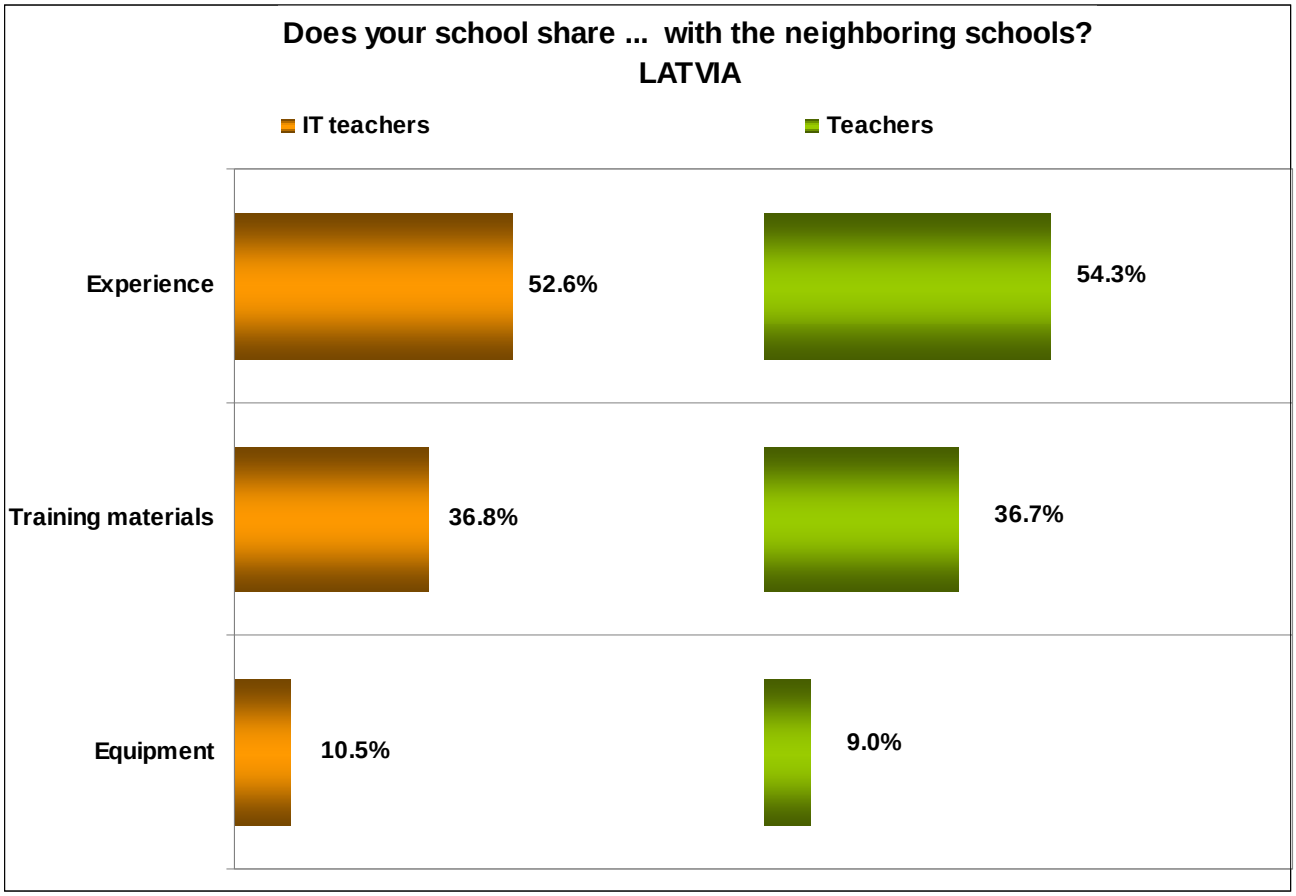
On the basis of quantitative survey data in Latvia and Lithuania, we can state that the pupils most often get the assistance to answer the questions related to IT usage matters from teachers of informatics. Most computer teachers (97,4%) and pupils (in Latvia 80,9% and in Lithuania – 77,0%) consider that in the case of uncertainty they can ask their IT teacher for advice, but the future teachers in Latvia are equally (54,5%) sure that they should ask for help both their IT teacher and their course mates. It should be stressed that IT teachers again provide a more positive evaluation than the other audiences, in the particular case – than pupils. Only 1,3% of all IT teachers have answered that the help is not available, whereas this answer variant was selected by 11,9% of pupils in Latvia and by 15,6% in Lithuania.

The formation of special crew of pupils consulting on the questions of IT usage would be purposeful and useful, however, unfortunately there is no such a practice, especially in Lithuania, to form special crews of pupils for mutual assistance which could help to clarify the problems raised in IT usage field. But, as it can be seen, in the opinion of future teachers, such organization of help is quite successful.



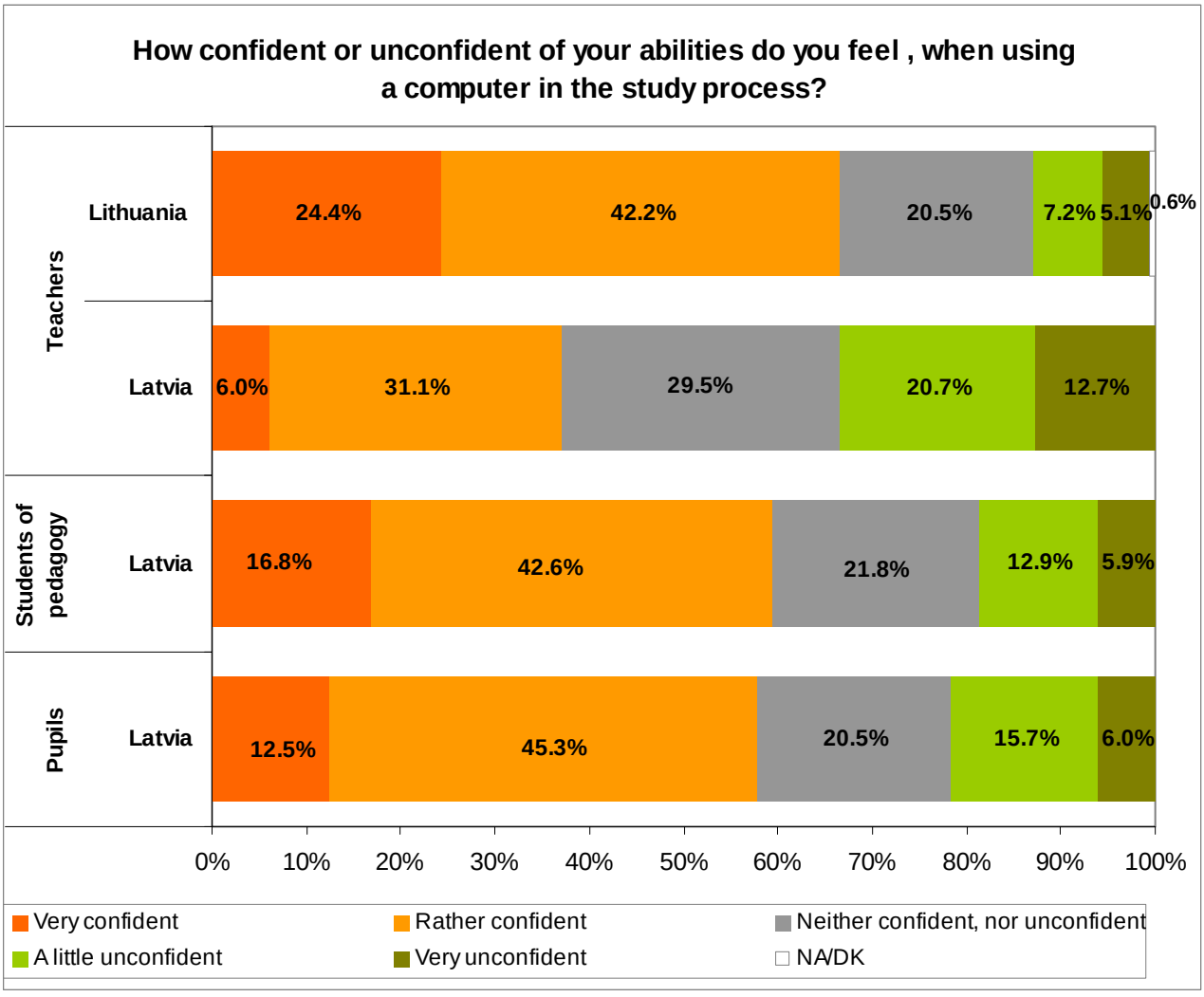
3.2.5.3. Cooperation among schools

Within the study teachers and IT teachers (the quantitative study in Latvia) were asked a question on the co-operation in ICT matters among schools. When analyzing the results, we can observe a tendency to mutually 'help' each other with immaterial values, i.e.: in more than half of cases schools share their experience on ICT matters; in one third of cases – with training materials; only in about 10% of cases they commonly use equipment (mainly such co-operation takes place within project weeks or common activities). Such results, on the one hand, reflect the fact that IT technologies are a tangible value, for which each specific school is materially liable, but, on the other hand, they reflect that ICT are perceived as a 'treasure', meant for their own usage.



3.2.6. Confidence in ability to use ICT

Most confident of their abilities ('very' and 'rather confident' of themselves), when using a computer in training process, are Lithuanian teachers (66,6%), followed by Latvia's future teachers and pupils, who are 59,4% and 57,8% of cases respectively. But from teachers in Latvia more often than from the other groups of survey participants we received the answer alternative 'feeling very unconfident' (12,7%). The said results could be explained as follows – teachers in Latvia relatively less often than their Lithuanian colleagues have access to a home computer, they also less often use ICT in study process (both during classes and when preparing for them) → thus their usage experience is not so large and the teachers themselves feel unconfident.

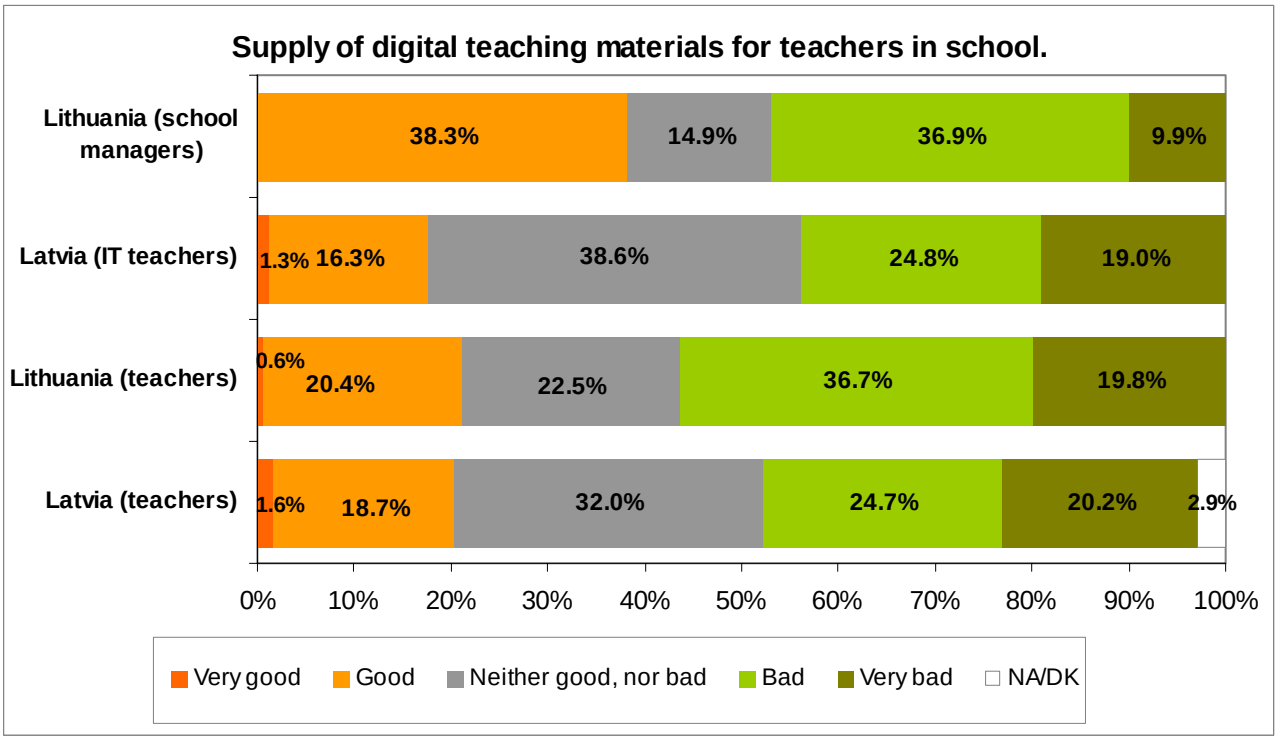


In Estonia in the quantitative study („Tiger in Focus" – Executive Summary, 2004) a different methodology was used – teachers were asked to estimate their competence themselves on a 3-point scale; statements were dividend into 2 categories. The first category measured general skills in using ICT; the second category measured the professional application of ICT in teaching the subject. As we might expect, teachers' general skills were higher than their professional ICT competence. Comparing with 2000, we can observe a rapid increase in the number of the teachers, who evaluate their competence level, application of ICT in teaching the subject as being high.

3.3. Supply and usage of digital teaching materials

The surveyed respondents (teachers and IT teachers) in Latvia evaluate school maintenance with digital training aids more critically than their Lithuanian colleagues – the maintenance with digital training materials was found very good or good by only 20,3% of teachers and by 17,6% of IT teachers. Regarding the said question, the negative evaluations tend to dominate – 44,9% of the surveyed teachers, providing the answer to the said question, chose the alternatives - a 'bad' or 'very bad' maintenance with digital training materials. The percentage of negative answers provided by IT teachers reached 43,8%.

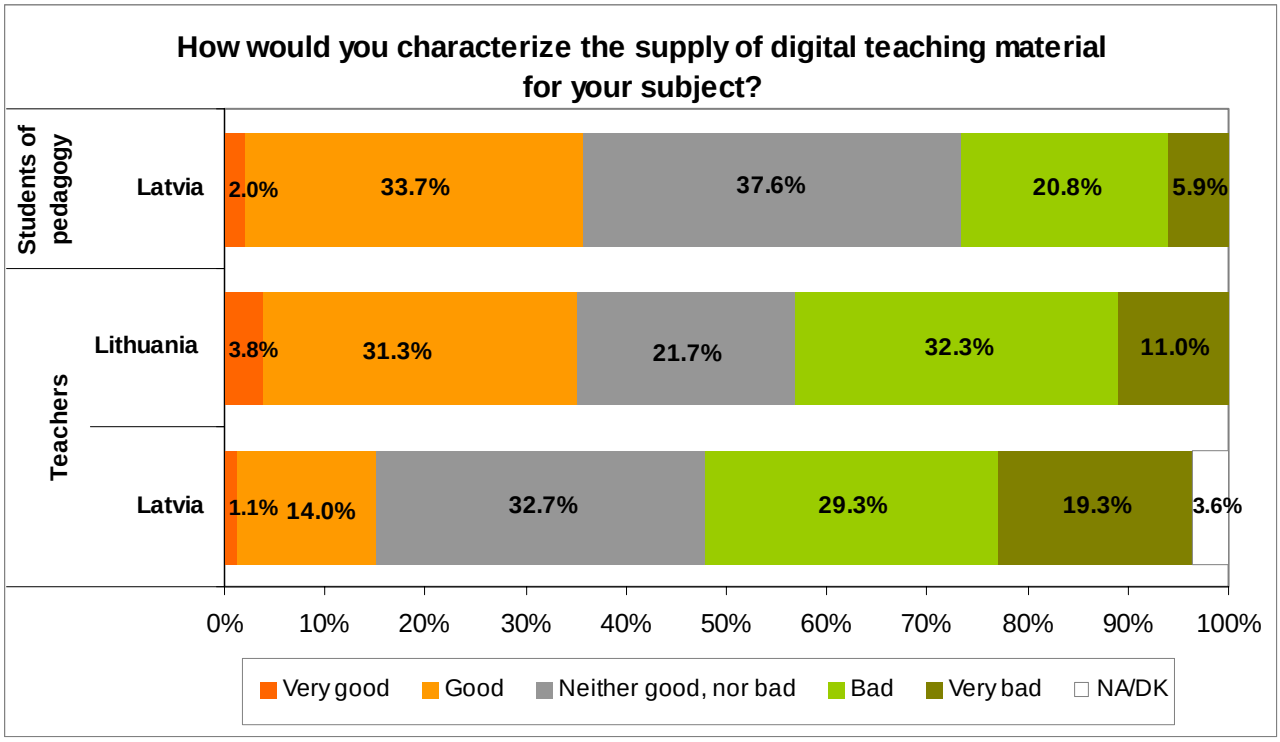
It is interesting to note that Lithuanian school managers' opinion is considerably different from that of teachers - 38,3% consider that the maintenance with training materials shall be evaluated as good, whereas only 21% of Lithuania's school teachers provide a similar opinion.



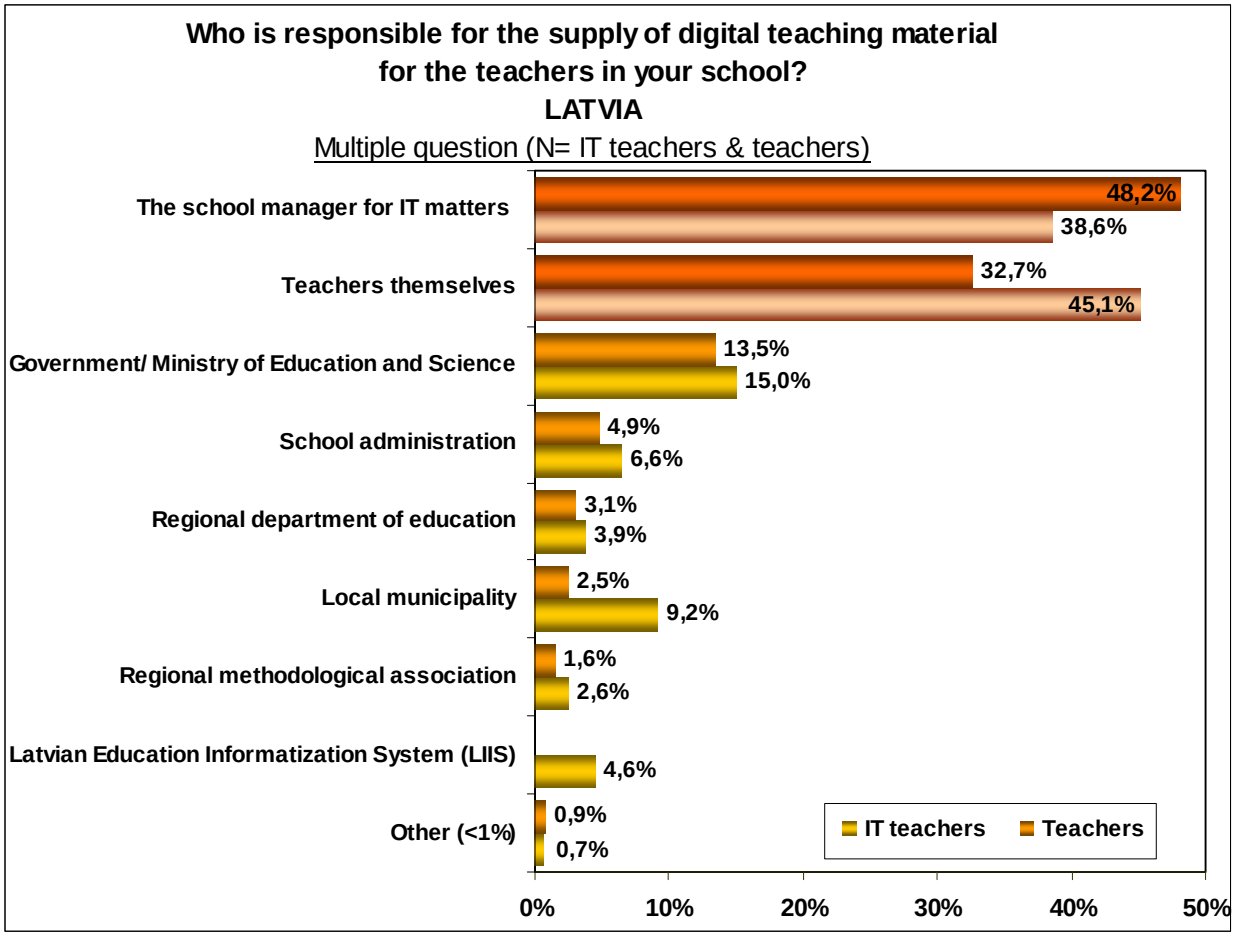
In Latvia future teachers, speaking about a subject's provision with such digital training aids as computer encyclopedias, simulations, picture archives etc. are more optimistic and providing a more positive evaluation than teachers – most probably it shall be explained with the impression of the ICT possibilities formed during their studies which are not actually corresponding to the real situation at schools.

It should be noted that teachers in Lithuania much more positively evaluate the maintenance of their subject with digital training materials than their colleagues in Latvia.

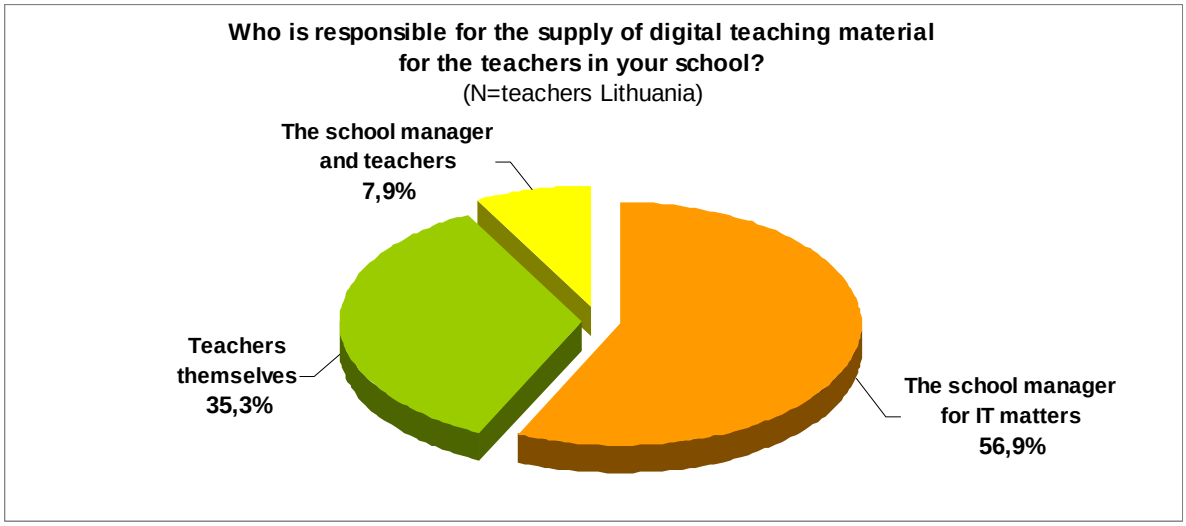
The arrangement of the provided answers can be seen in the Chart below:



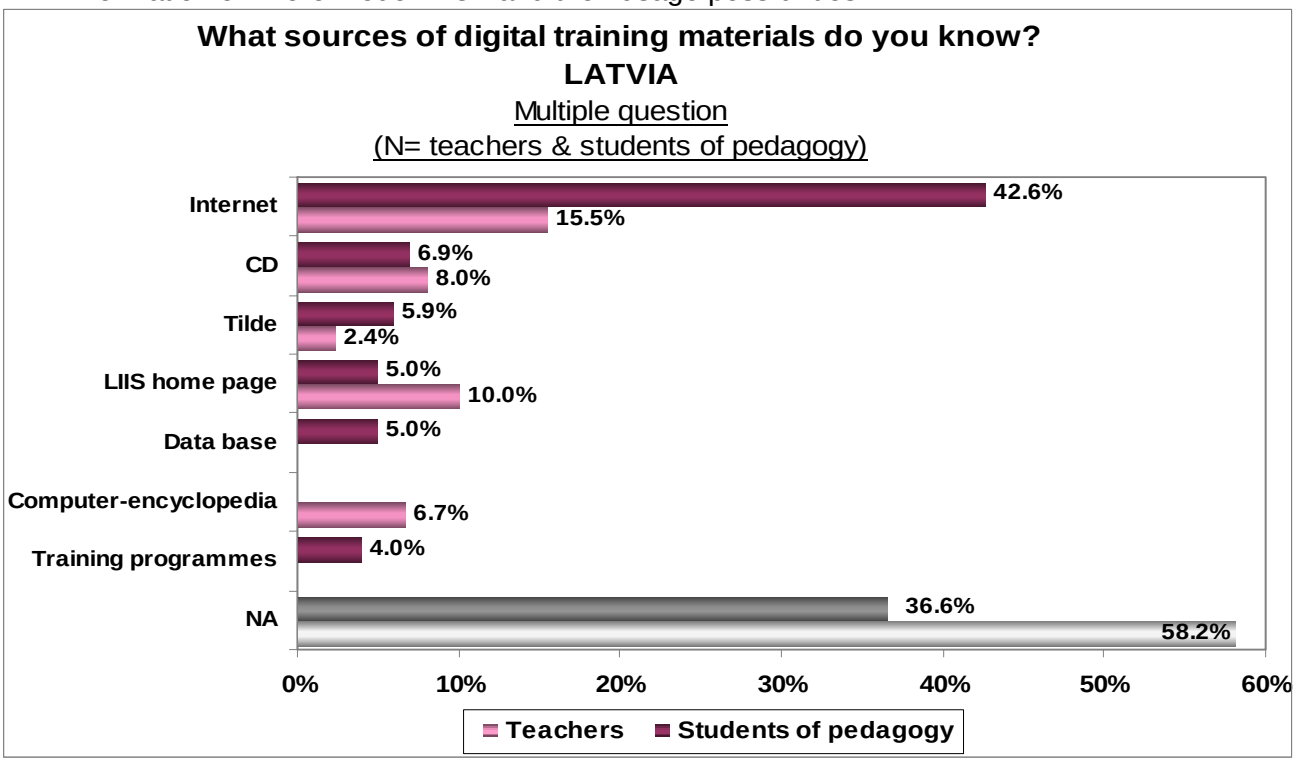
During the survey also a question was asked on who should be responsible for providing teachers with digital training materials. Here we can observe an interesting regularity: in most cases teachers think that liable are IT teachers and headmasters for IT matters (48,2%), whereas IT teachers think that teachers themselves are responsible for the provision (45,1%). We can conclude that none of the parties is particularly willing to be responsible for the specific sphere.



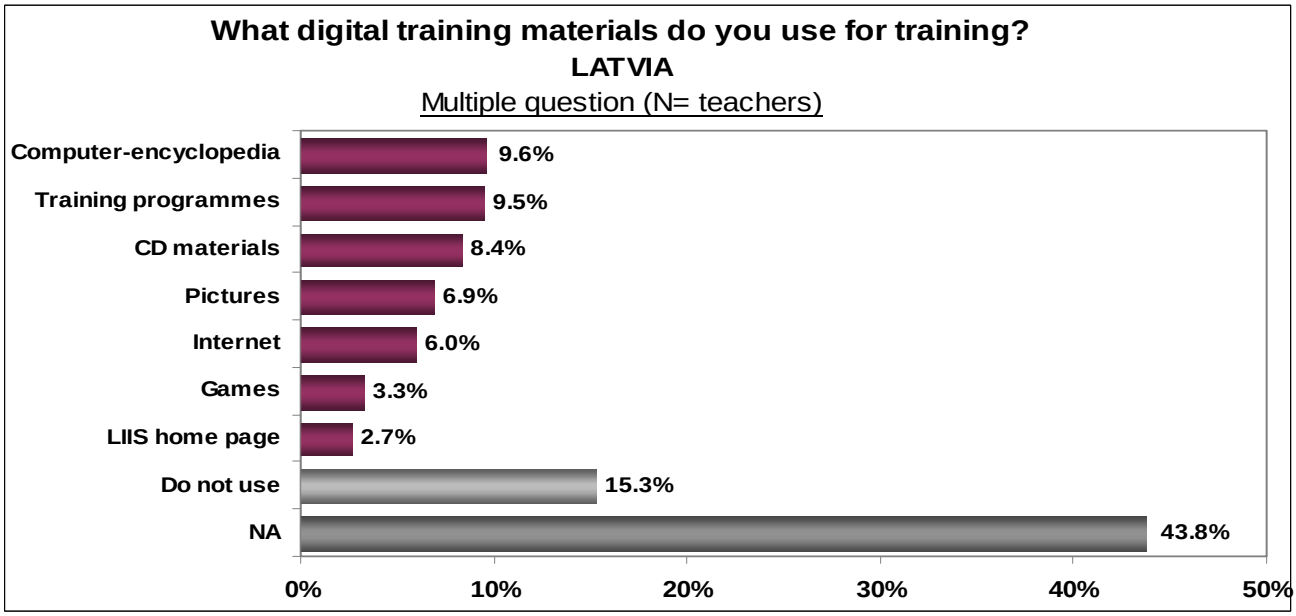
In Lithuania the said question was asked only to teachers, thus, it is not possible to compare teachers' provided answers with school managers' opinions, still we can see that, like in Latvia, also in Lithuania teachers think that the ones responsible for the provision with digital training materials are school managers for IT matters.



Latvia's teachers and future teachers were asked to mention sources of digital training materials. The most frequently mentioned answer was the Internet (future teachers – 42,6% and teachers – 15,5%). However, here we can observe a very large percentage of ignorant respondents: more than half or 58,2% of teachers and 36,6% of students could not provide an answer. It means that irrespective of the relatively high degree of computerization, respondents still lack knowledge and information on more modern ICT and their usage possibilities.



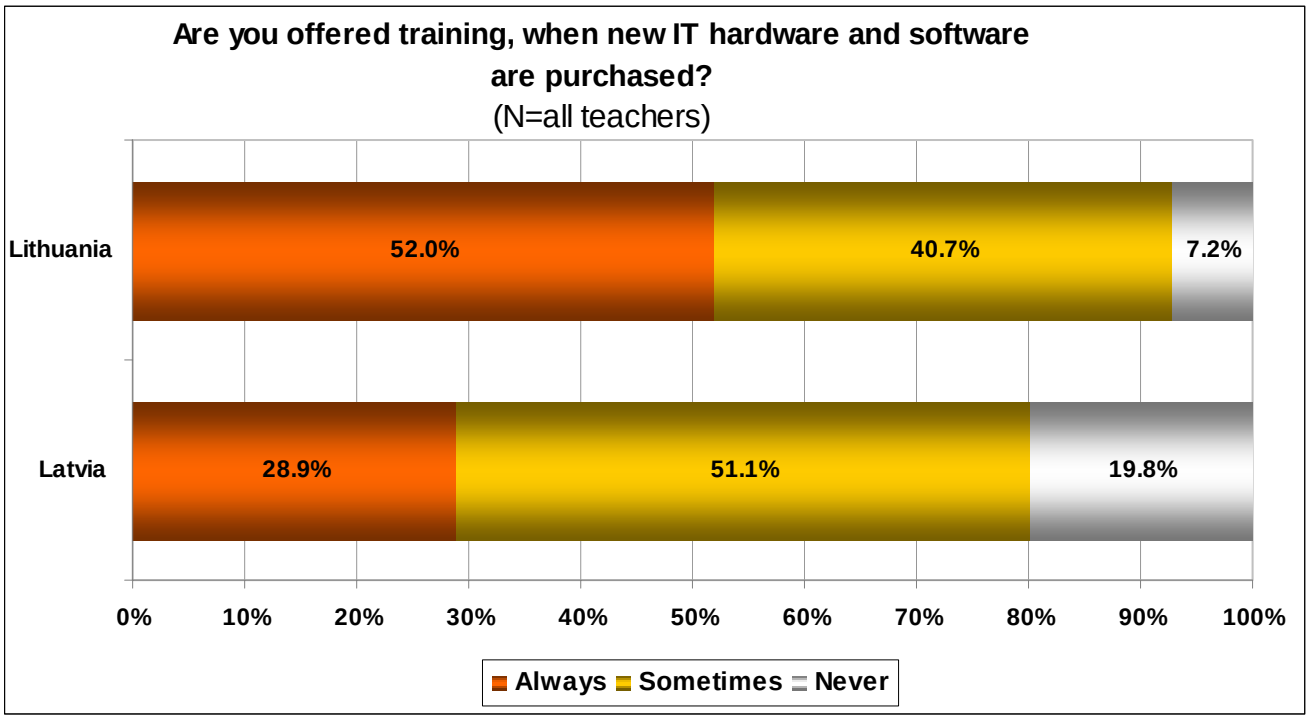
Finally teachers were asked to answer on what digital training materials are used in training process. Most respondents could not provide an answer or they clearly indicated that they do not use such materials. However, a relatively small part mentioned some types of digital training materials. More detailed information can bee seen in the Chart:



4. TEACHERS' TRAINING

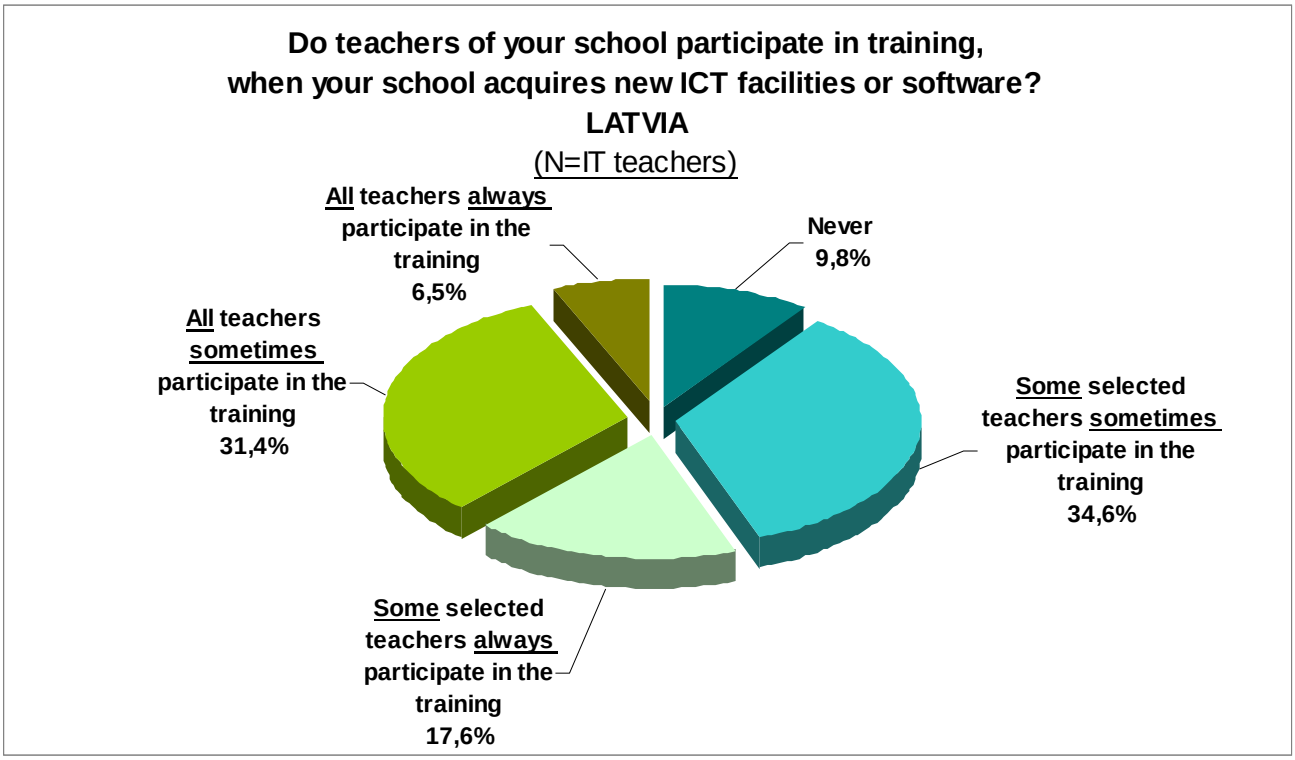
Relatively the best situation regarding teachers training is in Estonia – „All teachers have had possibilities to participate in different ICT courses, organized either by the state (TLF), the other organizations or the schools themselves." (Development of ICT in Estonian Education, Qualitative survey, 2005)

But a part of Latvia's (19,8%) and Lithuania's (7,2%) teachers admitted that no training has been offered to them, when new IT hardware and software are purchased in school.

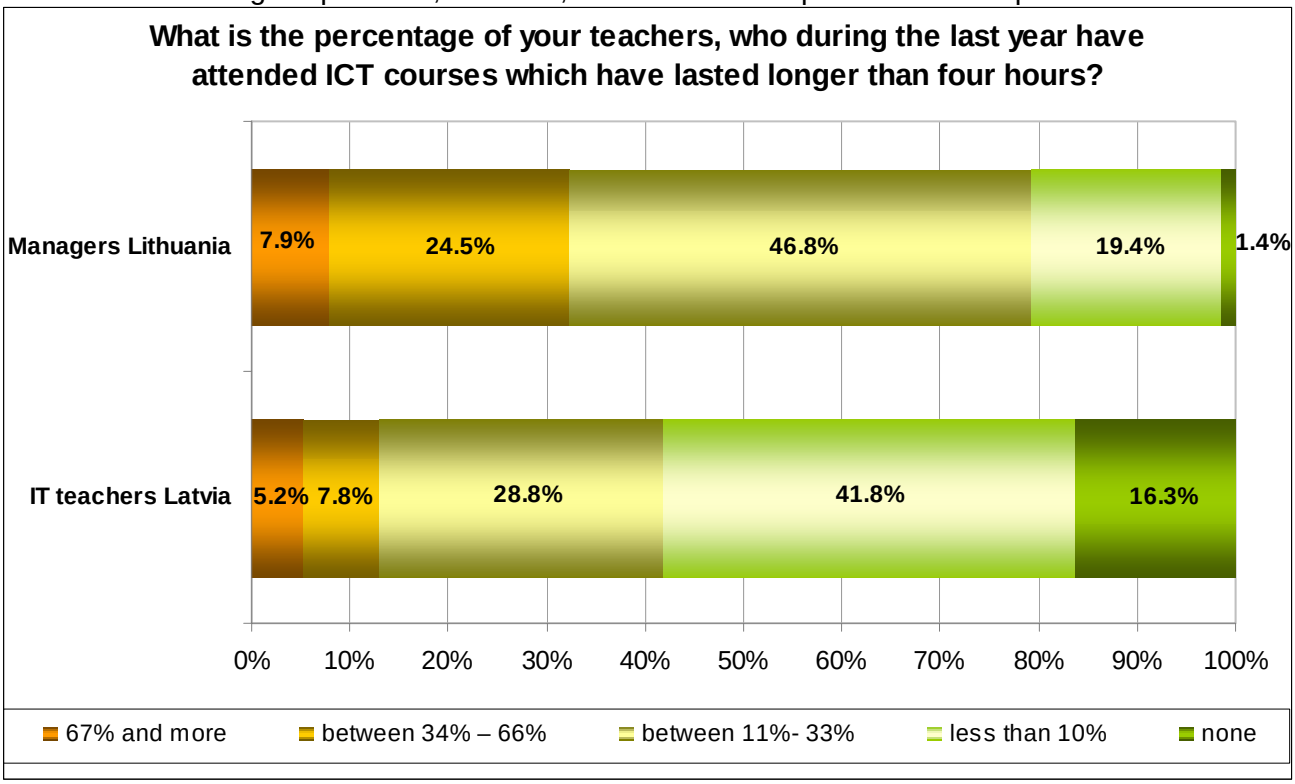


Comparing the results, we can conclude that IT teachers are more optimistic than, probably, the real situation would allow it – just 9,8% of IT teachers have answered that teachers of their school never participate in training (see the next page), whereas 19,8% of teachers of other subjects have mentioned that no training has been offered to them in cases when the school has acquired new ICT.

To illustrate the situation additionally, it is useful to observe IT teachers' provided answers (Latvia, quantitative survey) – as we can see in the following Chart, in a little more than half of cases (52,2%) only few and specially selected teachers participate in training, if the school has acquired new ICT facilities or software.

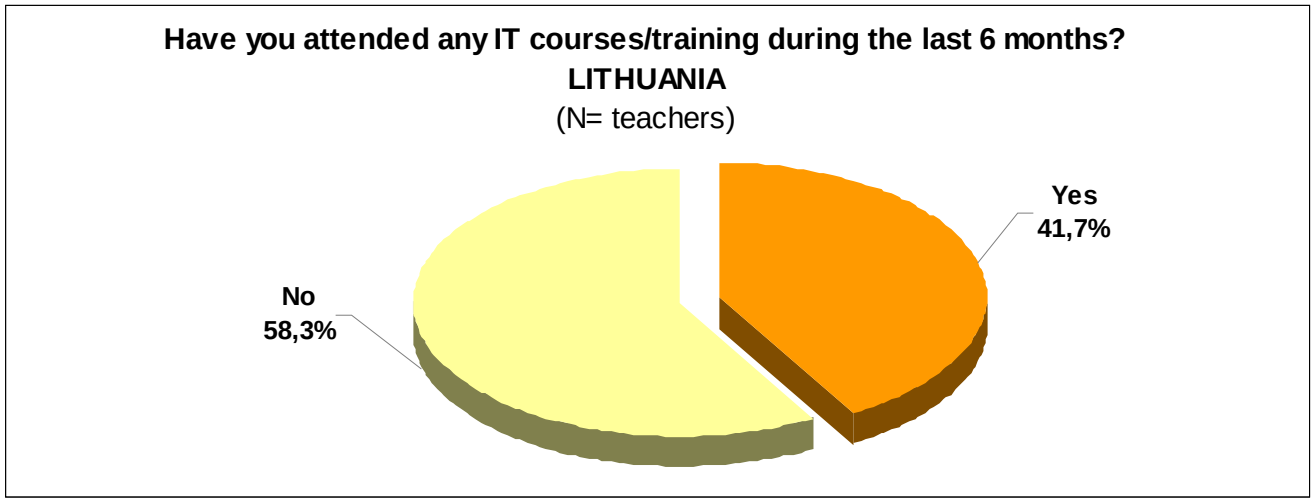


Actually in Latvia and Lithuania the courses more or less are perceived as a privilege and not as a daily phenomenon and necessity, which should be available to every teacher. Besides, most teachers still attend courses, which are not longer than four hours, thus, we can speak only about the minimal training. It is possible that basic knowledge is provided, however, no wider and deeper skills are acquired.

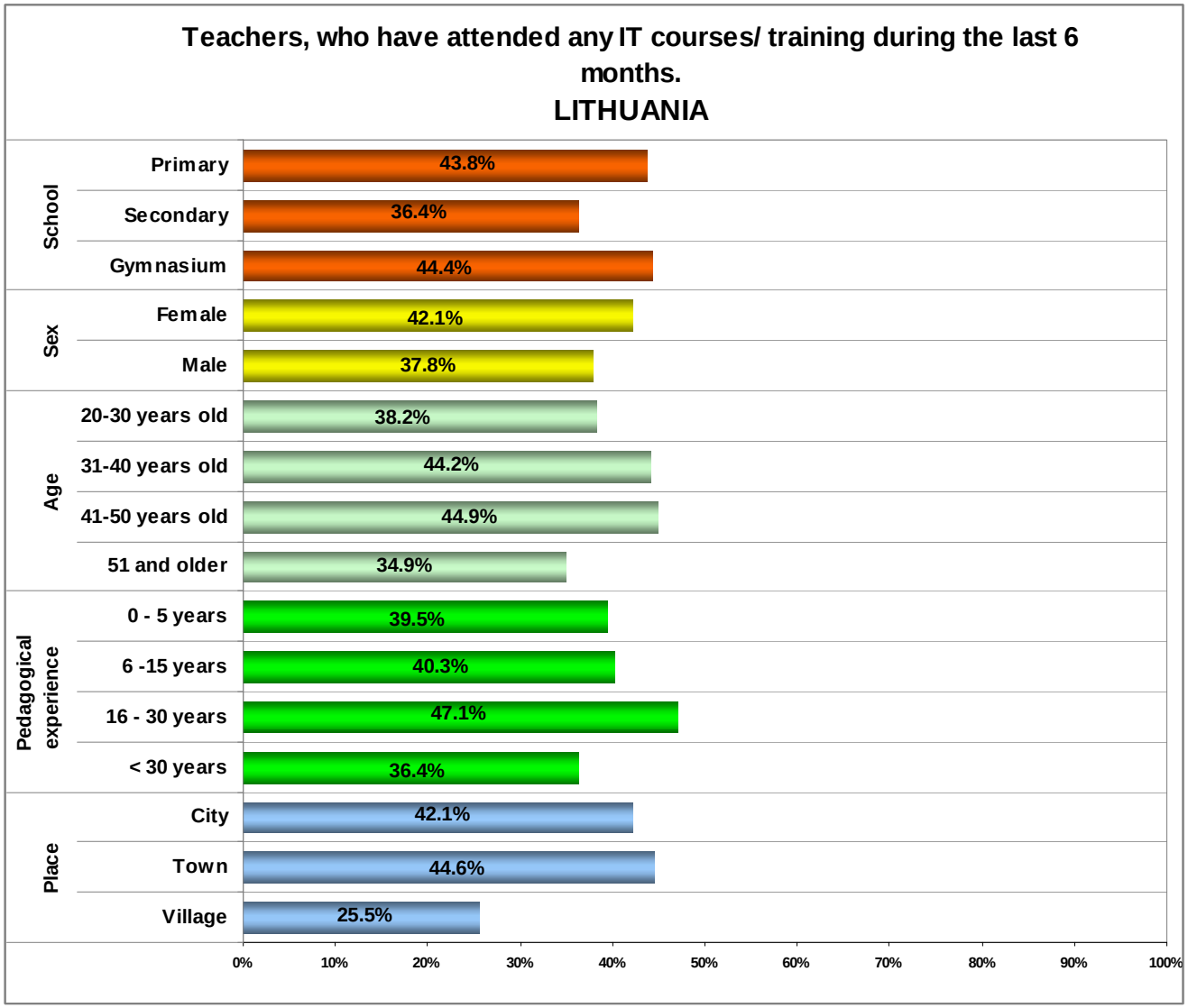


4.1. Attended courses and their evaluation

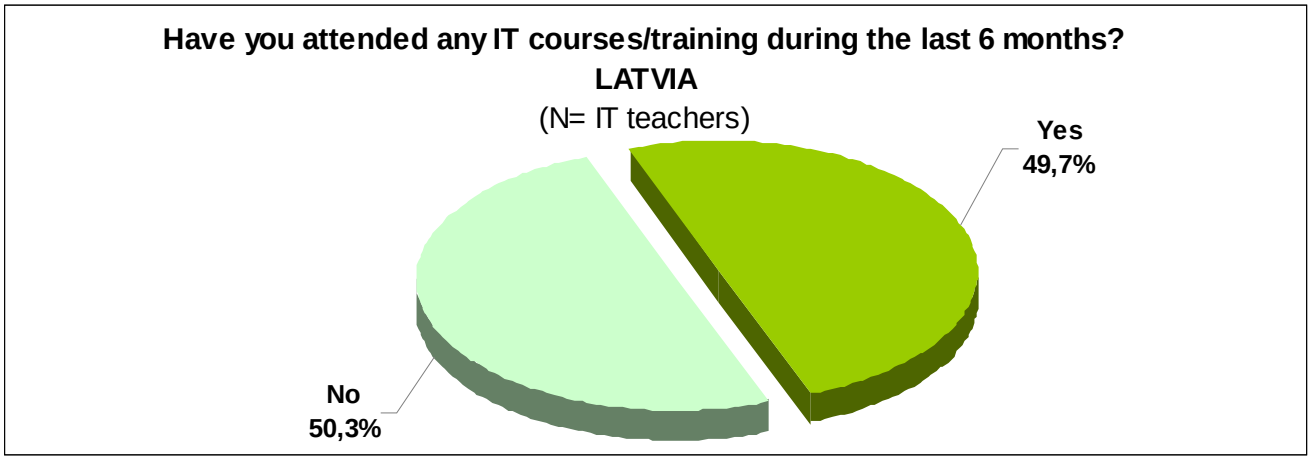
It is considered that refresher courses in the area of IT for teachers are significant factor in the improvement of teaching. 41,7% of pedagogues in Lithuania pointed that during the last 6 months they had to attend the refresher courses and training in IT.

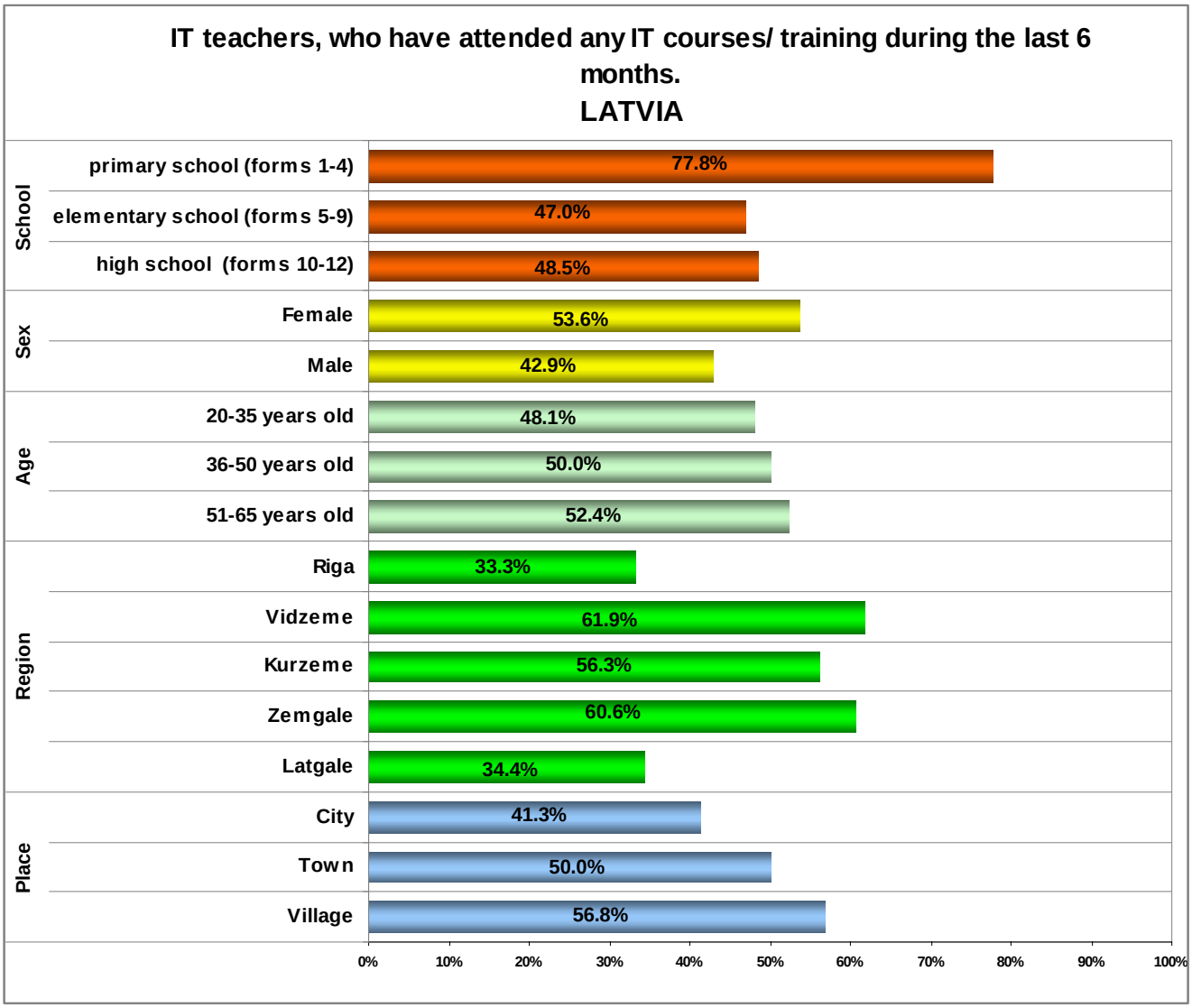


It should be noted that relatively more often they are middle-aged teachers from city/ town:

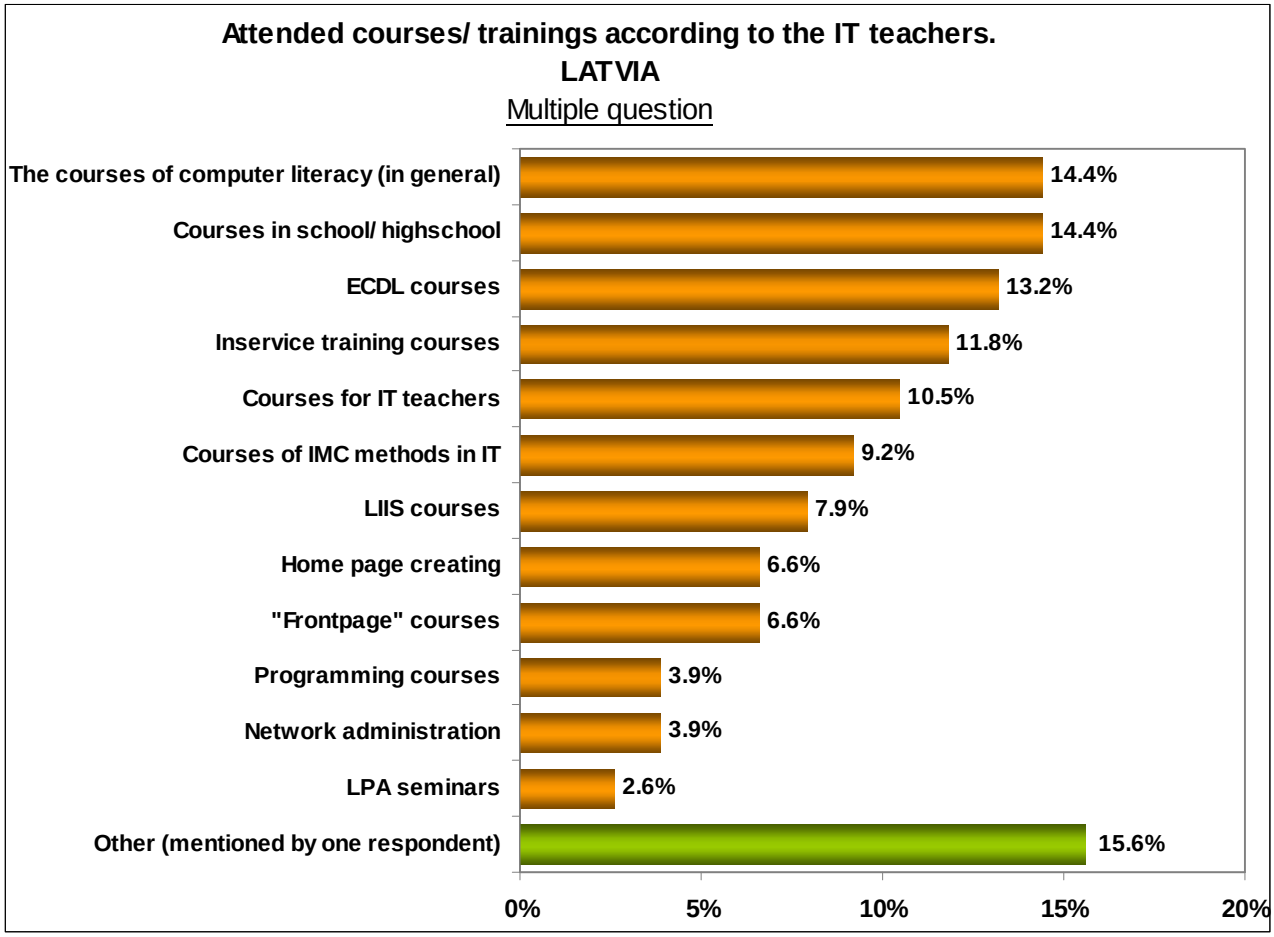


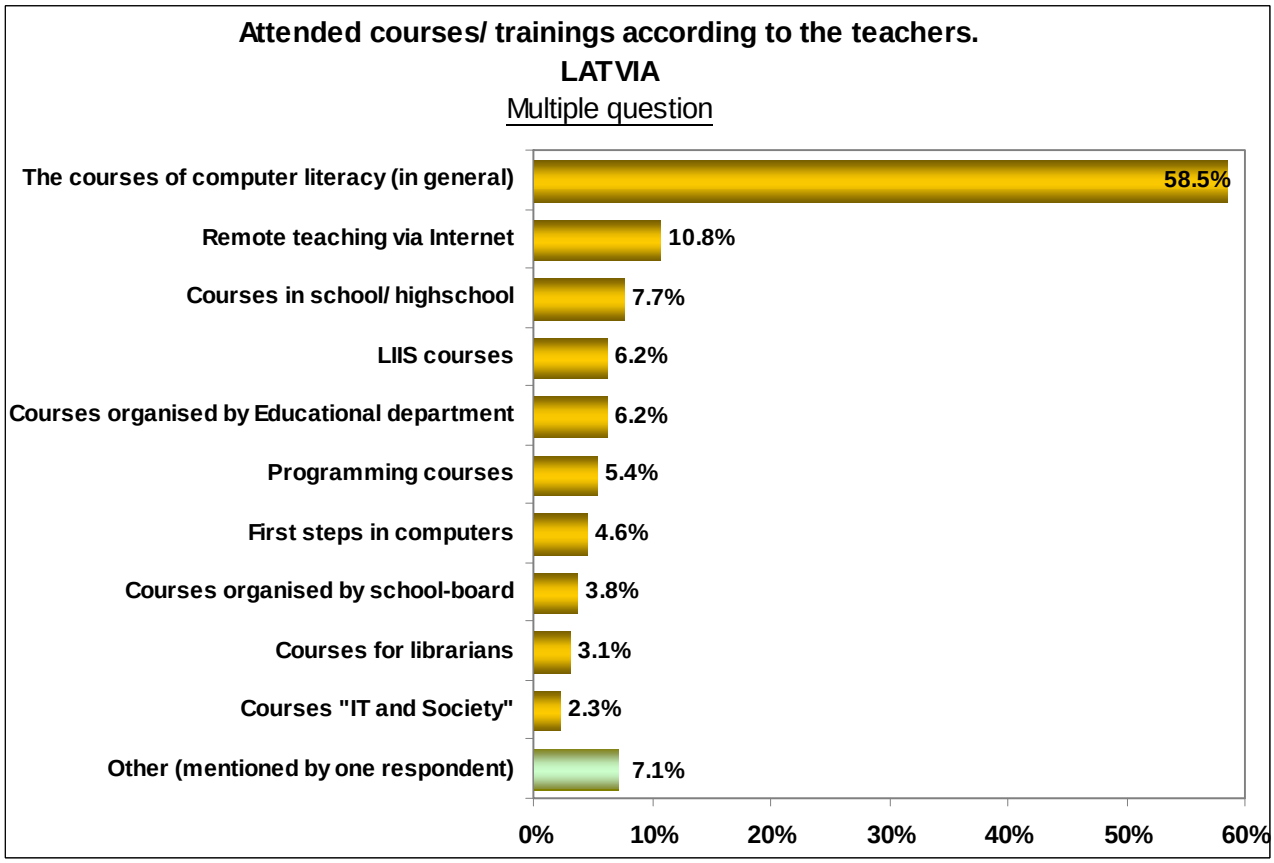
Almost half or 49,7% of all Latvia's IT teachers during the last six months have attended ICT courses. Most often they are teachers from rural primary schools.



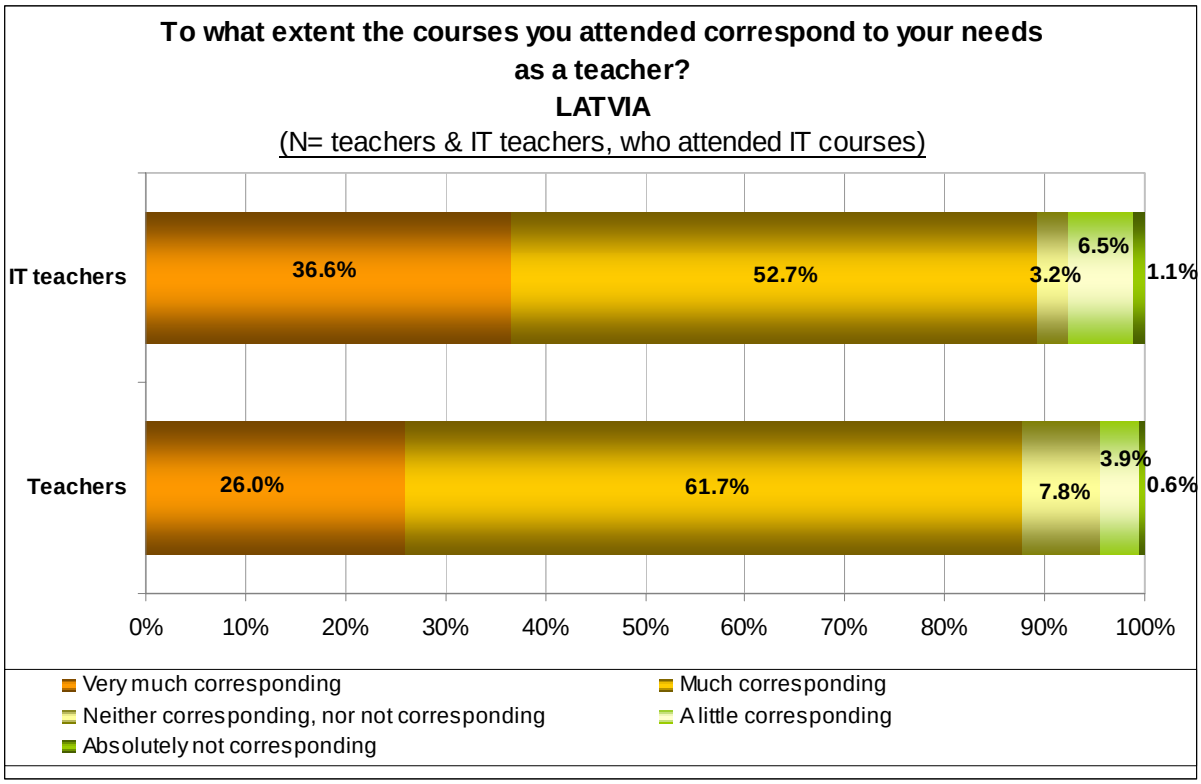


The answers on the courses most frequently mentioned by Latvia's respondents, which they have attended during the last six months, are reflected in the following Charts:

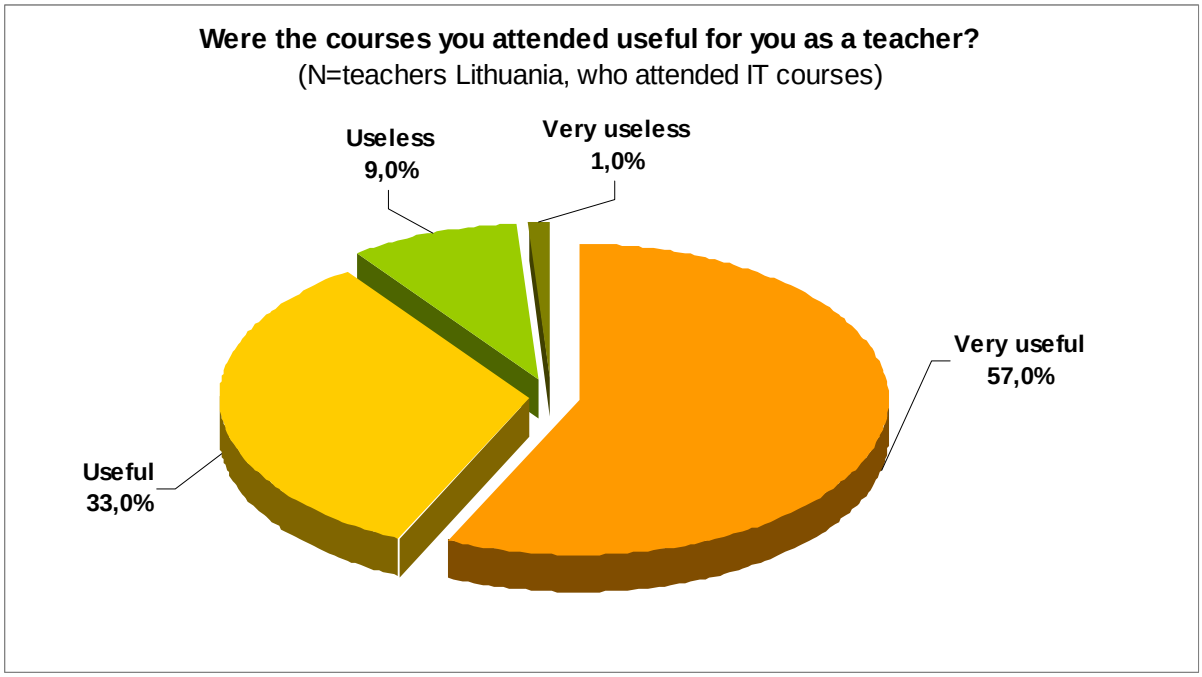




In Latvia more than one third of IT teachers (36,6%) and more than one fourth of (26,0%) teachers of other subjects admitted that the attended courses to a great extent are corresponding to their necessities. Relatively more critical were IT teachers – 7,6% considered that courses a little or even not at all were corresponding to their necessities.



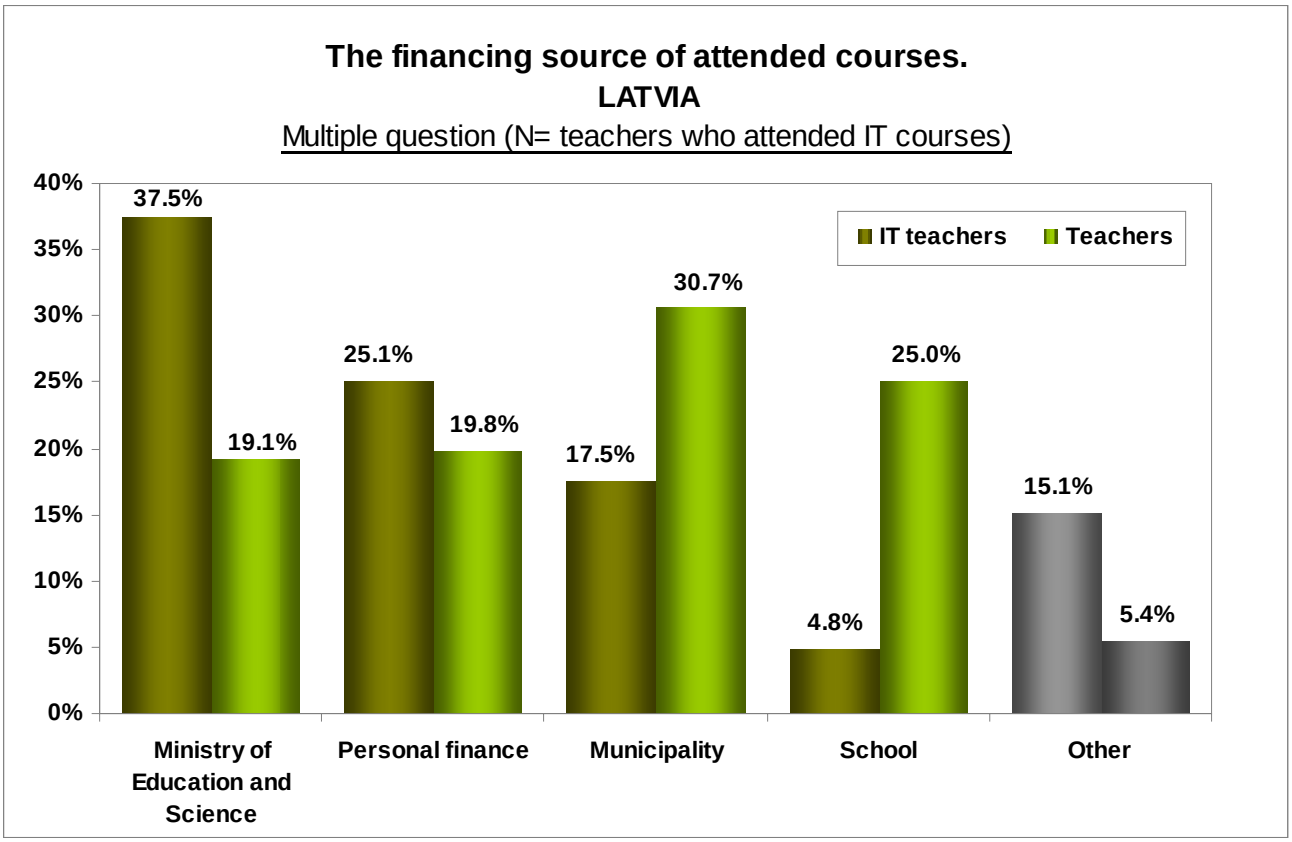
Since at the study, which was conducted in Lithuania, a different evaluation scale was used, the obtained results are shown in the second Chart:



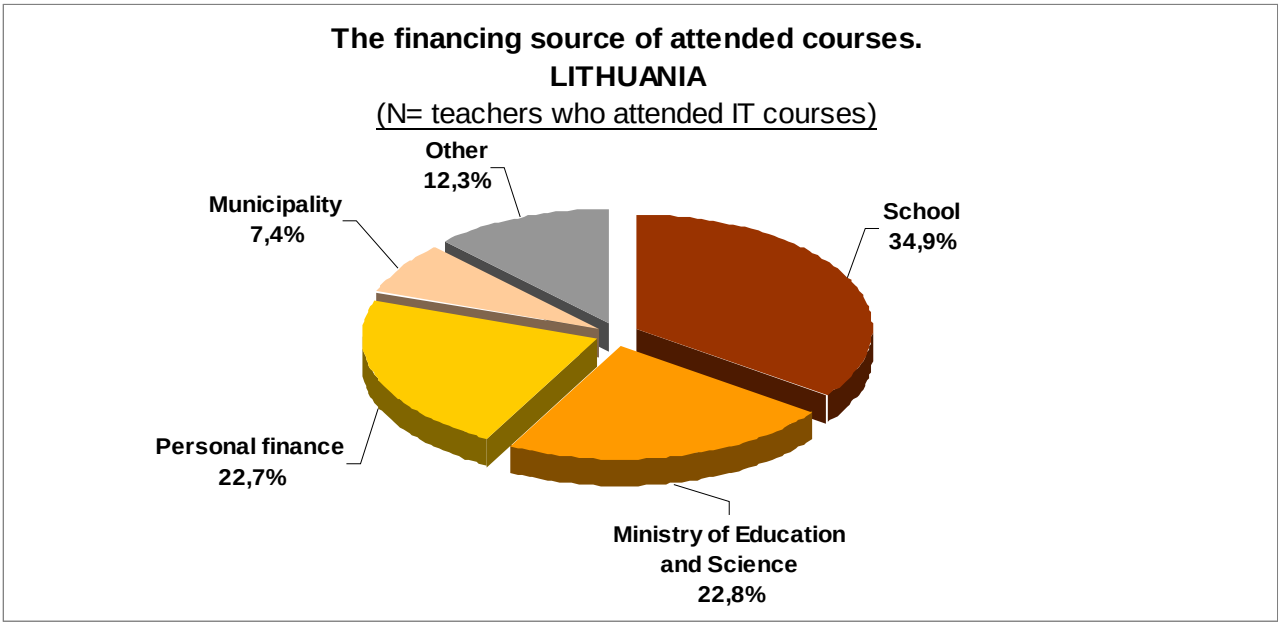
On the whole, we can see that teachers both in Latvia and in Lithuania consider courses as being useful, necessary and more or less corresponding to their necessities.

4.2. Financial sources of teachers' training

When analyzing the data obtained during the quantitative study on the financing sources of the attended ICT courses, we shall conclude that in Latvia IT teachers more often have attended the courses financed by MES or LIIS (37,5%), but teachers of other subjects have had more possibilities to acquire additional knowledge on ICT matters in courses financed by a municipality or school (30,7% and 25,0% respectively).



But in Lithuania most often course financing comes from school (34,9%), as well as from the MES (22,8%) or from teacher's own pocket (22,7%).



In both countries, Latvia and Lithuania, the payment for the courses is often quite a serious financial problem to teachers and school. For instance, the network of schools being disorderly, there are quite big number of vacant positions for students in small schools, particularly in villages, therefore, the student's basket is hardly sufficient for the earnings of teachers. On the other hand, the number of teachers in the small schools being little, it is difficult to cumulate the greater amount of money and intend it to the teachers' refresher courses. Although the teachers claim that their salaries are too small to pay for the refresher courses, however, due to the decreasing number of working places and increasing competition of teachers, relatively many teachers pay the refresher courses in IT from their own finances (22,7% of Lithuanian teachers and 25,1% of IT teachers in Latvia).

4.3. Readiness to use and intensity of using ICT in teaching/learning process

During the studies IT teachers and other experts in Latvia and Estonia were asked to evaluate the following things: teachers' readiness to use ICT in training and the training intensity of the ICT usage. The said questions in Latvia were included both in the qualitative and the quantitative part of the study, whereas in Estonia – only in the qualitative study.

Situation with readiness to use and intensity of using ICT in teaching/learning process in Latvia is not very optimistic.

The information obtained during the qualitative study shows that in none of Latvia's universities they teach methodology how to integrate ICT in training process. Teachers can learn about the ICT usage methodology only at Methodological centers. Unfortunately this methodology quite often is "fragmentary" and does not cover the whole subject, but just a separate topic of it. To some extent it can be explained with the fact that educational standard envisages the ICT usage during training process only as a recommending assumption, that is why it has not been necessary to draft methodological recommendations for teaching the whole subject, using ICT (LU: *Educational standard has general sentences, regarding which you can say that they express everything. However, one should specifically say that ICT SHALL be used also when teaching other subjects, then MES should draft the methodology*). However, experts admit that such "instructions from above" would not be too helpful to use ICT actively in training, if there are no technical possibilities provided to use ICT at school.

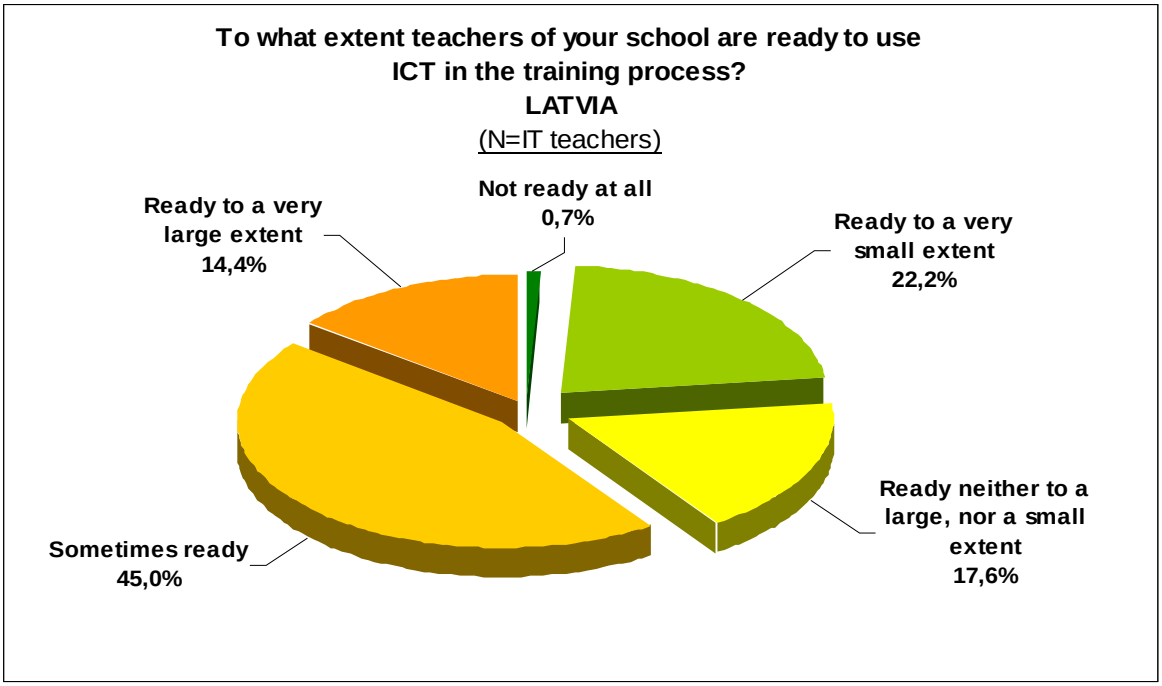
Generalizing we could say that teachers' willingness to use ICT in training process is just proportionally dependent on school's technical possibilities – **the larger are the possibilities** to use ICT (administration's support; computer classrooms are not overburdened; projectors are available; teachers have easy access to a [home, school] computer), **the larger is the willingness** to use ICT in training.

In Estonia the total school computerization and internetisation is relatively highest in the Baltic States and most teachers use a computer and the Internet mainly to make preparations for their lessons, some - also for communicating with colleagues and parents, printing out worksheets, and only few – also for making small programs.

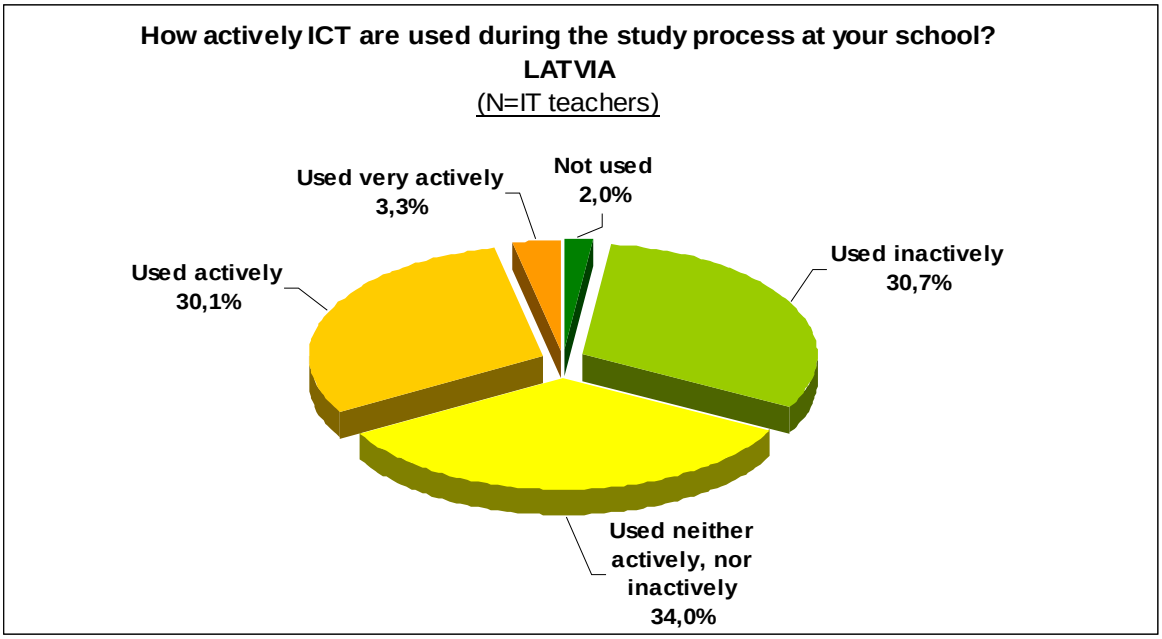
Still, as for the study process itself, teachers integrate computers much less. *"Teachers of different subjects are different. While the general competence has*

increased, the implementation of tools in teaching these subjects is still modest and a lot remains to be done." (Development of ICT in Estonian Education, Qualitative survey, 2005)

Formally Latvia's teachers would be ready to use ICT in training process. More than half (59,4%) of the IT teachers surveyed during the quantitative study consider that teachers of their school to a large or very large extent are ready to use ICT in teaching process.



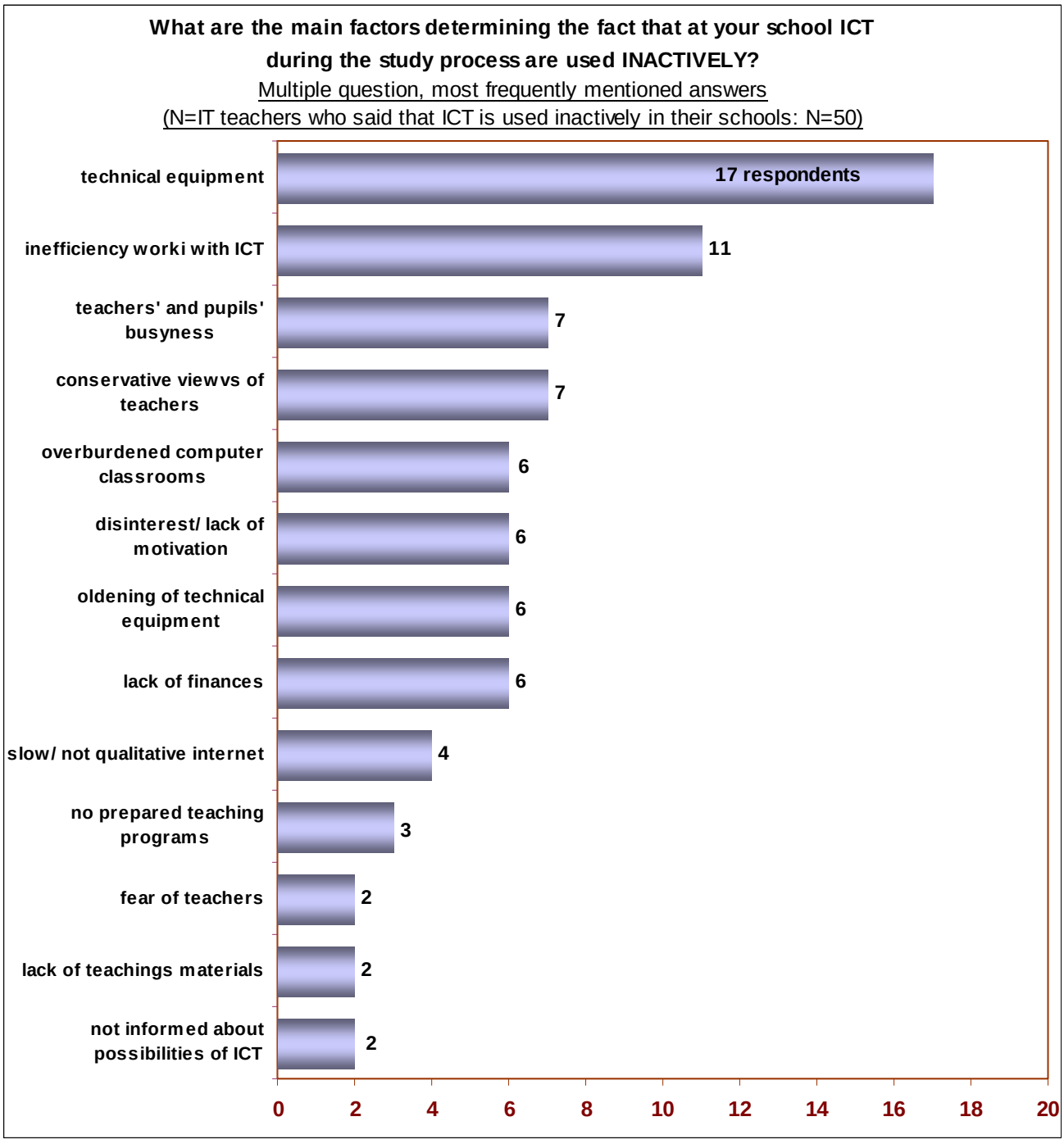
However answering the question ***„How actively ICT are used during the study process at your school?"***, only one third of IT teachers have provided the answer variants 'used actively' or 'very actively'. And almost the same percentage of respondents (32,7%) consider that ICT in training process are used inactively or are not used at all.



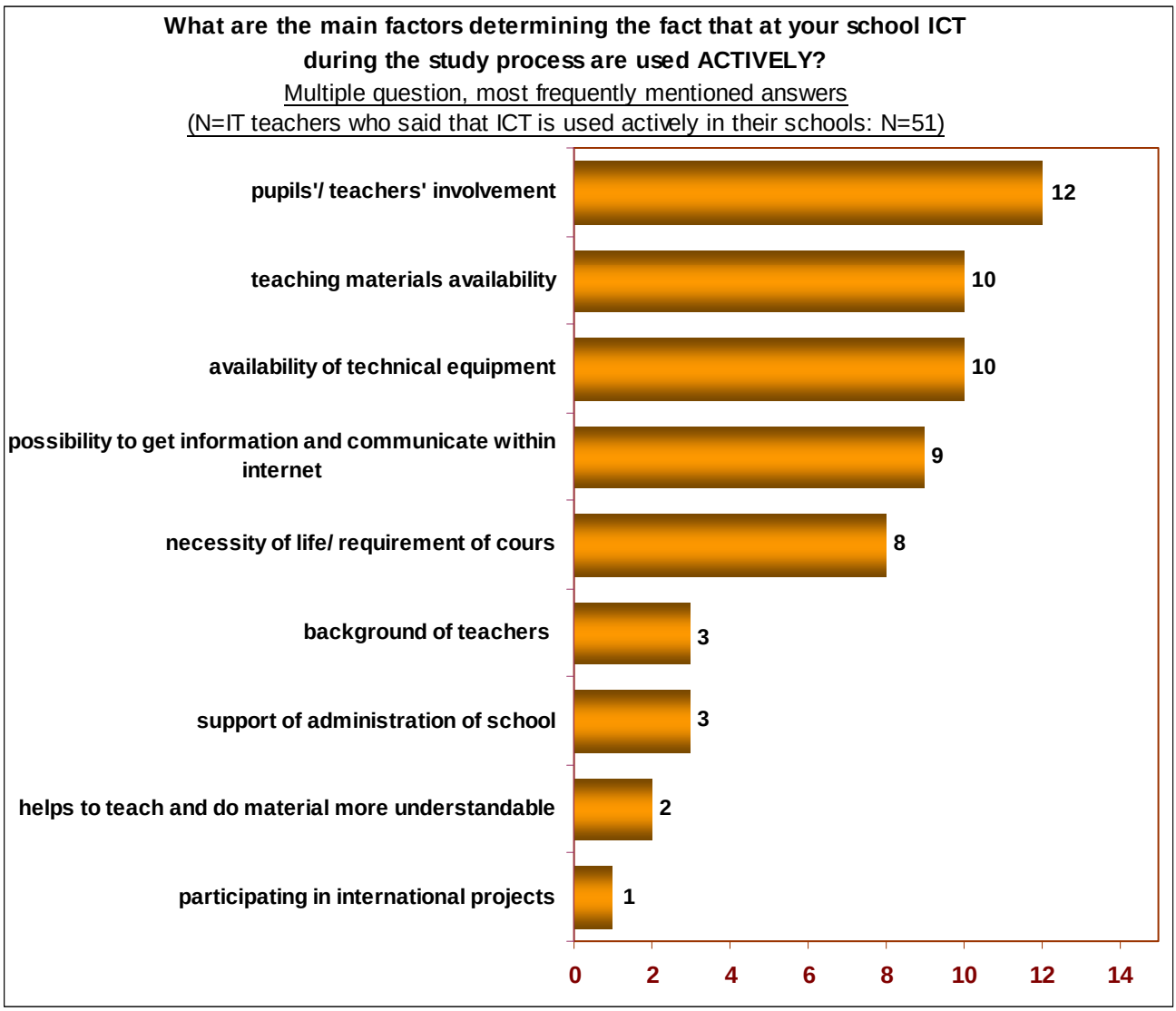
Respondents were asked to explain their answer, mentioning, what the main factors are determining the fact that at their school ICT during the study process are used inactively. The following phenomena were mentioned as the main reasons:

- Lack of computer equipment;
- Teachers' inability to use ICT in training;
- Pupils' and teachers' work/ study load;
- Conservative teachers' views.

More detailed information in the next Chart:



But the ICT usage in training process to a larger extent is based only on teachers' own enthusiasm (12 respondents):

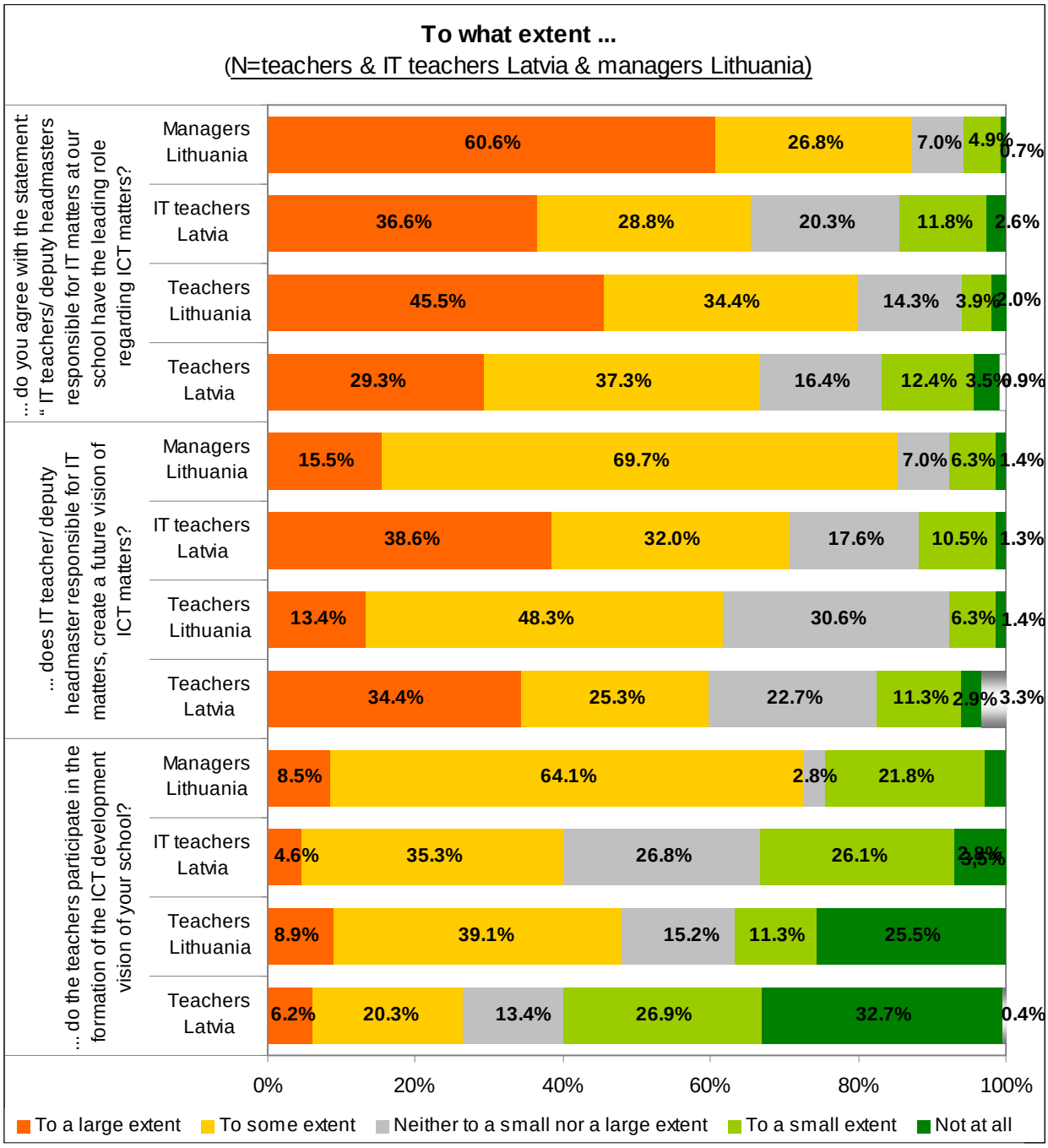


Similar conclusions were made also in Estonia: „Using the means of ICT in the study process depends enormously on the enthusiasm of a teacher, and the attitude of his/her school leaders to ICT." (Development of ICT in Estonian Education, Qualitative survey, 2005).

5. IMPLEMENTATION AND MANAGEMENT OF ICT IN EDUCATION

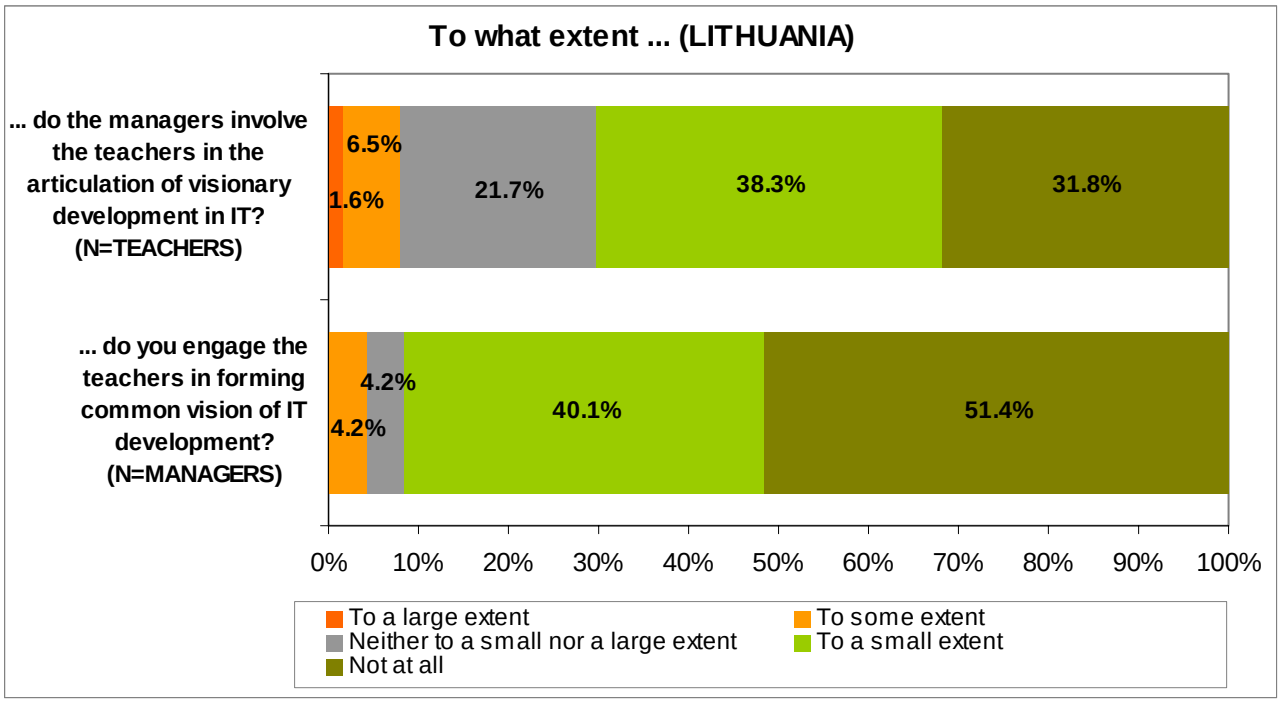
5.1. Teachers' involving in development of ICT in school

Most teachers (Latvia and Lithuania), school managers (Lithuania), as well as IT teachers (Latvia) consider that IT teachers or deputy headmasters responsible for IT matters take the leading role in ICT matters, as well as to a larger or smaller extent create a future vision of ICT matters.



The vision most often is a ground to achieve the successful implementation of the set task and unfortunately, teachers' participating in the formation of the ICT development vision in schools, is evaluated much lower than both in Latvia and Lithuania.

The managers in Lithuania claim themselves that teachers are too less involved (91,5%). IT vision still is not completely clear in many schools and even the managers themselves assess it quite skeptically. The fogginess of the vision could be determined by the low involvement of teachers in its planning and forming which is partly approved by the managers themselves



5.2. Hindrances and driving forces influencing the introduction of the of Information communication Technologies in education

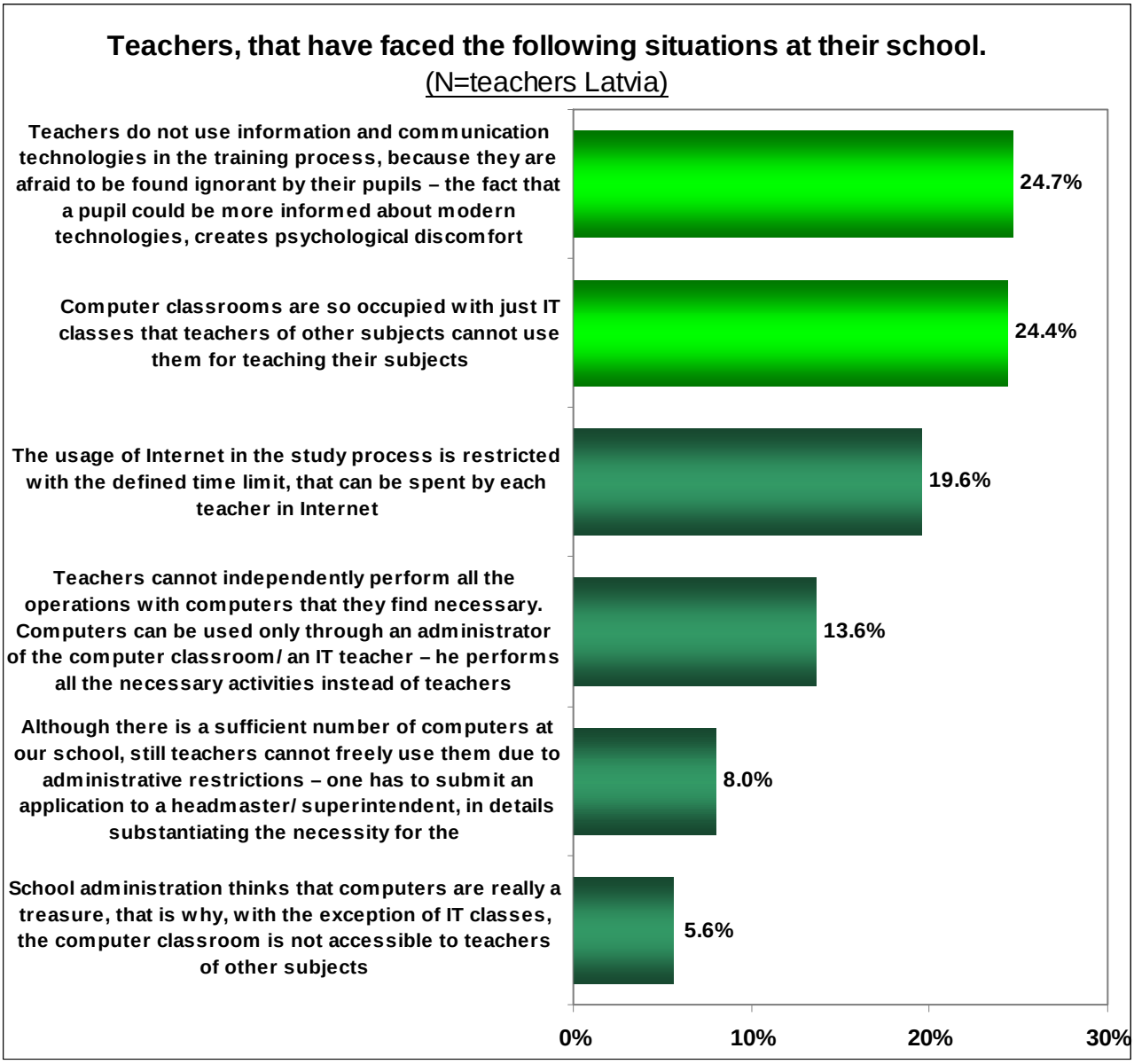
The studies conducted in the Baltic States show that the main hindrances to the intensive ICT usage in training are both technical (lack of computers) and financial (lack of funding), as well as intellectual (lack of methodological support and training programs) and psychological (fear to look incompetent in the eyes of pupils).

5.2.1. Situations at school hindering the ICT usage in training

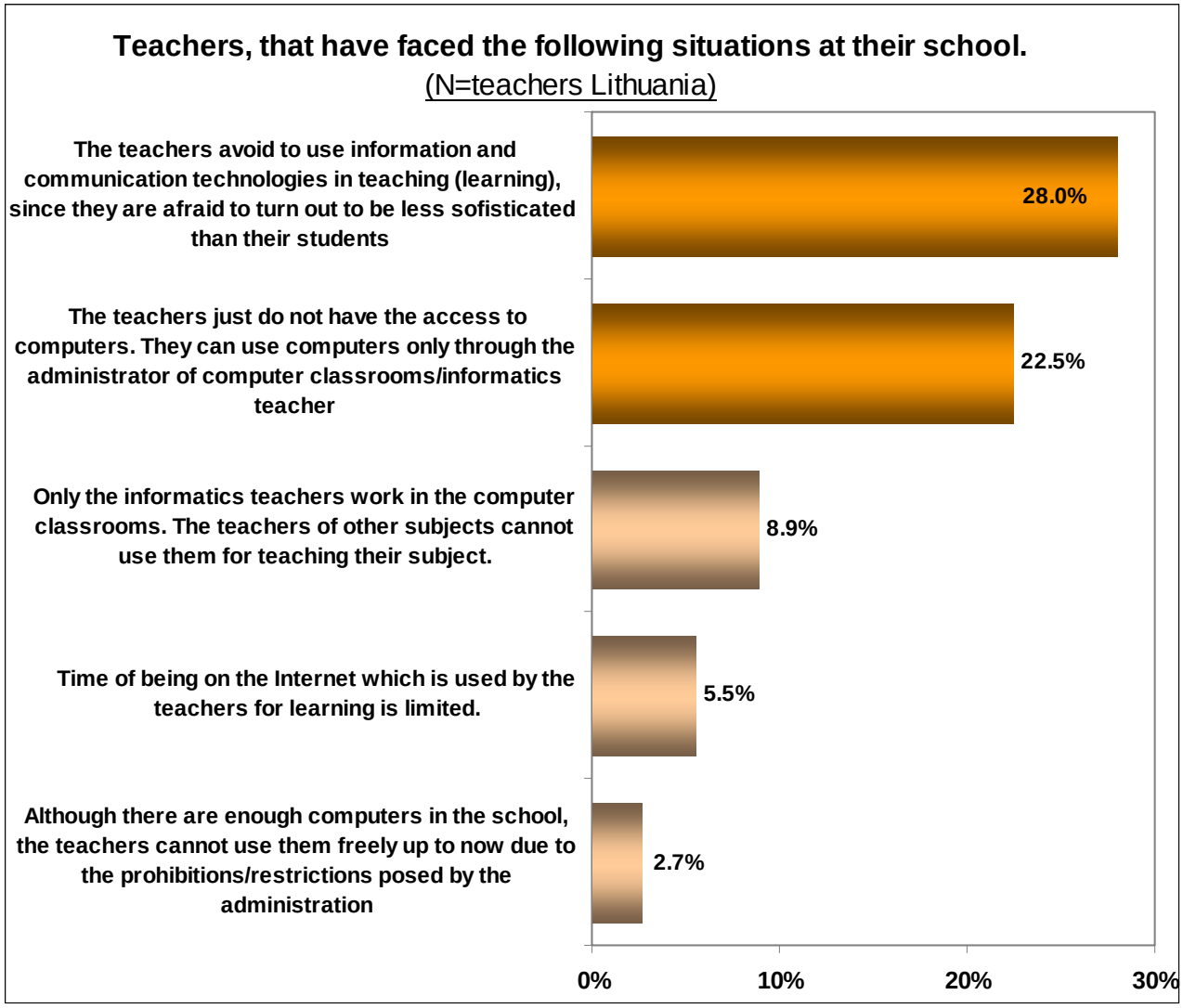
During the quantitative study conducted in Latvia teachers were asked a question on whether they at school have faced various situations, hindering the ICT usage in training. Almost one fifth of teachers (24,7%) indicated that they have faced a situation of psychological barriers, when ICT are not used in training process, because they are afraid to look incompetent in the eyes of pupils. The obtained information is in line with that learned during the qualitative study that „*It is psychologically difficult for adults to admit that they are not able to do something – children do not have such problems, if they cannot do anything, they ask others, but really few teachers dare to ask a pupil to give him advice. Teacher would feel ashamed to ask. Teachers of the Latvian language should put up with the fact that in the 7th form three fourths of pupils would have a better knowledge of computers than they, when learning, how to write official documents. It is a psychological problem of the generation, since young people will always have better knowledge of new technologies*." (Specialist of the Riga district Education Board)

The second most frequently mentioned situation (24,4% of teachers), which hinders the intensive ICT usage in the training process, is the fact that computer classrooms are too occupied with IT classes. Due to this business and due to the fact that in most cases classrooms of other subjects have no computers and projectors, teachers of other subjects cannot teach their classes in the IT classroom, for training using ICT (see the Chart on the next page).

Source: *Latvian Facts* quantitative survey 2005



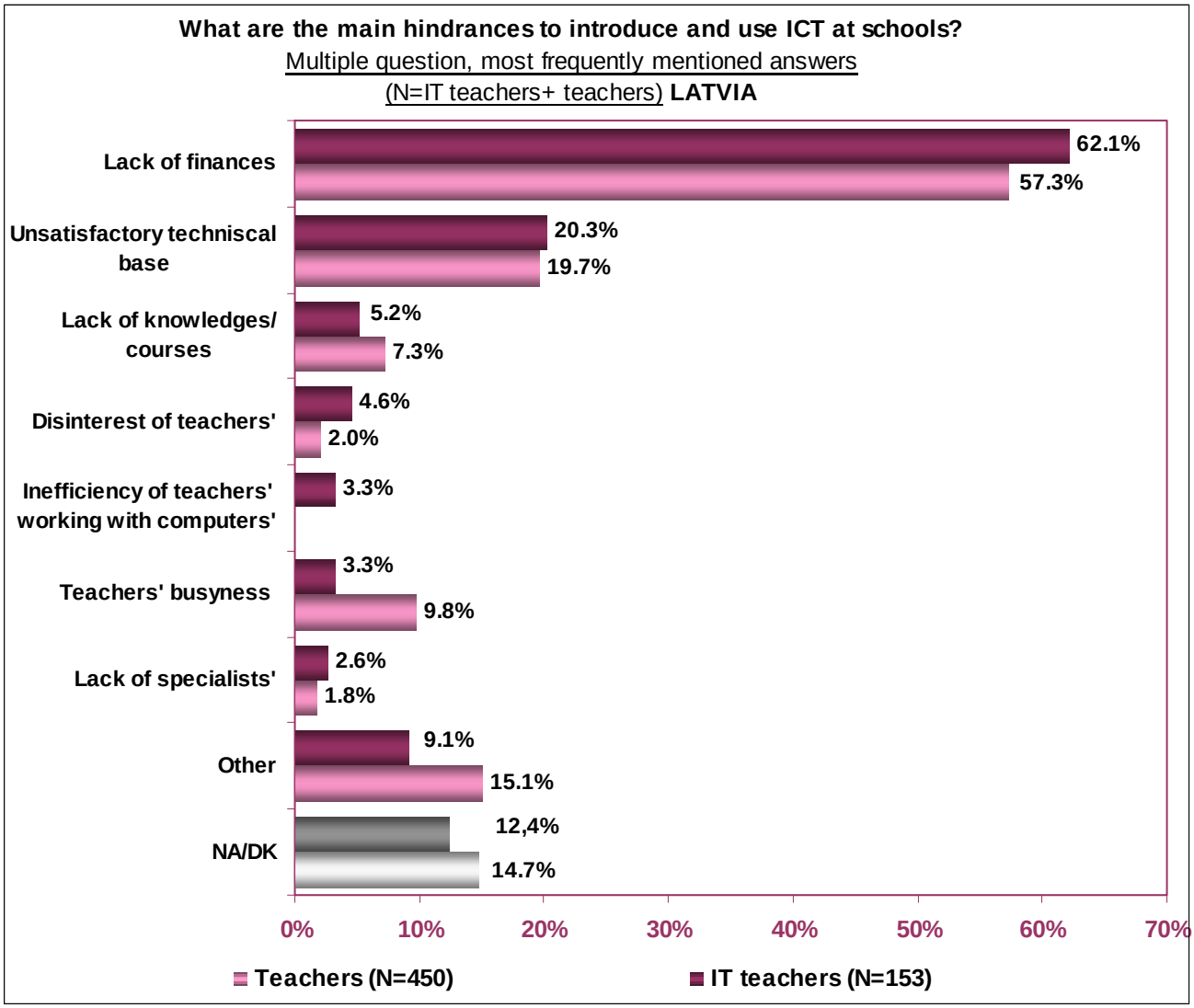
Also within the quantitative study conducted in Lithuania teachers were asked a question about various situations hindering the ICT usage in education. Like in Latvia, also Lithuanian teachers most often (28%) mentioned that they have faced fear to look more incompetent than their pupils. But the second most frequently mentioned situation was the limited access to ICT without an IT teacher's mediation (22.5%).



Source: ***Social Research Laboratory at the Kaunas University of Technology*** **quantitative survey 2005**

5.2.2. Hindrances delaying the ICT introduction and their intensive usage in training process

According to IT teachers and teachers of other subjects surveyed during the quantitative study in Latvia, the main hindrance delaying the ICT introduction and their intensive usage in training process is the lack of funding (62,1% of IT teachers; 57,3% of teachers). As the next reason is mentioned the schools' bad technical maintenance (20,3% and 19,7% respectively). The other answers, which are mainly related to teachers' interest and preparation level, are mentioned in less than 10% of the cases.



Source: *Latvian Facts* quantitative survey 2005

Also the results of the qualitative study conducted in Lithuania show a similar picture – 63% of Lithuanian teachers think that the main hindrance is the lack of funding, but 32% – the insufficient provision with computer equipment. Unlike Latvia, in Lithuania respondents most often (68%) as the main hindrance to the introduction of ICT in education have mentioned the problems related to software – 32% consider that they are short of legal software, 20% - that software is outdated, 12% - that they would need special training programs.

Lithuanian qualitative study: main hindrances to the ICT introduction in education

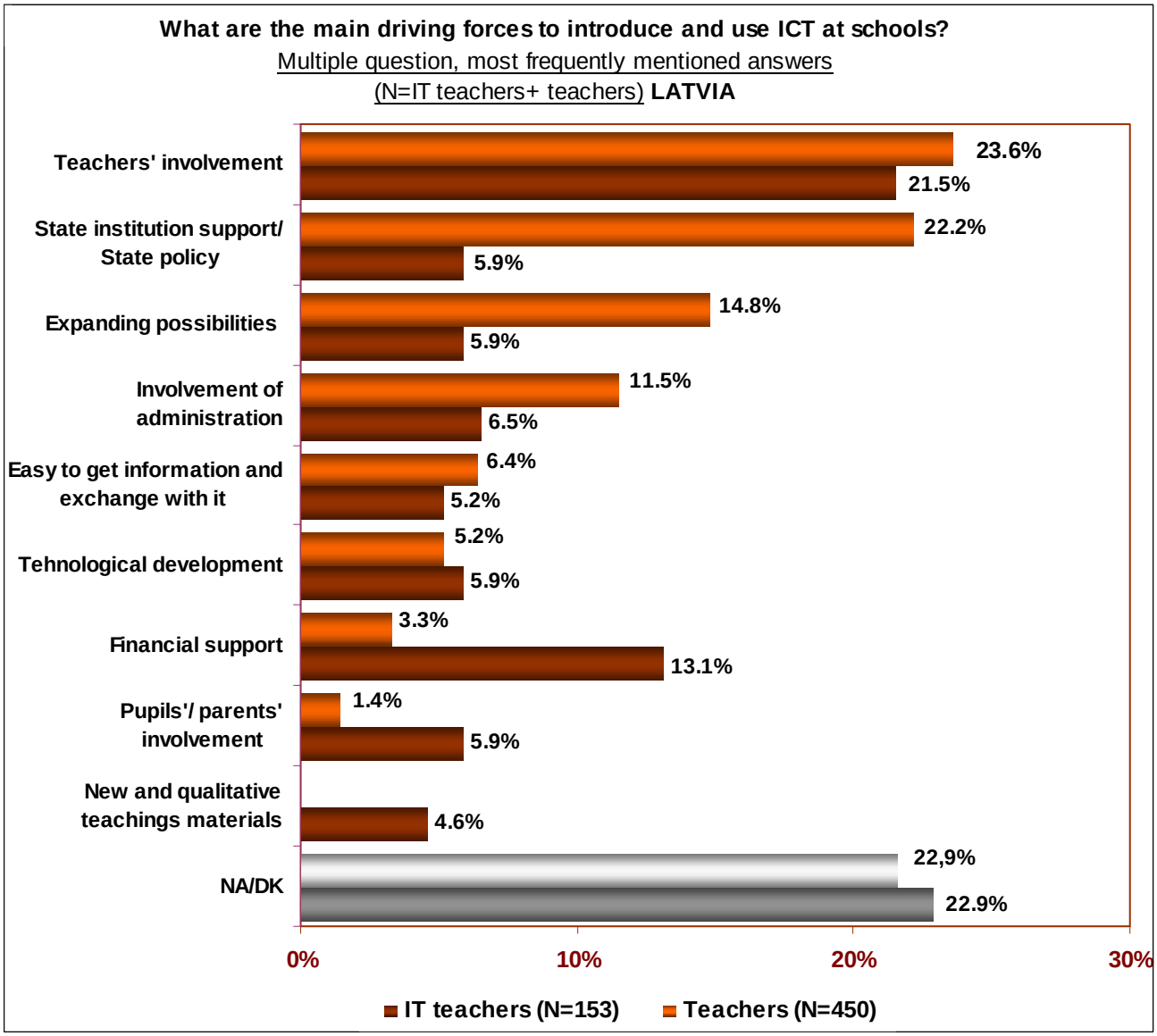
Main difficulties and obstacles encountered in the past few years by implementing IT in Lithuanian schools (N =42)

Category	(%)	Subcategory	(%)
Problems concerned with 'software'	68%	Lack of legal software	32%
		Out-of-date hardware and/or software	20%
		Lack of teaching/learning software (especially in Lithuanian language)	12%
		Lack of teaching/learning software (especially for pupils with special needs)	2%
		Viruses	2%
Financial problems	63%	Lack of funds/sponsorship	61%
		Small investments from municipalities	2%
Lack of computers	32%		
Insufficient computer literacy skills	27%	Insufficient teachers' computer literacy skills	20%
		Insufficient student's computer literacy skills	7%
Lack of competitive IT's specialists	24%		
„Slow Internet"/ insufficient quality of the Internet line	24%		
No possibilities to renew computers' appliances	17%		
Problems considered with legal basis	15%	Not clear politics of government and/or municipality	10%
		Insufficient legal basis	2%
		Inadequacy of national curriculum for IT integration	2%
Other problems	27%	Teachers avoid to use IT in the educational process	12%
		There are some unusable/unused possibilities of IT in educational process	9%
		Additional time for the preparation of lessons	4%
		Low-quality hardware which are handed over from Ministry of Education and Science	2%

But, according to the qualitative study conducted in Estonia, Estonians consider that the main hindrance is the non-existence of a specific state program, which would ensure the ICT introduction in education (*there is the educational policy without ICT, and the ICT policy without education*). Currently Estonian curricula have no elements related to ICT usage – training programs, methodologies etc. (*I think that we would have better use if the national curriculum said that ICT means are to be used, if textbooks contained tasks that requires the use of a computer and if exercise books can be filled out on the Internet rather than on paper. Because teachers see that she or he no longer has to think of what to use and what activities to develop. This would be a methodological guidance and a fixed direction that would be very helpful; State curriculum should make a clearer reference to integration of ICT means. Because the Intel training is too one-sided (lack of pedagogical and e-school support, too much focused on Microsoft software), we organize a course that is mainly based on e-learning, in the key of digital didactics. This should be continued and made more massive*).

5.2.3. Driving forces of ICT introduction in training process

In Latvia teachers think that the main driving force for the introduction of modern technologies in educational system is teachers' own interest (teachers - 23,6% and IT teachers - 21,5%). In the next position we can observe an essential difference between the opinions of teachers of other subjects and IT teachers or deputy headmasters responsible for IT matters. Thus, teachers are willing to receive state institutions' (for example, Ministry's of Education) support on a political level, whereas IT teachers or deputy headmasters responsible for IT matters, who take care of school's technical maintenance, think that the ICT introduction can be intensified, if increasing financing.



Source: *Latvian Facts* quantitative survey 2005

Regarding the facilitation of teachers' interest, within the Latvia's qualitative study experts indicated that there could be at least two scenarios – the optimistic and the pessimistic one.

According to the optimistic scenario, teachers could be motivated to use ICT in training process with an additional payment to their salary for an innovative approach (such an opinion is popular at those schools, in which ICT already are used relatively widely – for example, at the Ogre Grammar School), as well as supporting teachers technically – if a teacher at home or at school has a free access to a computer, he loses his "fear" from it and forms routine work skills (this approach is popular at the schools, in which ICT are used relatively rarely).

However, some experts mentioned that one should not overestimate the additional payment for innovation, since it may happen that traditional methods also may have good results (Headmaster of a grammar school: *If we speak about additional payments, it really matters, how large it could be – 10-15 lats won't be a significant payment, whereas 80 lats will be an abnormal payment. A person, who does not use ICT, perhaps just with chalk and a blackboard has very good success in his training work, but he will not receive the additional payment just due to the fact that somebody else will show nice pictures on the computer. It won't be right*).

But the pessimistic scenario envisages that the problem will be solved of its own, with the change of teachers' generations and when ICT would become a life's necessity like bank settlement cards and cellular telephones (an IT teacher of a grammar school: *There are possibilities to use a computer, but, if these skills are not acutely necessary, you can use your time much more usefully. If we compare it with other things, we could say as follows – there was a period, when they stopped paying salaries in cash and you were forced to start using bankcards. Before that it was also possible to open a bank account, but in most cases teachers did not do it, because it was complicated. The same was regarding cellular telephones – at the beginning many people considered that it is exclusive but now it is our daily life, and it is hard to do without it. The same is regarding computers – school is a conservative institution, which does not quickly react to changes in the surrounding environment and the same refers to teachers. The people who for years can work at school are ones with conservative opinions, sticking to their own views*).

According to all experts, the problem shall be solved, drafting a national level computerization strategy of educational system and renewing financing for the LIIS

project, which could mean the purchase of new computers and the change of old computers.

Also within the Lithuanian qualitative study experts have indicated that the main driving force for the ICT introduction is financing (80%). As the next factor facilitating the ICT usage was mentioned the fact that more attention is paid to software (34%). Almost one fifth of respondents consider that teachers shall be additionally taught to work with ICT, but about 15% think that a driving force should be a national support to educational organizations.

Lithuanian qualitative study: the necessary support to the ICT introduction in education

Recommendations to Lithuanian government, structures of business, influential NGOs (N =42)

Category	(%)	Subcategory	(%)
To invest funds	80%	Give more finances to schools' computerization and/or renewal of computers appliances	56%
		Investment not only to „hardware", but also to „software"	13%
		IT's coordinator establishment	7%
		Raise the payment of IT's specialist in the schools	3%
Pay more attention to software	34%	Establish legal software in the schools / give more attention to software	17%
		Create common integrated software package in a school	17%
Organize teaching, computer literacy's seminars	19,5 %		
Government's support to organizations maintaining education	14,6 %		
Administer the control	12%	Control IT's implementation process in the schools	5%
		Control use of finances	7%
Legally regulate IT's establishment and usage in the schools	12%		
Create united informational system	12%		
Other	12%	IT hardware in schools consign to care of the professional firms	5%
		Include ICT requirement to employees' official specifications	5%
		Contract and hold connection with different foundations and organizations that can support IT development	2%

The impact of the lack of financing on the ICT introduction in education is well characterized by the information obtained during the Latvian qualitative study. During the last two years the state is granting no more financing for the purchase of computers within the LIIS project, that is why not only the purchase of new computers has stopped, but also the change of the old ones, which is necessary for the maintenance of the already achieved level. According to the LIIS representatives' calculations, in 2004, just in order to maintain the existing level, 5,208 computers should have been changed, and it would cost 2.604.000 lats (a LIIS project manager: *In order to maintain the existing level, this year we need 2,5 millions, whereas for computerization for the next two years only 1,5 million lats are envisaged*). But, in order to ensure development and achieve, for example, the EU level of 2002, in 2004 we should have purchased 12,122 computers, which would cost 6.061.000 lats.

The LIIS forecast shows that, if the computer stock is not regularly renewed, by year 2008 one would reach a 0 point, when the computerization of the educational system should be started anew (a representative of the Education and Science Ministry: *Computers' life is from 3 to 5 years. In order just to maintain the achieved level, each year one should change at least 1,000 computers, but now there has been an interruption for several years*). However, in this forecast, ignoring the reality that during the last years Latvia's school computer stock is renewed mainly with municipal funds, it is assumed that all computers functioning in education system are bought only for state budget funds.

Thus, constantly not renewing and not supplementing a computer stock, there is an increasing number of the computers, which are difficult to use in training process (a representative of the Education and Science Ministry: *About 60% of computers cannot be used to teach people to work with modern programs*) – outdating equipment just deepens the unsolved problem of overburdened computer classrooms which is typical for many schools. Experts mentioned the occupation of computer classrooms as one of the main reasons, why ICT are not actively used, when teaching other subjects than IT.

5.2.4. Causality determining the inactive ICT usage in training process

To a large extent the data obtained during the Latvia's school survey correlate with the reasons (which are causing obstacles) identified during the qualitative study and with the factors which are causing the negative background for the ICT usage in training. Generalizing, it is possible to form a chain of regularities, due to which teachers do not use ICT too actively in training process.

1. Until now in Latvia there has not been a uniform long-lasting education computerization strategy of a national (ministry) level, which would provide regular financing for the achievement of the set goals; thus, the government has easily managed to refuse from the financing of the LIIS project, which until now has ensured computerization of Latvia's schools (Secretariat of Minister of special tasks on Electronic management matters (SMSTEMM): *Until now they were employees of the Computer Science Institute of the University of Latvia (UL), who had their vision, and not employees of the Ministry of Education (ME), as it should be. At that time it was the UL initiative and it is very good that it was, but it is definitely clear that now the initiative should come from the ME, which should also draft the strategy. If the ME forms education policy in Latvia, and computerization strategy, as well as further separate projects are based on it, regular financing also should be envisaged for it. Until now everything has been just the opposite – the UL came with a specific project and further it was developing as it was managed by the UL. No initiative has come from the state, most likely due to the fact that the ME has not had a particular specialist, who would concentrate on the computerization of education. Actually, just the lack of strategy shows that until now nobody has dealt with it. And thanks God that the UL people had their initiative, otherwise at schools we would not have anything at all*.

2. When the financing ended, the process of supplementing and renewing computer stock stopped (LIIS project manager: *Until 2003 every year we received about 3 million lats, but now - only so much that we can 'preserve' LIIS life, i.e. – about 300.000*).

3. School administrations themselves usually do not have a sufficient understanding of the ICT significance for education (Clerk of the Education and Science Ministry: *If at school there are sufficiently active people, who understand the importance of ICT, then the school is very well computerized even in poverty conditions, because both various foundations and social*

projects are used. If at school there is no such a leader, then most probably there are only the compulsory 3 computers for the school administration), thus, no alternative finance sources are searched in order to supplement or renew the existing computer stock.

4. In the situation of not renewing and not supplementing school computer stock, computer classroom is not unburdened from IT classes, besides, computer equipment is continuing to get old and becoming unusable for intensive usage. Thus, the already scarce possibilities for teachers of other subjects to use a computer classroom for teaching their subjects are decreasing dramatically (Head of the School Board of the Daugavpils District: *It is problematic that there is only one computer classroom; if it is a large school, all the time there are IT classes. The classrooms are occupied and the others cannot get there*).

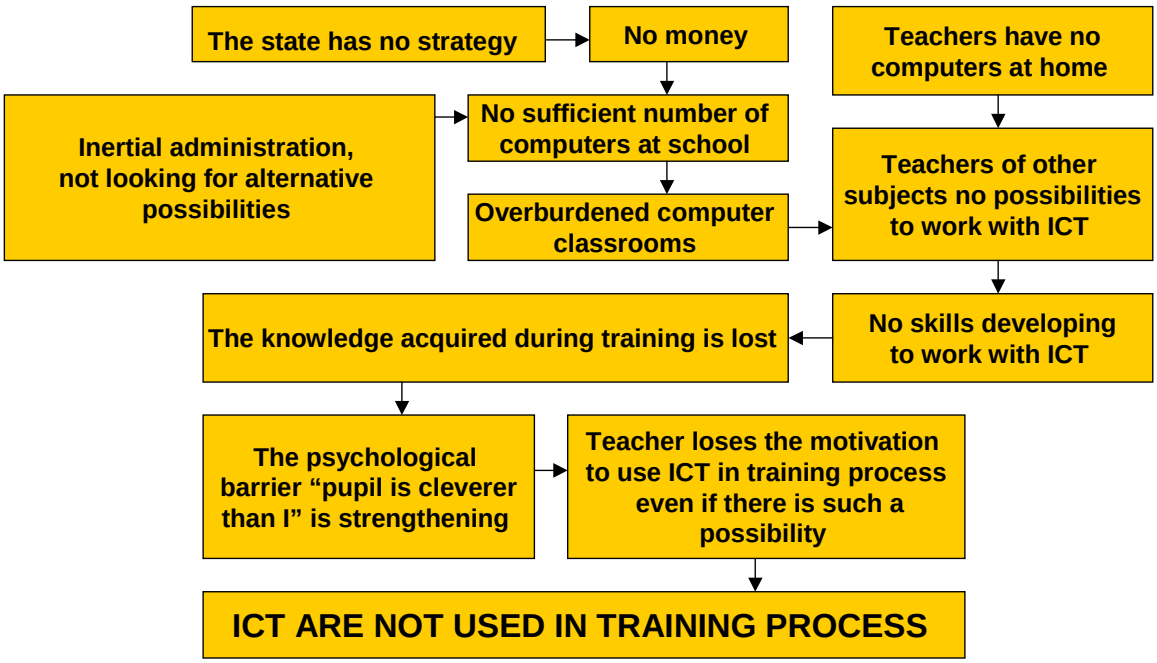
5. A part of teachers do not have home computers, since in comparison with their salary computers are expensive (Chief Specialist of the School Board of the Riga District: *In Sweden a teacher has to work for a month maximally in order to buy a computer, whereas in Latvia – half a year… That is why so few teachers have their own computers at home – it is good that they have children, then at least they force to buy one*), besides, at school possibilities to use computers (due to the busy computer classrooms) are limited. Thus, teachers of other subjects cannot strengthen the knowledge acquired at computer courses – they do not develop their skills to work with computers and they do not have a habit to use ICT (IT teacher in Gymnasium: *It would be ideal, if at teacher's working place, which quite often is his home, there were a computer, but due to financial reasons quite often it is not possible. If computers were available, then, in my opinion, there would be no problems at all, because it would become a daily phenomenon. If you use a computer too rarely, you do not develop any skills. You have knowledge, but no skills*).

6. Quite often pupils at home have newer computers and they can work better with them than teachers. Thus, a teacher, making sure about the modesty of his skills, strengthens his "fear to become ridiculous" in the eyes of pupils and he loses the willingness to try to use ICT when teaching his subject (Chief Specialist of the School Board of the Riga District: *It is psychologically difficult for adults to admit that they are not able to do something – children do not have such problems, if they cannot do anything, they ask others, but really few teachers dare ask a pupil to give him advice. Teacher would feel*

ashamed to ask. Teachers of the Latvian language should put up with the fact that in the 7th form three fourths of pupils would have a better knowledge of computers than they, when learning, how to write official documents. It is a psychological problem of the generation, since young people will always have better knowledge of new technologies).

7. As a result: no practical possibilities => no skills => no confidence of one's strength => no psychological motivation to use ICT in training process.

The scheme shows the chain of regularities identified during the qualitative study, why teachers do not use ICT in training process:



Combining the data obtained during the qualitative and quantitative studies, we can conclude that, although relatively many teachers have access to a home computer, still the actual lack of possibilities (computer classrooms are occupied; there is a shortage of new computers at schools) to use them in training process, combined with teachers' doubt about their skills and fear to look ridiculous in the eyes of their "computerized" schoolchildren hinder the ICT usage in training process. At the same time regarding the other subjects, where ICT are used (with the exception of IT classes) we should rather speak about passive usage (writing of texts) of computer technologies and not about the active one (simulations, presentations).

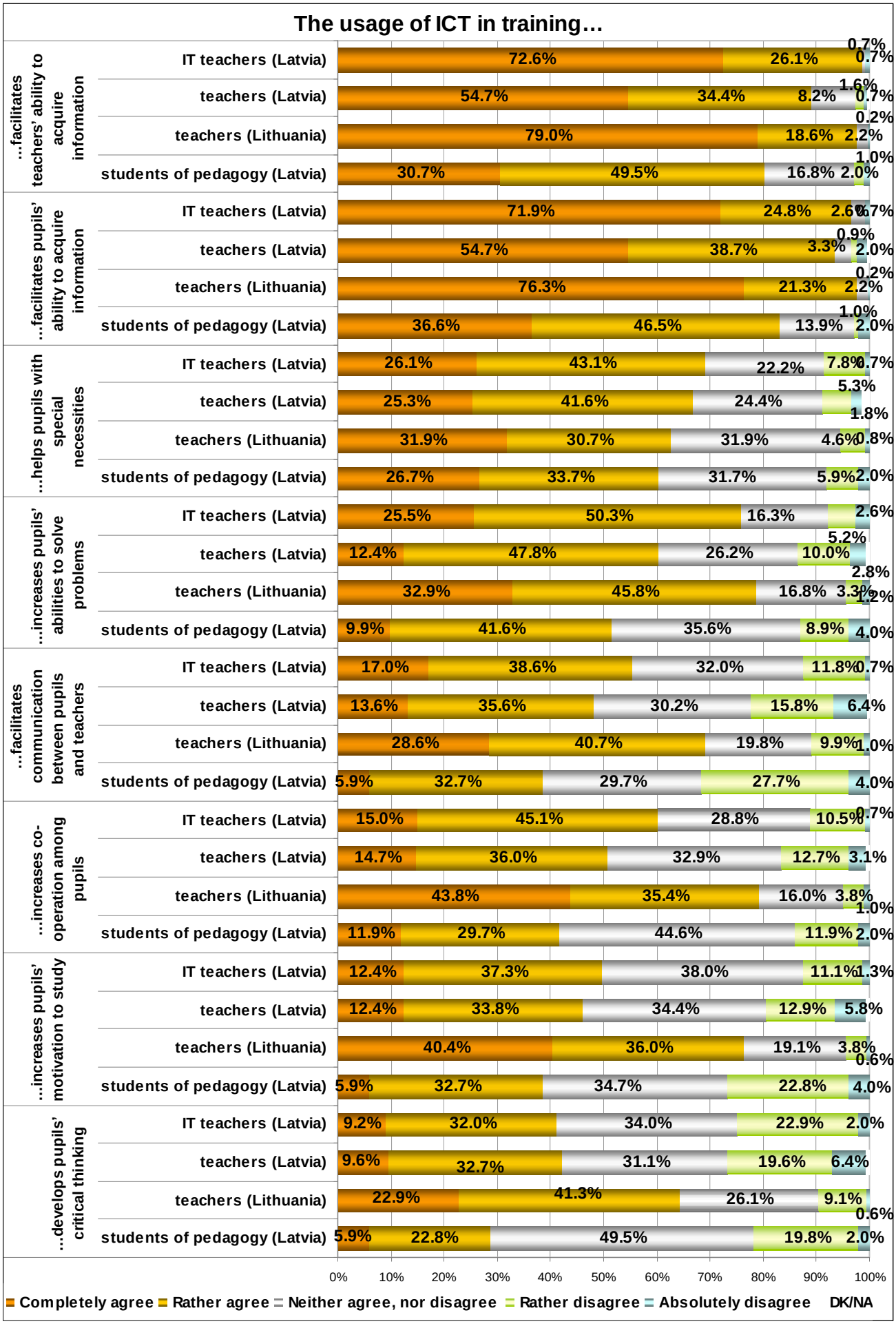
6. SIGNIFICANCE OF INFORMATION COMMUNICATIONS TECHNOLOGIES IN EDUCATION

6.1. ICT at school – a factor facilitating the improvement of the quality of study process

Study participants (IT teachers (in Latvia), teachers of other subjects (in Latvia and Lithuania) and future teachers (in Latvia)) had to evaluate to what extent they agree or disagree with several statements on the ICT impact on training process.

Respondents mainly agree with the fact that the ICT usage has an informatively communicative potential – the statements, that they help both pupils and teachers to get information, on average are supported by 85% and more respondents. At the same time the statement that ICT facilitate communication between pupils and teachers is supported by approximately 50% of respondents in Latvia and by approximately 70% in Lithuania. The statement that the usage of computer technologies facilitates pupils' motivation to learn and develops their critical thinking, is supported by approximately 75% of respondents in Lithuania and by only about half or fewer respondents in Latvia. On the whole, the respondents in Latvia tend to be a little more reserved than the Lithuanians (see Chart on the next page).

No essential tendencies can be observed in the respondents' socially demographic groups.



Source: *Latvian Facts* quantitative survey 2005

6.2. ICT at school – the image factor when selecting a school

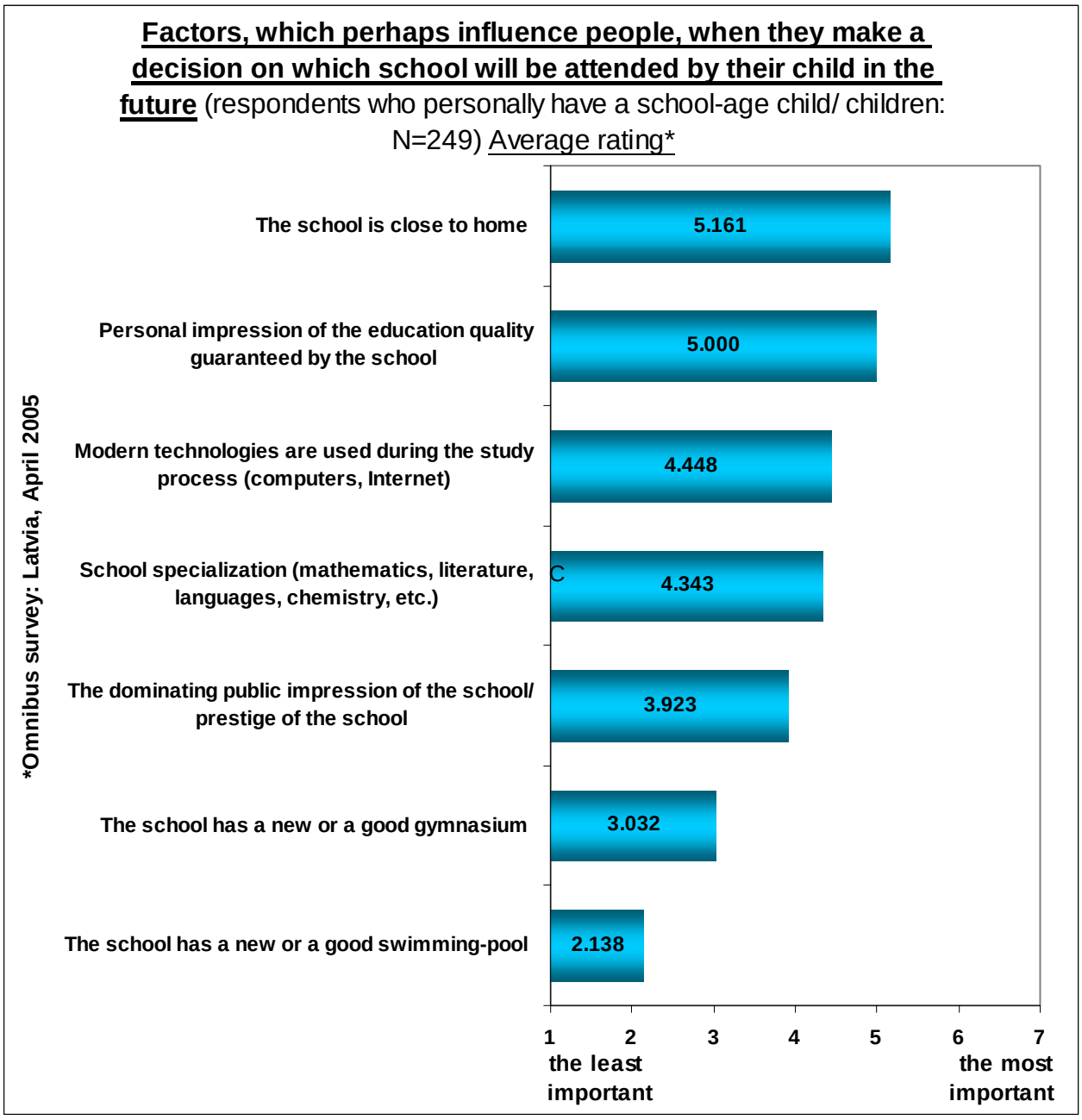
Within a monthly Latvian public opinion poll parents of school age children were asked questions on the factors influencing them, when making a decision on to which school to send their children and on the significance of ICT in their children's education and further life.

For respondents with school age children, when selecting a school for their child, the most significant aspect is the school's location - close to their home, their personal impression of the education quality provided by the school and the fact, whether during the study process modern technologies are used. If the first factor is really practical, but the second one – emotional and subjective, then the third one is rational and objective, because it is oriented to the development of skills necessary for the future work market. It is proven also by the parents' attitude toward the usage and acquiring of the modern technologies – most parents completely or rather agree with the statements which prove the necessity for modern technologies in daily life and at school and their significance for their children's future. Only 14 respondents (5,6%) agree with the statement that acquiring of modern technologies makes no sense and they will not be necessary for their children.

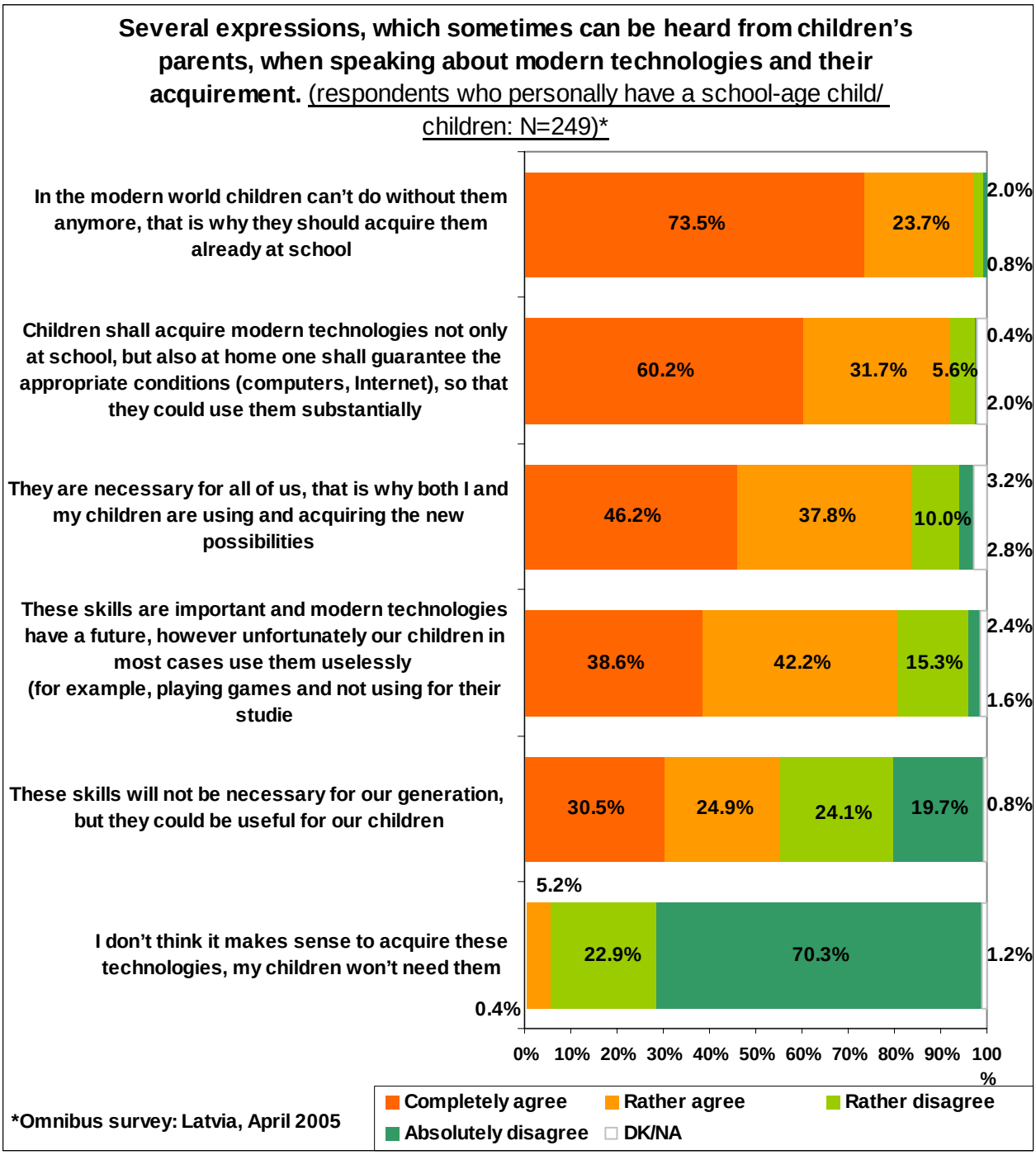
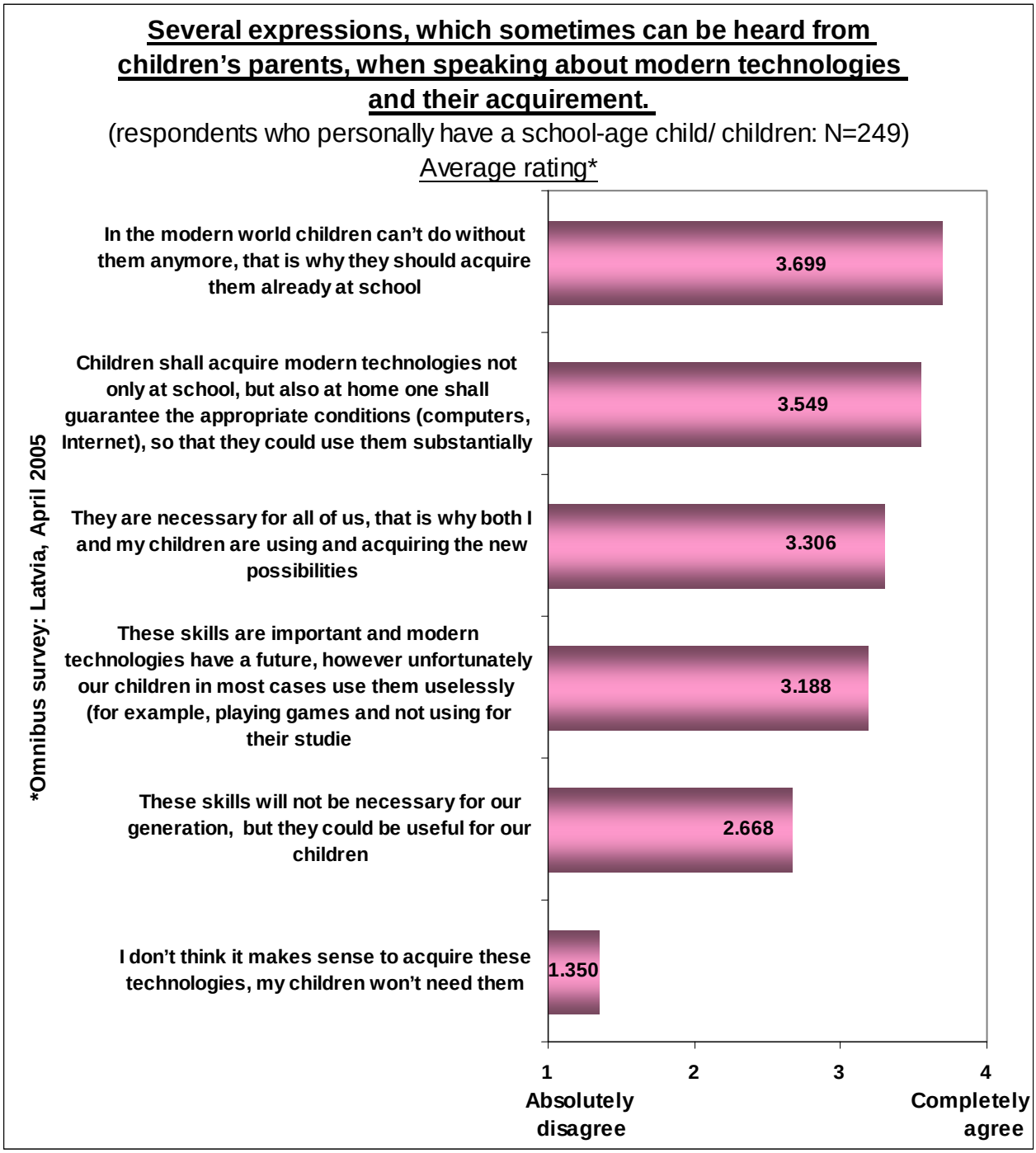
No essential tendencies can be observed in the respondents' socially demographic groups.

For more than half (57,4%) of the respondents with school-age children, surveyed in a monthly public opinion poll, the most important factor, determining the selection of a school for their children's studies, is the fact that it is located close to their home. For almost half (49%) of respondents very important is the personal opinion of the quality of the school's provided education. The usage of modern technologies in training is important for approximately one fourth of respondents (26,5%). But most respondents, when selecting a school, would not care, whether it has a swimming-pool (71,9%) or a new gymnasium (43,7%).

When analyzing the obtained results by the average showings, we can see that in the scale from 1 to 7, where 1 means “of a minor importance”, whereas 7 – “very important”, a school’s close location to home has been evaluated by respondents with 5,161 points, but their personal opinion of the school – with 5 points, which shall be considered as medium high evaluations. But the usage of modern technologies in training has been evaluated with 4,448 points, which is a little above the average evaluation. As it can be seen, for children’s parents the most important thing is the fact that school is located close to home and their child can easily reach the school, and not the fact that the school has a swimming-pool or a new gymnasium. Also usage or non-usage of modern technologies is not the main factor, when selecting a school, because parents’ choice is subjected to personal opinions on the quality of the education provided by the school.



At the same time, evaluating various statements on the role of modern technologies in children's life, almost all respondents (97,2%) consider that their child could not do without them and that they should be acquired already at school. Such a position is in line with the opinion of experts, clarified as a result of the qualitative study, that labor market requires skills to work with computer technologies and schools should teach children to work with them (an IT teacher of a grammar school: *If I don't teach my pupils to work with computers, they won't be competitive in the labor market*). The opinion that modern technologies will have no importance in children's future, is supported by just approximately 5% of respondents.



When analyzing the obtained results by average showings, it can be seen that in the scale from 1 to 4, where 1 means “absolutely disagree”, but 4 – “completely agree”, parents have evaluated the statement “in the modern world children can’t do without them anymore, that is why they should acquire them already at school” with 3,699 points, which is a very high evaluation. Also the other statements, which prove the significance of computer technologies and the necessity to acquire them, on average have been evaluated with 3 and more points. But the statement “I don’t think it makes sense to acquire these technologies, my children won’t need them” has been evaluated with 1,350 points, which is a very low evaluation.