National Agency for Education, Report 147

Schools and Computers 1997

- a quantitative picture -

Summary: In the autumns of 1993 and 1995, the National Agency for Education carried out a quantitative survey of the availability of computers in the schools. Now, in the autumn of 1997, the same survey has been repeated. Between 1995 and 1997, the number of computers in the schools has continued to increase considerably. This applies both to computers for use by teachers and for use in teaching. On the Swedish compulsory school level (7-16 age group), 13 pupils share a computer, as compared to 19 pupils in 1995. On the upper secondary level (*gymnasium*, not compulsory), the number of computers has increased by over 30% and computer density has increased from eight students per computer in 1995 to six in 1997. Of the municipal upper secondary schools, 91% have access to Internet. The corresponding percentage for the basic compulsory school level is 56%. Between the years of 1995 and 1997, the number of teachers per computer on the basic compulsory school level decreased from 12 to six. At municipal upper secondary schools, two teachers share one computer. At the upper secondary schools run by the county councils in 1997 and at independent (private) upper secondary schools, there is one computer per teacher. Since 1995, the number of school boards/administrative bodies who report that they have an IT (information technology) strategy or action program has increased substantially.

Key words*: quantitative survey, computers, IT, Swedish schools*

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Foreword

Within the framework of the assignment given by the government to the National Agency for Education to determine a national computer policy for Swedish schools, a survey of the availability of computers in the schools was conducted in the autumn of 1993 after consultation with the Swedish Association of Local Authorities and the Federation of County Councils.

The result of the 1993 survey, which was presented in the report *Schools and Computers – a Survey of Computer Use in the Schools*, attracted a good deal of attention from school boards, the cabinet office, the media, and other users. This motivated the National Agency for Education to repeat the survey in the autumn of 1995, to offer the opportunity for comparisons over time. The result of the 1995 study was presented in Report 99 of the National Agency for Education, *Schools and Computers in 1995 – A Quantitative Survey*, with its accompanying appendix, *Tables from Report 99 of the National Agency for Education, Schools and Computers in 1995 – An Account on the School Board Level.*

The purpose of the 1997 survey, as with the earlier studies, was to try to answer questions about: the number of computers used in teaching, the number of schools and the number of school computers connected to Internet and what kind of connection, placement of school computers, computer availability restricted to teacher use, and whether school boards have IT (information technology) strategies or action programs for the computer field.

Both the 1995 and 1997 studies were aimed at *all* bodies with responsibility for schools – local municipalities, county council municipalities, government boards, and school boards of independent (private) schools – so that the data could be presented on the school board level. Each municipality can thereby compare itself with other municipalities. The study has been conducted by LK Statistics & Studies in Linköping, on commission by the National Agency for Education. The project coordinator at the National Agency for Education was Sonja Tiderman.

The study shows that the number of computers in the schools continued to increase considerably between 1995 and 1997. This applies to computers for teacher use as well as computers for teaching. The ratio of students per computer is still lowest in rural municipalities but the differences between the kinds of municipalities has leveled off during the four-year period covered by

the study. The number of schools that are Internet-connected has increased substantially, even if there is a certain amount of variation between types of schools. Likewise, the study shows a marked increase in the number of school boards who report that they have an IT strategy or action program for the field of computers.

Access to IT equipment should be seen as a prerequisite for reaching the goal of increased knowledge about IT and its usage. Computers in themselves are not a guarantee that IT is being used in the teaching process. This is why the National Agency for Education is following up and evaluating IT usage in the schools through several projects. The most comprehensive project is a three-year evaluation led by Professor Ulla Riis of the Department of Education at Uppsala University. This study is part of the so-called ELOÏS project with researchers in Uppsala and Linköping.

Stockholm, April 1998

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Schools and Computers 1997

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Summary

The number of computers in the schools continued to increase markedly between 1995 and 1997. This applies both to computers used by teachers and ones used in teaching.

The number of computers for teacher use has increased by 66 percent at municipal basic compulsory schools, 51 percent at upper secondary schools, 65 percent within local authority-administered adult education, and 91 percent at schools for the developmentally disabled.

The number of computers used in teaching at municipal basic compulsory schools has increased by 62 percent. At upper secondary schools, the increase has been 31 percent, within adult education 41 percent, and at schools for the developmentally disabled, 25 percent.

The number of computers and the number of pupils/students per computer vary among types of schools according to Table 1 below. Variation among municipalities is also large, as can be seen in the separate table appendix of this report.

Table 1: Computers used for teaching i different forms of schools

Computers used in teaching	1993	1995		1997	
	No.of students per computer	No. Of computers	No.of students per computer	No. of computers	No.of students per computer
Municipal compulsory school	38	45 013	19	72 899	13
Independent compulsory school		1 526	12	2 175	13
Municipal upper secondary school	10	38 053	8	49 960	6
County council upper secondary school	20	2 494	10	3 208	7
Independant upper secondary school		974	6	1 413	5
Local authority administered adult education	*	8 286	8	11 663	9
Municipal+county council special schools for the developmentally disabled	8	1 821	6	2 271	4
Independant schools for the developmentally disabled		48	5	47	7

Adult education for the developmentally disabled	388	6	314	8
Special school	196	4	209	4
National School for Adults	25	**	52	**
Schools for Sámi	16	8	40	4

* Information not avaible ** Not relevant measurement

Since 1993, an increasing proportion of computers has been placed in classrooms. Almost two-thirds of the computers used in teaching at the compulsory school level and four-fifths in the schools for the developmentally disabled are now found in classrooms. At upper secondary schools and adult education, however, more than two-thirds are still found in special computer rooms.

The number of schools who have access to Internet varies a great deal among different forms of schools, with the highest proportion in the municipal upper secondary schools (91 percent) and the lowest at adult education for the developmentally disabled (30 percent).

Between the years of 1995 and 1997, the number of teachers at basic compulsory school (adjusted to number of full-time positions) per computer has decreased from 12 to six. At municipal upper secondary schools, two teachers share one computer, and at the county council and independent upper secondary schools, there is now one computer per teacher.

Since 1995, the number of school boards/administrative bodies who submit that they have adopted some kind of IT strategy/action program for the field of computers has also increased substantially. Within municipal basic compulsory schools, upper secondary schools, and adult education, two-thirds or more reply that they have such a plan.

1. Background

In 1993 and 1995, the National Agency for Education conducted quantitative surveys of the availability of computers in schools. The studies were presented in 1996 in the Agency's Report no. 99, *Schools and Computers in 1995 – a quantitative survey.*

In Autumn, 1997, the study was repeated, with the same goal groups as in 1995. The study of 1993 covered the types of schools of basic compulsory school, upper secondary school, and schools for the developmentally disabled in municipalities and county councils. In 1995 and 1997, the studies also included adult education for the developmentally disabled, schools for Sámi, special schools, and the National School for Adults, including both public and independent (private) school boards or other administrative bodies.

The survey was carried out using a questionnaire that was sent to all school boards in October, 1997. Two reminders to send in the filled questionnaire were sent out in November and December. Each school board was expected to collect the data from their schools and compile the answers for each type of school. LK Statistics & Studies in Linköping has conducted the study and subsequent analysis, commissioned by the National Agency for Education.

The intent of the study was to provide a quantitative picture, based on the different types of schools and school boards, of the number of computers, their distribution as to computer make, their placement, and the availability of Internet and CD-ROM players. The questions concerned both computers used in teaching and computers for use by teachers only. Furthermore, each administrative body was asked if they have adopted an IT strategy/action program for the computer field.

Many school boards are in charge of several types of schools that use the same rooms and computers, i. e., the types of schools – at least from the point of view of this survey – are integrated. There are many different combinations of "computer-integrated" types of schools. The most common are: basic compulsory school–schools for the developmentally disabled, upper secondary school–local authority-administered adult education, upper secondary school–local authority-administered adult education–adult education for the developmentally disabled, and local authority-administered adult education–adult education for the developmentally disabled. Consideration for this has been taken in the analysis of the data. If, for instance, the upper secondary school and the local authority-administered adult education program in a

municipality share the same computers, the number of computers has been recorded under "municipal upper secondary schools," along with the total of the number of students and teachers in both types of schools.

Some of the results from municipal basic compulsory school and upper secondary schools are shown according to their category of municipality, following categories determined by the Swedish Association of Local Authorities.

In a separate table appendix, a summary of the responses per school board is shown.
In calculating the number of students and teachers per computer, the information used was the number of students/teachers that applied at the same time that the survey of the number of computers was being carried out, which was in October, 1997. The information covers the number of students and teachers administered by those school boards, with their various types of schools, that sent in their responses, subtracting the schools that were not included in the responses. The number of teachers has been adjusted to apply to full-time positions. At local authority-administered adult education, the number of students has been adjusted to apply to full-time students.

The number of responses was 1,865 of a total of 1,970 recipients of the questionnaires, which means that the response frequency was 94.7 percent in total. This in turn means that 97.1 percent of the total number of pupils/students is covered by the responses. The response frequency for the different kinds of schools and school boards is presented in Chapter 6.

Where possible, comparisons with the surveys of 1993 and 1995 have been made.

The study of 1997 comprises seven kinds of schools and six different kinds of school boards/administrative bodies. To make the presentation somewhat simpler and to make it easier to compare with the survey of 1993, the school types and the schools boards have been categorized as follows:

- Municipal basic compulsory school (including sub-municipalities as acting school boards)

- Schools for Sámi (Lapps) (basic compulsory school, under the administration of the Sámi State School Board)

- Independent (private) compulsory schools

- Municipal upper secondary schools, including associations of upper secondary schools as school boards

- County council upper secondary schools

- Independent (private) upper secondary schools

- Local authority-administered adult education. The administrative body can vary between municipality, county council or association of upper secondary schools.

- Municipal and county council schools for the developmentally disabled

- Independent (private) schools for the developmentally disabled

- Adult education for the developmentally disabled. The administrative body can either be a municipality or an association of upper secondary schools.

- Special schools (state school board)

- National School for Adults (state school board)

2. Computers for teaching

Questions 2 and 3 of the questionnaire concerned computers used in teaching.

Basic compulsory school (ages 7-16)

According to the responses to the questionnaire of 1997, there are just over 75,000 computers used for teaching in municipal, state (the Sámi school), and independent basic compulsory schools. Since 1995, the number of computers used in teaching within municipal basic compulsory schools has increased by 62 percent. The density of the computers has also risen significantly: the number of pupils per computer in municipal compulsory schools decreased from 19 to 13 between 1995 and 1997. In the private basic compulsory schools, too, the average was 13 pupils per computer in 1997, which is a slight increase since 1995, when it was 12. The fact that the number of pupils per computer in private basic compulsory schools has increased, despite an increase in the number of computers of 43 percent, is due to a marked increase in the number of pupils in private basic compulsory schools.

A majority of the computers, 91 percent on the municipal compulsory school level, are PCs (IBM-compatible personal computers), which means a continued increase in this proportion since 1995. The proportion of Macintosh computers has decreased to 8 percent, while computers of other makes have now in effect disappeared. At independent basic compulsory schools, Macs are somewhat more common than at municipal schools, but even here, there is a predominance of PCs.

In Table 2 and Diagrams 1-2, the total number of computers used in teaching and their distribution as to the particular kind of municipal and independent basic compulsory school are presented.

Table 2: Number of computers for teaching at the basic compulsory school level

Municipal basic compulsory school	1993 Number	1995 Number	1997 Number	Index 1997 (1995=100)
Number of computers	**21 143**	**45 013**	**72 899**	**162**
Number of pupils per computer	**38**	**19**	**13**	

Independent basic compulsory school		1995 Number	1997 Number	Index 1997 (1995=100)
Total		**1 526**	**2 175**	**143**
Number of pupils per computer		**12**	**13**	

Diagram 1: Make of computer used in teaching at municipal basic compulsory school

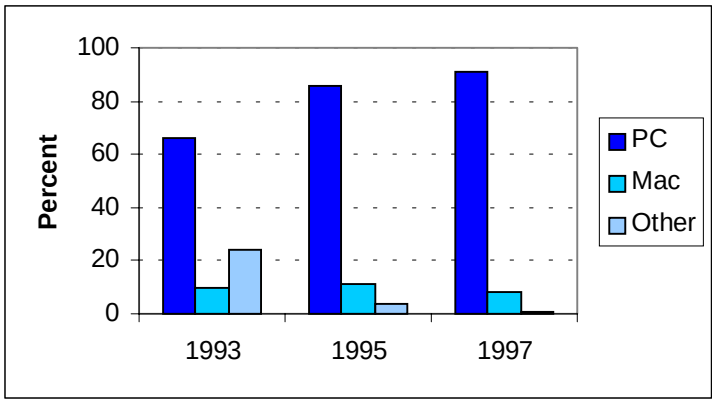
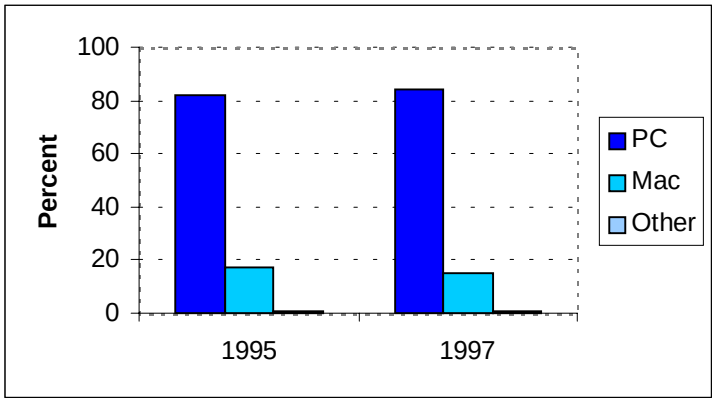


Diagram 2: Make of computer used in teaching at independent basic compulsory school



Computer density varies somewhat between different kinds of municipalities. In Table 3, the number of pupils per computer, grouped according to categories drawn up by the Swedish Association of Local Authorities, is shown. The pattern is pretty much the same for 1997 as for previous years – the more rural municipalities have the lowest number of pupils per computer. The differences between the municipal categories, however, have leveled off during the four-year period covered by the surveys.

Table 3: Number of pupils per computer within municipal basic compulsory education, according to category of municipality

Municipal basic compulsory school	Pupils per computer, 1993	Pupils per computer, 1995	Pupils per computer, 1997
Municipal category			

Cities*	54	22	12
Suburban municipalities	38	21	14
Large towns	39	18	14
Medium-large towns	39	19	13
Industrial municipalities	32	19	13
Rural municipalities	36	19	12
Sparsely-populated municipalities	23	14	8
Other large-size municipalities	37	21	12
Other small-size municipalities	34	22	12
Total	**38**	**19**	**13**

* No data available for Malmö in 1995

In Table 4, placement of the computers used in teaching at basic compulsory school is presented. At municipal basic compulsory schools, almost two-thirds of the computers are placed in classrooms, and in that case, do not usually belong to a local network. In total, more than one in every four computers is part of a local network. Since 1995, the number of computers placed in classrooms has increased.

At independent basic compulsory schools, the proportion of computers placed in the classroom has increased substantially, but it is still lower than at municipal compulsory schools.

The increase in the proportion of computers placed in classrooms can be explained by the fact that according to the present national curriculum, as opposed to the previous one, there is no separate subject called computer studies. Instead, the aim is for computers to become an integrated instrument in all subjects. Consequently, computers are needed in the classroom and not just in special computer rooms.

Table 4: Placement of computers used in teaching in basic compulsory education

Municipal basic compulsory school	1993 Percent	1995 Percent	1997 Percent
Computer room with local network	27	18	18
Computer room without local network	35	20	8
Classroom with local network	3	6	19
Classroom without local network	26	49	45
Other arrangement	10	7	9
Total	**100**	**100**	**100**

Independent basic compulsory school	1995 Percent	1997 Percent

Computer room with local network	35	17
Computer room without local network	17	11
Classroom with local network	11	22
Classroom without local network	32	29
Other arrangement	5	11
Total	**100**	**100**

In Table 5, placement of the computers used in teaching at municipal basic compulsory schools, grouped according to municipal category, is shown. The sparsely-populated municipalities and the "other large-size municipalities" have a higher share of computers with local networks than the other municipal categories.

Table 5: Placement of computers used in teaching in municipal basic compulsory education, grouped according to municipal category, 1997

Municipal basic compulsory school	Computer room with local network	without local network	Classroom with local network	without local network	Other arrangement
Municipal category 1997	Percent	Percent	Percent	Percent	Percent
Cities	17	12	21	41	9
Suburban Municipalities	18	9	14	47	11
Large towns	17	8	21	45	9
Medium-large towns	18	6	17	50	9
Industrial municipalities	21	10	12	49	9
Rural municipalities	19	7	23	45	7
Sparsely-populated municipalities	22	7	28	28	16
Other large-size municipalities	17	7	30	36	10
Other small-size municipalities	21	7	16	49	7
Total	**18**	**8**	**19**	**45**	**9**

Upper Secondary School (*Gymnasium*)

According to the responses to the survey of 1997, a total of over 54,000 computers are being used for teaching on the upper secondary school level (*gymnasium*, approx. ages 17-19). Since 1995, the number of computers used in teaching has increased by 31 percent within the municipal upper secondary

schools and 29 percent within the county council upper secondary schools. The ratio of students per computer at municipal upper secondary schools has decreased from eight to six and at the county council upper secondary schools from ten to seven between 1995 and 1997. At independent upper secondary schools, the ratio of students per computer has decreased from six to five.

A majority of the computers, more than 90 percent at the municipal and county council upper secondary schools, are PCs, which is a relatively unchanged figure since 1993. The proportion of Macintosh computers has increased, while computers of other makes have more or less disappeared. At independent upper secondary schools, Macintosh is considerably more common than at the municipal and county council upper secondary schools, but even there, PCs are in the majority.

In Table 6, the number of computers used in teaching and the distribution of the different makes within municipal, county council, and independent upper secondary schools can be seen.

Table 6: Number of computers used in teaching in upper secondary schools

Municipal upper secondary school	1993 Number	1995 Number	1997 Number	Index 1997 (1995=100)
Number of computers	**22 728**	**38 053**	**49 960**	**131**
Number of pupils per computer	**10**	**8**	**6**	

County council upper secondary schools	1993	1995 Number	1997 Number	Index 1997 (1995=100)
Total	**1 463**	**2 494**	**3 208**	**129**
Number of pupils per computer	**20**	**10**	**7**	

Independent upper secondary schools	1995 Number	1997 Number	Index 1997 (1995=100)
Total	**974**	**1 413**	**145**
Number of pupils per computer	**6**	**5**	

Diagram 5: Make of computer used in teaching at municipal upper secondary schools

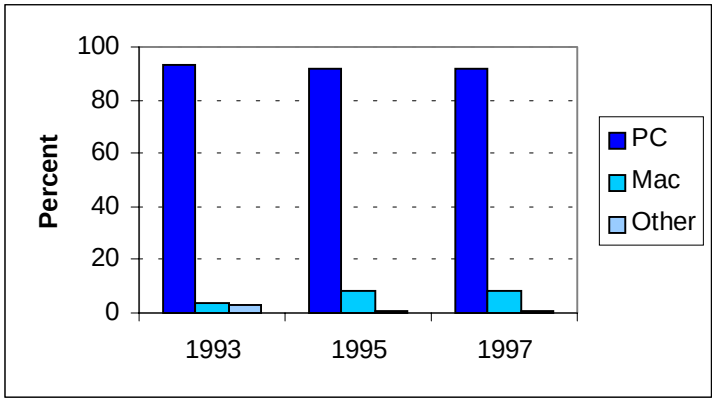


Diagram 6: Make of computer used in teaching at county council upper secondary schools

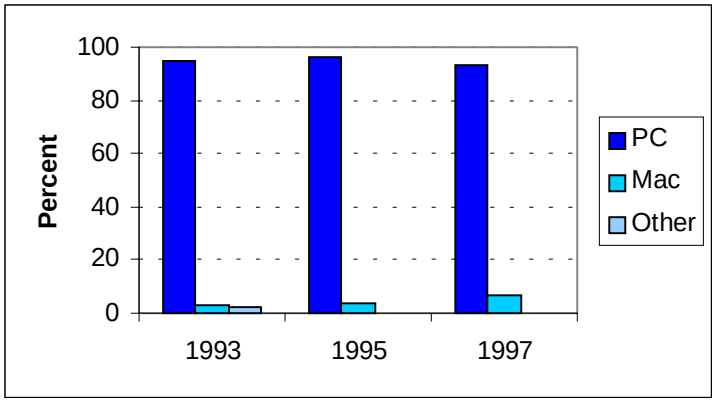
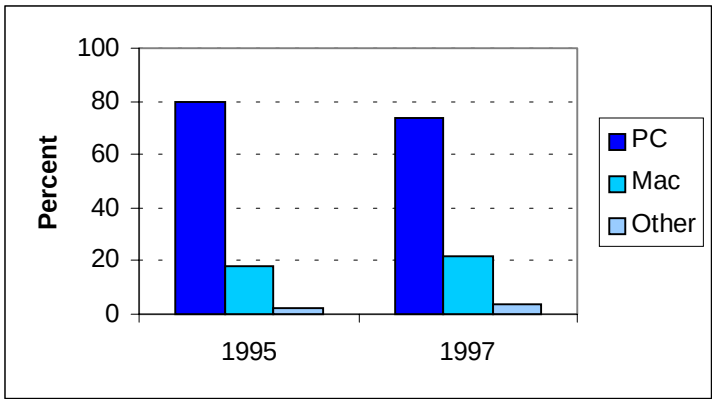


Diagram 7: Make of computer used in teaching at independent upper secondary schools



In upper secondary schools, too, computer density varies somewhat between municipalities of different kinds. In Table 7, the number of students per computer at municipal upper secondary schools is shown, grouped according to categories drawn up by the Swedish Association of Local Authorities. Urban areas have the highest ratio of students per computer; in other areas, the differences are slight.

Table 7: Number of students per computer at municipal upper secondary schools, divided into municipal category

Municipal upper secondary school Category of municipality	Students per computer 1993	Students per computer 1995	Students per computer 1997
Cities*	13	19	10
Suburban municipalities	12	9	7
Large towns	11	8	6
Medium-large towns	10	8	6
Industrial municipalities	6	5	5
Rural municipalities	8	6	6
Sparsely-populated Municipalities	7	5	5
Other large-size municipalities	11	7	6
Other small-size municipalities	6	4	5
Association of upper secondary schools		8	7
Total	**10**	**8**	**6**

*Data from Göteborg not available in 1993

In Table 8, the placement of the computers used in teaching in upper secondary education is presented. Most of the computers – two out of three within municipal and county council upper secondary schools – have been placed in computer rooms. A majority are also connected to local networks. Relatively few computers are placed in classrooms. Since 1995, the number of computers used in local networks has increased.

The number of computers placed in computer rooms is thus, despite a slight decrease, still rather high, as opposed to basic compulsory school. The reason for this could be that most upper secondary schools have special educational programs that include computer subjects, or else have courses that require that each student in a particular class has access to a computer.

Table 8: Placement of computers used in teaching at upper secondary schools

Municipal upper secondary schools	**1993** Percent	**1995** Percent	**1997** Percent
Computer rooms with local Network	47	59	64
Computer rooms without local network	34	18	6
Classrooms with local network	2	6	16
Classrooms without local network	10	14	8

Other arrangement	6	4	7
Total	**100**	**100**	**100**

County council upper secondary schools	1993 Percent	1995 Percent	1997 Percent
Computer rooms with local network	26	40	50
Computer rooms without local network	61	35	17
Classrooms with local network	0	4	10
Classrooms without local network	5	13	8
Other arrangement	8	8	16
Total			

Independent upper secondary schools	1995 Percent	1997 Percent
Computer rooms with local network	57	43
Computer rooms without local network	12	11
Classrooms with local network	14	30
Classrooms without local network	10	4
Other arrangement	8	13
Total	**100**	**100**

In Table 9, placement of computers used in teaching at municipal upper secondary schools according to category of municipality is presented. The number placed in computer rooms and the number with local networks is especially high in cities and suburban municipalities.

Table 9: Placement of computers used in teaching at municipal upper secondary schools according to category of municipality 1997

Municipal upper secondary school	Computer rooms		Classrooms		Other arrangement
Category of municipality 1997	With local network Percent	Without local network Percent	With local network Percent	Without local network Percent	Percent
Cities	75	6	9	8	3
Suburban municipalities	74	2	17	3	4
Large towns	61	7	20	7	5
Medium-large towns	65	5	13	9	8

Industrial municipalities	56	6	13	14	11
Rural municipalities	49	7	13	13	18
Sparsely-populated municipalities	54	4	26	6	10
Other large-size municipalities	61	7	16	6	10
Other small-size municipalities	67	3	10	7	13
Association of upper secondary schools	66	7	10	11	5
Total	**64**	**6**	**16**	**8**	**7**

Local authority-administered adult education (komvux)

According to the survey of 1997, there was a total of almost 11,700 computers for use in teaching at local authority-administered adult education, *komvux*. Since 1995, the number of computers used in teaching in this kind of adult education has increased by 41 percent. Adjusting the number of students in adult education as of October 15, 1997 to correspond to full-time studies, the figure for full-time students per computer comes to eight. This increase is due to the fact that full-time studies in local authority-administered adult education have increased a full 78 percent from 1995 to 1997 – in other words, much faster than the number of computers.

Within many school boards, the computer equipment for local authority-administered adult education and upper secondary schools is the same. In these cases, the data for the adult education schools are included in the data for upper secondary schools.

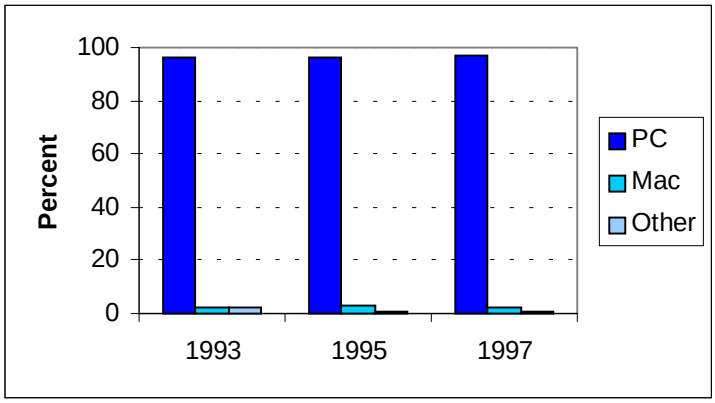
Almost all of the computers used for teaching at local authority-administered adult education schools are PCs.

From Table 10 and Diagram 11, the number of computers used for teaching and their distribution within different kinds of adult education can be seen.

Table 10: Number of computers used in teaching within adult education

	1993 Number	1995 Number	1997 Number	Index 1997 (1995=100)
Number of computers	**4 417**	**8 286**	**11 663**	**141**
Number of pupils per computer		**8**	**9**	

Diagram 11: Make of computer used in teaching within local authority-administered adult education



In Table 11, placement of computers used in teaching within local authority-administered adult education is shown. A majority of the computers are placed in computer rooms and are part of a local network. Relative few are placed in classrooms. Since 1995, the number of computers that are part of local networks has increased.

Table 11: Placement of computers used in teaching within local authority-administered adult education

Local authority-administered adult education	1993 Percent	1995 Percent	1997 Percent
Computer room with local network	50	62	73
Computer room without local network	39	19	8
Classroom with local network	0	4	9
Classroom without local network	7	11	5
Other arrangement	3	4	5
Total	**100**	**100**	**100**

Schools for the developmentally disabled *(särskola)*

According to the survey of 1997, approximately 2,300 computers are available for use in teaching at schools for the developmentally disabled. Since 1995, the number of computers used in teaching at municipal and county council schools for the developmentally disabled has increased by 25 percent. The ratio of students per computer in the municipal and county council schools for the developmentally disabled has decreased from six to four between 1995 and 1997. At independent schools for the developmentally disabled, there was an average of seven students per computer in 1997.

In those cases where schools for the developmentally disabled and basic compulsory schools have computer equipment in common, the schools for the developmentally disabled are included in the data for basic compulsory schools.

Most of the computers, over 90 percent, are PCs, which is an increase since 1995.

In Table 12 and Diagrams 13-14, the number of computers used in teaching and their distribution according to municipal, county council, or independent school for the developmentally disabled is presented.

Table 12: Number of computers used in teaching at schools for the developmentally disabled

Municipal+county council schools for the developmentally disabled	1993	1995	1997	Index 1997
	Number	Number	Number	(1995=100)
Number of computers	**1 294**	**1 821**	**2 271**	**125**
Number of pupils per computer	**8**	**6**	**4**	

Independent schools for the developmentally disabled	1995	1997	Index 1997
	Number	Number	(1995=100)
Number of computers	**48**	**47**	**98**
Number of pupils per computer	**5**	**7**	

Diagram 13: Make of computer used in teaching in municipal and county council schools for the developmentally disabled

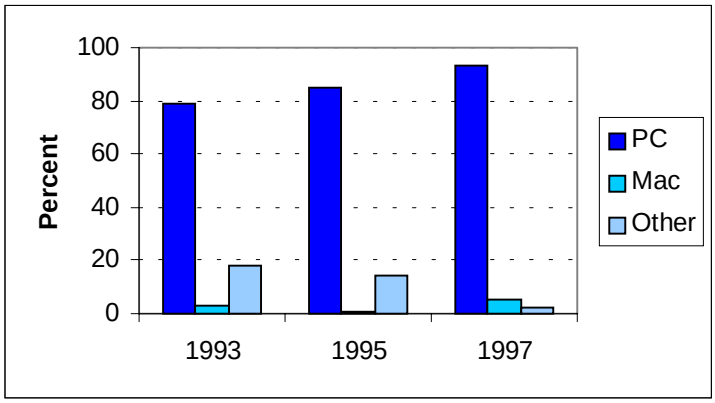
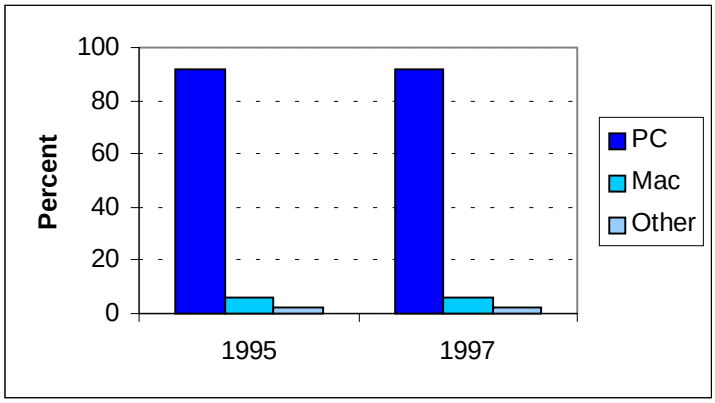


Diagram 14: Make of computer used in teaching in independent schools for the developmentally disabled



In Table 13, placement of the computers used in teaching at schools for the developmentally disabled is shown. Most of the computers are placed in classrooms and are usually not included in local networks. Only a small number of computers are in computer rooms, with or without local networks. Since 1995, the number of computers placed in classrooms has increased slightly.

Table 13: Placement of computers used in teaching at schools for the developmentally disabled

Municipal+county council schools for the develop-mentally disabled	1993 Percent	1995 Percent	1997 Percent
Computer room with local network	10	10	8
Computer room without local network	13	8	6
Classroom with local network	5	11	18
Classroom without local network	63	68	64
Other arrangement	10	3	5
Total	**100**	**100**	**100**

Independent schools for the developmentally disabled	1995 Percent	1997 Percent
Computer room with local network	45	0
Computer room without local network	18	19
Classroom with local network	0	0
Classroom without local network	29	75
Other arrangement	8	6
Total	**100**	**100**

Other types of schools

In Table 14, the number of computers used in teaching and their distribution as to type of school, such as adult education for the developmentally disabled, special school, the National School for Adults, and schools for Sámi (Lapps), can be seen. These latter schools comprise six basic compulsory schools, whose administrative body is the state Sámi School school board.

In many school board domains, the same computers are available for adult education for the developmentally disabled as for local authority-administered adult education and/or upper secondary schools. Data from adult education for the developmentally disabled is then included in those schools' data.

Concerning the Swedish National School for Adults, the data for "students per computer" is not shown in the table, since this unit of measurement is not relevant to this school form.

Table 14: Number of computers used in teaching in other types of schools

Adult education for the developmentally disabled	1995 Number	1997 Number	Index 1997 (1995=100)
Number of computers	**388**	**314**	**81**
Number of students per computer	**6**	**8**	

Special schools	1995 Number	1997 Number	Index 1997 (1995=100)
Number of computers	**196**	**209**	**107**
Number of students per computer	**4**	**4**	

National School for Adults	1995 Number	1997 Number	Index 1997 (1995=100)
Number of computers	**25**	**52**	**208**

Schools for Sámi	1995 Number	1997 Number	Index 1997 (1995=100)
Total	**16**	**40**	**250**
Number of students per computer	**7**	**4**	

In special schools and the National School for Adults, all of the computers used in teaching are PCs. The corresponding percentage for adult education for the developmentally disabled is 97 percent and for schools for Sámi, 75 percent. In the Sámi schools, the percentage of computers that are Macs has increased from six percent in 1995 to 23 percent in 1997.

In Table 15, placement of the computers used in teaching at other types of schools is shown. At adult education for the developmentally disabled and at

Sámi schools, most of the computers are placed in classrooms. A majority are not connected to a local network. In special schools, over half of the computers are placed in classrooms, and a majority are connected to a local network. At the National School for Adults, most of the computers are to be found in computer rooms and are connected to a local area network.

Table 15: Placement of computers used in teaching at other types of schools

Adult education for the developmentally disabled	1995 Percent	1997 Percent
Computer room with local network	41	11
Computer room without local network	12	9
Classroom with local network	4	17
Classroom without local network	40	62
Other arrangement	4	1
Total	**100**	**100**

Special schools		
	Percent	Percent
Computer room with local network	12	36
Computer room without local network	16	2
Classroom with local network	10	42
Classroom without local network	58	19
Other arrangement	3	1
Total	**100**	**100**

National School for Adults	1995 Percent	1997 Percent
Computer room with local network	64	90
Computer room without local network	0	0
Classroom with local network	0	0
Classroom without local network	8	0
Other arrangement	28	10
Total	**100**	**100**

Schools for Sámi	1995 Percent	1997 Percent
Computer room with local network	0	0
Computer room without local network	19	0
Classroom with local network	0	45
Classroom without local network	75	48
Other arrangement	6	8
Total	**100**	**100**

3. Computers for teachers' use only

Question 1 of the survey dealt with computers for use by teachers only.

Basic compulsory school

According to the survey of 1997, there are 11,500 computers used only by teachers at the basic compulsory school level. Since 1995, the number of teachers' computers within municipal compulsory school has increased by 66 percent. A majority of the computers, 90 percent in the municipal compulsory schools, are PCs, which is an increase since 1995. The proportion of Macintoshes has decreased somewhat.

Computer density has continued to increase, and in the municipal basic compulsory school, the number of teachers (adjusted to number of full-time positions) per computer for teacher use has decreased from 12 to 16 between 1995 and 1997. At independent basic compulsory schools, the number of teachers per this kind of computer has decreased from six to four.

In Table 16 and Diagrams 21-22, the number of teachers' computers and the distribution of different makes at municipal and independent basic compulsory schools can be seen.

Table 16: Number of computers for use by teachers in basic compulsory schools

Municipal compulsory school	1993 Number	1995 Number	1997 Number	Index 1997 (1995=100)
Number of computers	**2 764**	**6 632**	**11 020**	**166**
Number of teachers per computer	**27**	**12**	**6**	

Independent compulsory school		1995 Number	1997 Number	Index 1997 (1995=100)
Total		**268**	**517**	**193**
Number of teachers per computer		**6**	**4**	

Diagram 21: Make of teachers' computers within basic compulsory schools

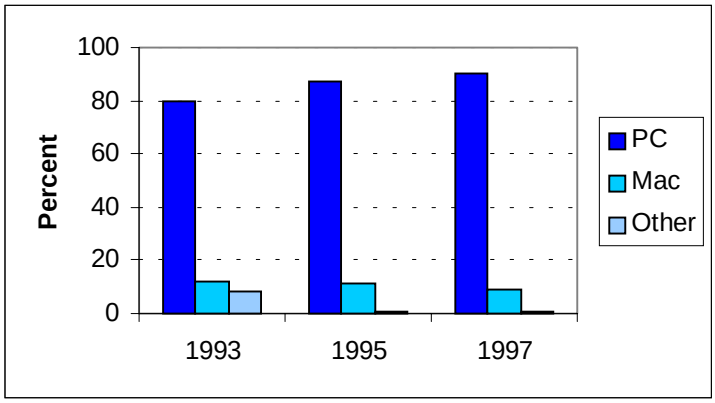
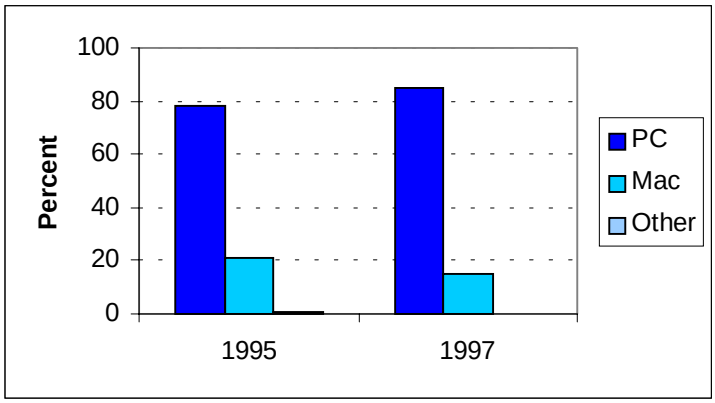


Diagram 22: Make of teachers' computers within independent basic compulsory schools



Upper secondary school

In the upper secondary schools, according to the survey of 1997, there is a total of approximately 13,000 computers reserved for use by teachers. Since 1995, the number of teachers' computers within municipal upper secondary schools has increased by 51 percent, those run by county councils by 35 percent, and those that are run independently by 41 percent. A majority of the computers, 94 percent at the municipal upper secondary schools, are PCs, which is an increase since 1995. The proportion of Macintoshes has decreased somewhat, even at independent schools, where they nonetheless still comprise a quarter of the teachers' computers.

Between 1995 and 1997, the number of teachers per computer has decreased from three to two at municipal upper secondary schools. At independent and county council upper secondary schools, computer density is one teacher per computer.

In Table 17 and Diagrams 23-25, the number of teachers' computers and the distribution of different makes at municipal, county council, and independent upper secondary schools can be seen.

Table 17: Number of computers for use by teachers at upper secondary schools

Municipal upper secondary school	1993 Number	1995 Number	1997 Number	Index 1997 (1995=100)
Number of computers	**2 924**	**7 362**	**11 096**	**151**
Number of teachers per computer	**7**	**3**	**2**	

County council upper secondary schools	1993	1995 Number	1997 Number	Index 1997 (1995=100)
Total	**480**	**1 169**	**1 581**	**135**
Number of teachers per computer	**5**	**3**	**1**	

Independent upper secondary schools		1995 Number	1997 Number	Index 1997 (1995=100)
Total		**235**	**331**	**141**
Number of teachers per computer		**2**	**1**	

Diagram 23: Make of teachers' computers within municipal upper secondary schools

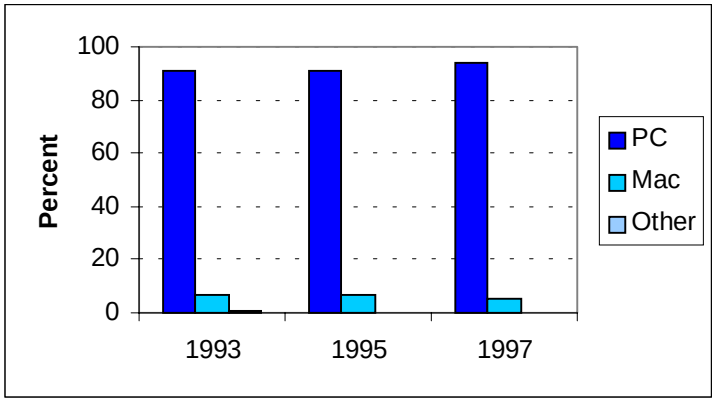


Diagram 24: Make of teachers' computers within county council upper secondary schools

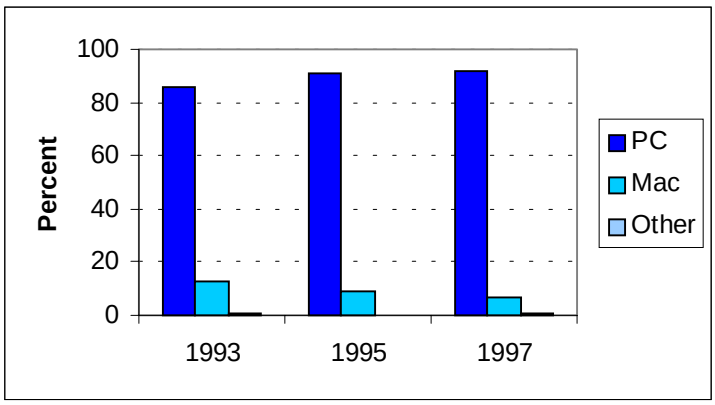
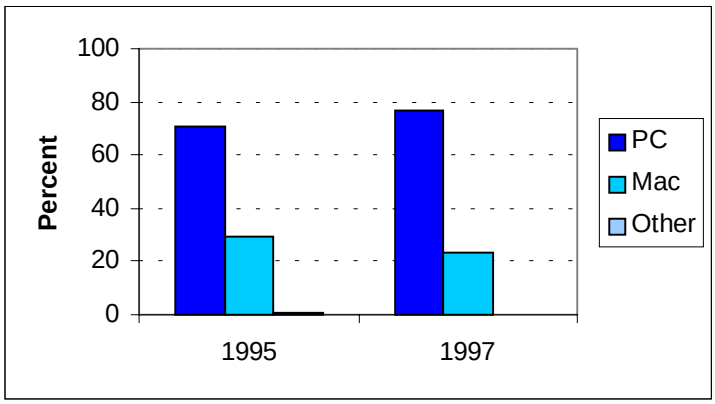


Diagram 25: Make of teachers' computers within independent upper secondary schools



Local authority-administered adult education *(komvux)*

According to the survey of 1997, there was a total of just under 2,400 computers for teachers' use only within local authority-administered adult education *(komvux)*. Since 1995, the number of teachers' computers at local authority-administered adult education has increased by 65 percent. Almost all of the computers are PCs.

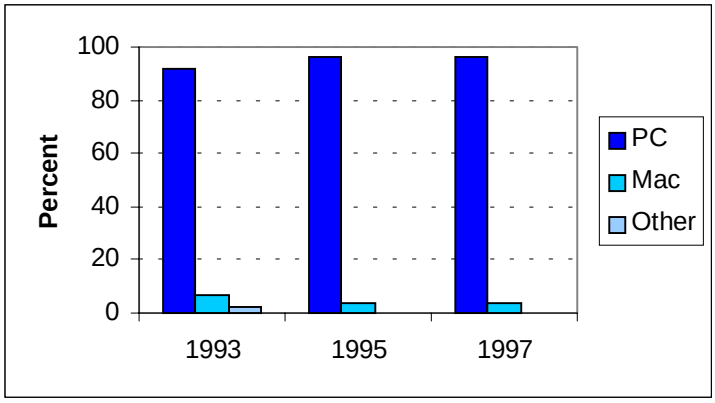
The number of teachers per computer is two for both 1995 and 1997.

In Table 18 and Diagram 26, the number of teachers' computers and the distribution of different makes within local authority-administered adult education can be seen.

Table 18: Number of computers for use by teachers within local authority-administered adult education

	1993 Number	1995 Number	1997 Number	Index 1997 (1995=100)
Number of computers	**471**	**1 432**	**2 364**	**165**
Number of teachers per computer	**9**	**2**	**2**	

Diagram 26: Make of teachers' computers within local authority-administered adult education



Schools for the developmentally disabled

In total, according to the survey of 1997, there were almost 400 computers reserved for use by teachers in schools for the developmentally disabled. Since 1995, the number of teachers' computers within the municipal and county council schools for the developmentally disabled has increased by 91 percent. Almost all of the computers in these schools were PCs, while the small number of independent schools for the developmentally disabled had a high proportion of Macintosh computers.

Computer density in schools for the developmentally disabled has previously been low regarding computers for use by teachers only. The number of teachers per computer has nonetheless decreased between 1995 and 1997 from 15 to 7 at municipal and county council schools for the developmentally disabled. For independent schools for the developmentally disabled, reliable statistics of the number of teachers per computer are not available.

In Table 19 and Diagrams 27-28, the number of teachers' computers and the distribution of different makes within municipal, county council, and independent schools for the developmentally disabled is shown.

Table 19: Number of computers for teachers' use in schools for the developmentally disabled

Municipal+county council schools for the developmentally disabled	1993	1995	1997	Index 1997
	Number	Number	Number	(1995=100)
Number of computers	**109**	**186**	**356**	**191**
Number of teachers per computer	**29**	**15**	**7**	

Independent schools for the developmentally disabled	1995	1997	Index 1997
	Number	Number	(1995=100)
Number of computers	**17**	**19**	**1128**

Diagram 27: Make of teachers' computers within municipal and county council schools for the developmentally disabled

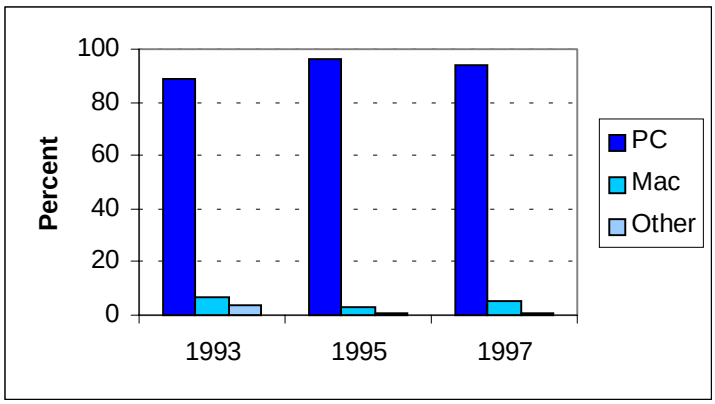
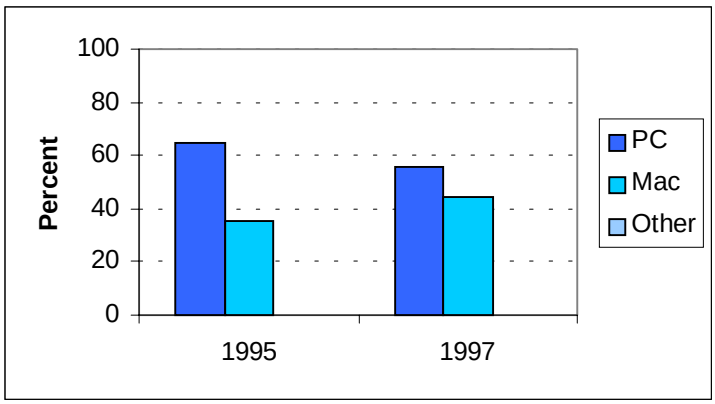


Diagram 28: Make of teachers' computers within independent schools for the developmentally disabled



Other types of schools

Table 20 shows the number of teachers' computers and the distribution of different makes within the schools of adult education for the developmentally disabled, special schools, the National School for Adults, and schools for Sámi.

Table 20: Number of computers for use by teachers within other types of schools

Adult education for the developmentally disabled	1995 Number	1997 Number	Index 1997 (1995=100)
Number of computers	**64**	**57**	**89**

Special schools	1995 Number	1997 Number	Index 1997 (1995=100)
Number of computers	**59**	**40**	**68**
Number of teachers per computer	**5**	**7**	

National School for Adults	1995 Number	1997 Number	Index 1997 (1995=100)
Number of computers	**10**	**80**	**800**
Number of teachers per computer		**1**	

Schools for Sámi	1995 Number	1997 Number	Index 1997 (1995=100)
Total	**6**	**6**	**100**
Number of teachers per computer	**4**	**4**	

At the National School for Adults and the schools for Sámi, all of the teachers' computers are PCs. The corresponding percentage is 98 for adult education for the developmentally disabled and 97 for special schools.

4. Internet and CD-ROM

Question 4 of the survey dealt with the availability of Internet and CD-ROM for computers used in teaching. As opposed to earlier sections of the survey, here the question asked was both how many computers there were and *how many schools.*

Table 21 shows how many schools and computers have access to Internet within each type of school.

More than half of all the basic compulsory schools are connected to Internet. Of the municipal upper secondary schools, 91 percent are connected to Internet, while the proportion is lower in county council and independent upper secondary schools. Within local authority-administered adult education, 69 percent of the schools have Internet connections, while schools for the developmentally disabled and adult education for the developmentally disabled have lower shares – less than one school in three.

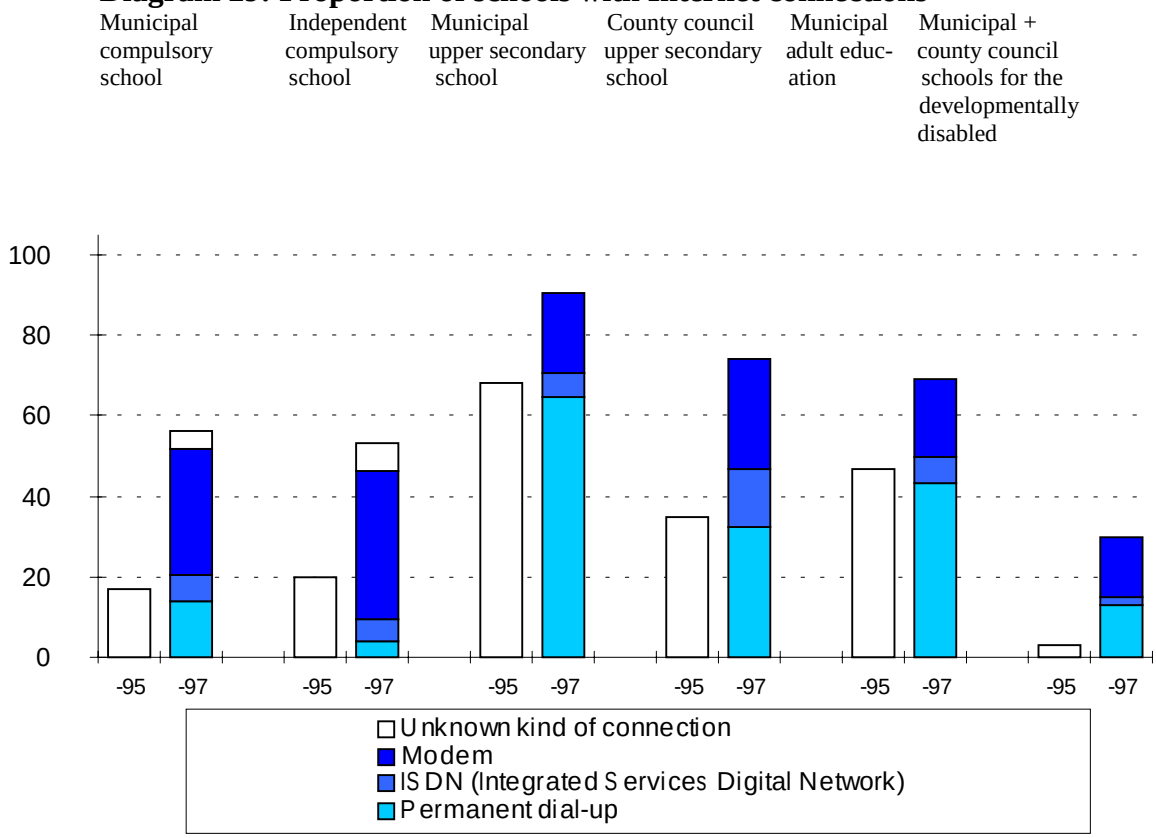
Table 21: Access to Internet

	1995 Percentage of schools with Inter-net	1997 Percentage of schools with Internet	Computers with Internet
	Percent	Percent	Percent
Municipal compulsory school	17	56	31
Independent compulsory school	20	53	49
Municipal upper secondary school	68	91	67
County council upper secondary School	35	74	52
Independent upper secondary school	40	69	58
Local authority-administered adult education	47	69	70
Municipal+county council special schools for the developmentally disabled	3	30	25
Independent schools for the developmentally disabled	23	39	91
Adult education for the develop-mentally disabled	14	19	24
Special school	38	86	63
National School for Adults	50	100	100
Schools for Sámi	0	100	38

Within municipal upper secondary schools and adult education, a majority of the schools with access to Internet have a permanent dial-up. In basic compulsory schools, on the other hand, there is a predominance of connections

via modems. The distribution of the six largest school types is shown in Diagram 29.

Diagram 29: Proportion of schools with Internet connections



There are CD-ROM players in about two out of three basic compulsory schools. Most municipal upper secondary schools have CD-ROM, but at the county council and independent upper secondary schools, as at local authority-administered adult education, the numbers are smaller. In schools for the developmentally disabled, CD-ROMs are still fairly uncommon.

Table 22: Access to CD-ROM players

	1995	1997	
	Proportion of schools with CD-ROM Percent	Proportion of schools with CD-ROM Percent	Proportion of computers with CD-ROM Percent
Municipal compulsory school	61	65	52
Independent compulsory school	50	64	55
Municipal upper secondary school	84	83	38
County council upper secondary school	60	73	36
Independant upper secondary school	51	66	61

Local authority administered adult education	64	71	45
Municipal+county council special schools for the developmentally disabled	34	56	49
Independant schools for the developmentally disabled	23	39	68
Adult education for the developmentally disabled	41	30	36
Special school	75	86	63
National School for Adults	50	100	71
Schools for Sámi	33	100	35

5. IT strategy/action program

Question 5 of the survey was: *Does your school board or other administrative body have an IT strategy/action program for the computer field?* The question concerned plans that have been adopted by the board or other committee. There were three response choices to choose from:

YES, a separate plan has been adopted
YES, as part of the school plan
NO

Table 23 shows the answers from the different kinds of administrative bodies and types of schools in 1997 and compares them with the answers from 1993 and 1995. Since 1995, the proportion of administrative bodies who report that they have a plan has increased substantially throughout. Within municipal basic compulsory school, upper secondary school, local authority-administered adult education, and schools for the developmentally disabled, two-thirds or more now answer that they have a plan. A low proportion of plans – less than one-third – are reported from independent schools.

In some municipalities, the answers regarding basic compulsory school could not be interpreted on an administrative-body level (municipal council), since separate sub-municipalities have submitted different answers.

Table 23: School boards/administrative bodies that have adopted IT strategies/action programs for the computer field

Municipal compulsory school	1993 Percent	1995 Percent	1997 Percent
Specially adopted plan	11	35	68
Part of school plan	6	10	9
No plan	75	43	15
No information available	8	10	5
Different answers from sub-municipalities		3	3
Total	**100**	**100**	**100**

Independent compulsory school	1995 Percent	1997 Percent
Specially adopted plan	16	18
Part of school plan	14	12
No plan	62	56
No information available	7	14
Total	**100**	**100**

Municipal upper secondary school	1993 Percent	1995 Percent	1997 Percent
Specially adopted plan	9	35	56
Part of school plan	4	9	10
No plan	63	41	16
No information available	23	14	19
Total	**100**	**100**	**100**

County council upper secondary school	1993 Percent	1995 Percent	1997 Percent
Specially adopted plan	33	38	55
Part of school plan	13	0	5
No plan	47	52	36
No information available	7	10	5
Total	**100**	**100**	**100**

Independent upper secondary school		1995 Percent	1997 Percent
Specially adopted plan		22	16
Part of school plan		6	13
No plan		57	55
No information available		14	15
Total		**100**	**100**

Municipal adult education	1993 Percent	1995 Percent	1997 Percent
Specially adopted plan	8	32	62
Part of school plan	3	6	9
No plan	41	40	15
No information available	48	22	14
Total	**100**	**100**	**100**

Municipal+county council school for the developmentally disabled	1993 Percent	1995 Percent	1997 Percent
Specially adopted plan	5	40	59
Part of school plan	5	13	10
No plan	62	28	11
No information available	28	19	19
Total	**100**	**100**	**100**

Independent special school for the developmentally disabled		1995 Percent	1997 Percent
Specially adopted plan		0	6
Part of school plan		8	0
No plan		85	56

No information available	8	38
Total	**100**	**100**

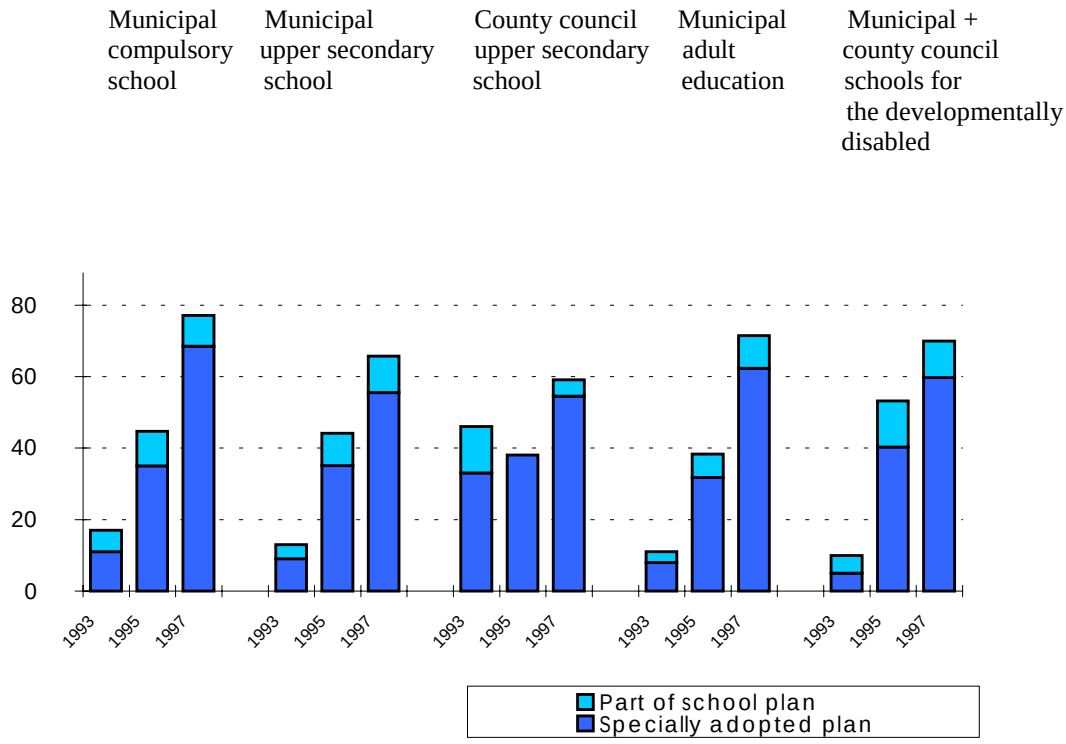
Adult education for the developmentally disabled	1995 Percent	1997 Percent
Specially adopted plan	32	39
Part of school plan	10	7
No plan	36	13
No information available	23	41
Total	**100**	**100**

Special schools 8 school boards, 8 schools	1995 Percent	1997 Percent
Specially adopted plan	13	43
Part of school plan	0	0
No plan	50	43
No information available	38	14
Total	**100**	**100**

National School for Adults 1 school board, 2 schools	1995 Percent	1997 Percent
Specially adopted plan	0	0
Part of school plan	0	0
No plan	100	100
No information available	0	0
Total	**100**	**100**

Schools for Sámi 1 school board, 6 schools	1995 Percent	1997 Percent
Specially adopted plan	0	100
Part of school plan	0	0
No plan	100	0
No information available	0	0
Total	**100**	**100**

Diagram 30: Proportion of school boards/administrative bodies with IT strategies/action programs for the computer field



6. Response frequency

The questionnaire of 1997 was sent to a total of 1,970 recipients, covering seven types of schools and six kinds of school boards. The number of respondents was 1,865, which means that responses came from 94.7 percent. This percentage represents approximately 97.1 percent of the total number of students covered by these particular administrative bodies.

The response frequency varied between different sub-groups as can be discerned in Table 24. The fact that the number of responses within the municipal basic compulsory schools is larger than the number of municipalities in Sweden is due to the fact that in some municipalities, the questionnaire was sent to sub-municipal councils in charge of some basic compulsory schools.

Table 24: Response frequency for different sub-groups

	1993		1995		1997	
Response frequency	No. of responses	Percent	No. of responses	Percent	No. of responses	Percent
Municipal compulsory school	258	90	349	97,2	388	96,8
Independent compulsory school			206	95,4	294	92,7
Municipal upper secondary school	184	89	255	92,7	269	95,7
County council upper secondary school	17	74	22	100	22	95,7
Independant upper secondary school			70	90,9	83	90,2
Local authority-administered adult education	231		281	93,4	290	96
Municipal+county council special schools for the developmentally disabled	112		151	90,4	257	93,5
Independent schools for the developmentally disabled			15	88,2	24	96
Adult education for the developmentally disabled			175	91,6	228	93,8
Special school			8	100	7	87,5
National School for Adults			1	100	2	100
Schools for Sámi			1	100	1	100
Total			**1534**	**93,8**	**1865**	**94,7**

The response frequencies in 1995 and 1997 were exceptionally high. Thus, the reliability of the material should be good. The degree of comparability with the survey of 1993 is somewhat lower, but should nonetheless be relatively good for most questions, if the comparisons are limited to the national level.

In 1993, there was probably a “partial reduction of figures” of an unknown extent, consisting of answers from some school boards that did not correspond to each of the board’s respective types of schools. In 1995 and 1997, an effort was made to calculate the extent of this reduction. According to the school boards’ responses from 1997, this “partial reduction” comprised 162 schools, making up 1.6 percent of the total number of students of all types of schools

and school boards. This “partial reduction” has been subtracted in all of the calculations. The 105 school boards/administrative bodies that have not answered the survey at all comprise only 1.3 percent of the total number of students.

7. Survey questionnaire

Schools and Computers 1997

Complete questions and explanations for the questionnaire form

Check first that you are reporting on the correct type of school on the questionnaire form. The type of school is printed on the label in the upper right-hand corner. You should have received one report form for each type of school. If different types of schools share computer resources, please make a note of this on the extra lines provided below the label.

Question 1 **In total, how many computers were available for teacher use only, i. e. for teachers' pedagogical work, for example, for preparation and evaluation of classes, correcting tests, constructing teaching materials or databases, etc, on 15 October, 1997?**

Report only computers that the school board (employer) has supplied exclusively for use by teachers. The number of computers used in teaching is to be reported under Question 2.

Question 2 **How many computers were available for use in teaching in the schools per 15 October, 1997?**

Computers within each institution that were intended for use by teachers only or other computers used only by teachers for their personal work are to be reported under Question 1.

Question 3 **Where are the computers used in teaching placed?**

How many of the computers used in teaching according to Question 2 are placed in separate computer rooms, with or without local networks within the school, and how many computers for teaching use are placed in classrooms?

Question 4 **To what extent is there access to extern computer communication (Internet) and CD-ROM players?**

The intent is to find out the number of schools and computers that are connected to Internet, and if the connection occurs via modem, ISDN, or a permanent dial-up, and how many of them have Read-Only-Memory technology (CD-ROM players).

Question 5 **Does the school board/administrative body (municipality, county council, independent school, special school, and the National School for Adults) have an IT strategy or action program for the computer field?**

The question applies only to plans that have been officially adopted by a board or committee.

Question 6 **Comments and opinions.**

Refers to the specification of Note 2 in the questionnaire and other clarifications that the administrative body might find necessary.

Note! If the reported information does not cover all of the schools administered by the school board/administrative body, please make a note of the schools that have been excluded.