

2. Networked Learning

In order to assess electronic readiness according to the methodology [1] using Networked Learning component index the following data were used:

- 1) data from 104 questionnaires from comprehensive educational institutions and area departments of education, 12 questionnaires from higher educational establishments;
- 2) statistical information of the Main Informational-Analytical Center of Ministry of Education;
- 3) expert estimations of the level of ICT equipment of educational establishments.
- 4) 1759 visitors of the <tut.by> site assessed the following three indices, namely “Computer Access at the familiar To You Educational Institutions”, “Level of Using Computers in Curricula at the familiar To You Educational Institutions “ and “Level of computer skills of the familiar to you teachers”. The opinion poll may be regarded as a sociological survey. It incorporates opinions, expressed by the representatives of different scopes of activity, whereas the data from centralized questionnaires cover the ICT specialists’ opinions only. The report contains the appropriate index diagrams designed on the basis of the information gained from the both sources as they present perception of the problem from various points of view, the one of experts and another one of the population.

As for today two national programs aimed for educational system informatization have been adopted in Belarus:

1) Republican program for Educational System Informatization (approved by the Resolution of the Council of Ministers of the Republic of Belarus (Resolution No 129 dated 29.01.1998, revised edition of Resolution No 366 of the Council of Ministers of the Republic of Belarus dated 22.03.2002). Completion time: 1998-2006.

Its main purposes are:

- to raise the level of students’ skills in the field of modern networked industrial technologies;
- to develop and successfully apply networked educational technologies in the work of educational institutions;
- to create an appropriate hardware and software basis for the usage of modern networked technologies in training institutions and educational establishments;
- to rise the efficiency of the curricular and training process, improve the quality of training and education substantially;
- to create the system of informational support for education management.

2) The State Program for Formation of the Information Computer Network of the Educational System of the Republic of Belarus (BelNet) (approved by Resolution No 1813 issued by the Council of Ministers of the Republic of Belarus on 29.11.2000. Completion time: 2000-2002).

The purpose of this program is to provide equal footing for pupils/students and specialists in different educational institutions (first of all, at rural comprehensive schools) in obtaining knowledge and other essential educational information meeting up-to-date requirements, national and European standards.

In order to achieve the target it is required to:

- establish the republican system for building up and using networked educational informational resources;
- build up networked educational resources and integrate them into the national and international global computer networks;
- build up a proper logistics base and a networked infrastructure in order to integrate educational institutions into a united republican educational network, whereby providing a prompt access for students to Belarusian, Russian and international information resources.

2.1. Schools' Access to ICT

2.1.1. Computer availability at educational institutions

By the beginning of 2002 80.3 % of comprehensive educational institutions in the republic have been equipped with computers. About 22.1 % of the machines are up-to-date modern computers. The majority tends to be outdated and requires replacement. However, educational institutions at all educational levels mostly enjoy access to computers (Fig. 2.1). 8 % of educational institutions have more than one computer class. 11 % of educational institutions use at least one computer in management.

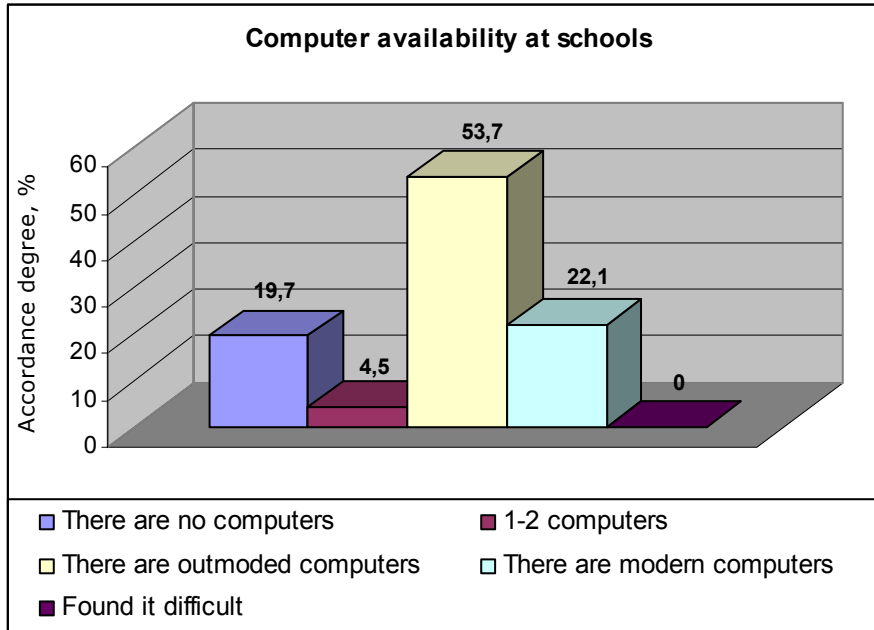


Fig. 2.1

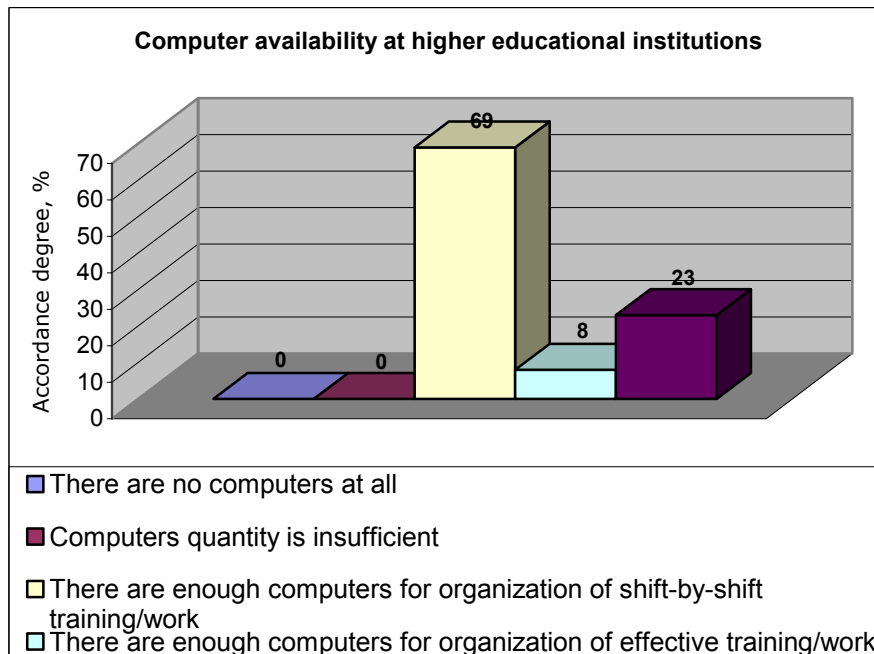


Fig. 2.2

Higher educational institutions of the republic are equipped enough to provide for shift-by-shift training (Fig. 2.2). The computerization of the curricular in higher schools is found to be at 69 % level. The same factor for management makes up 71 %. It is noteworthy, that there are much

more computers in higher schools for technical sciences as compared to those in higher schools for humanitarian sciences.

2.1.2. Computer affordability at educational institutions

The computer access in comprehensive educational institutions is usually available during academic hours. In schools, there are on the average 50 students per compute. A minor quantity of teachers uses computers during off-hour time in order to prepare for classes (Fig. 2.3). The number of educational institutions, which organize computer access in the extracurricular time, (operating with training program packages for different subjects, doing homework, PC game clubs, etc.) tends to increase.

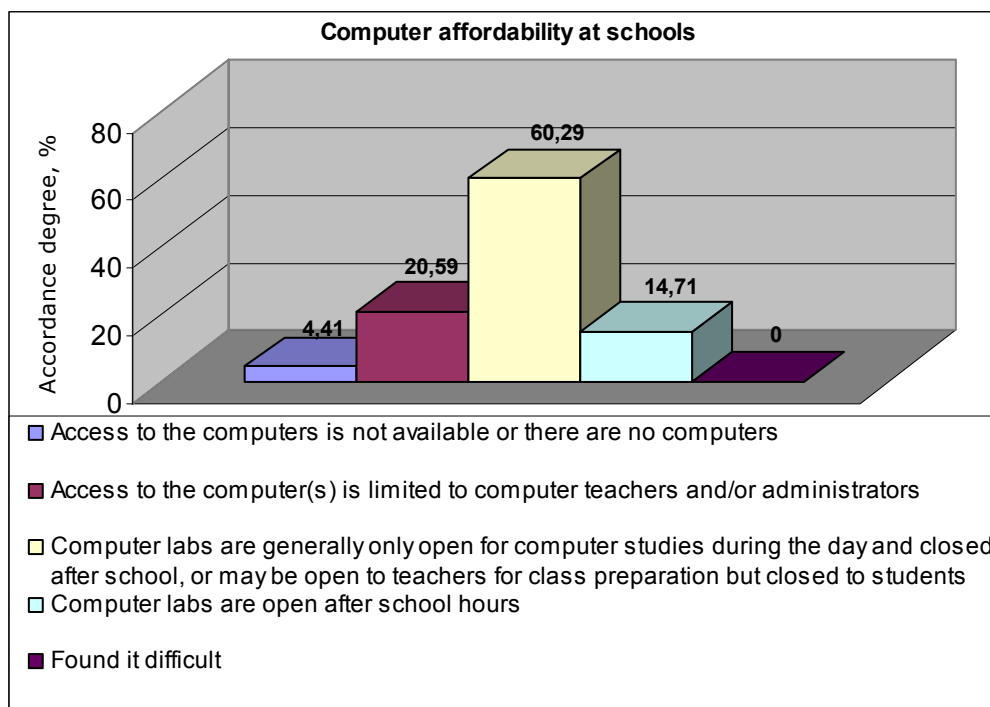


Fig. 2.3

The access to computers or computer hardware at higher schools is available both in the curricular and extracurricular time at no additional charge (Fig. 2.4). On the average, there are 22 full-time students per one up-to-date computer used in the curricular in higher schools. However, printers, scanners, digital cameral and other devices are rarely available to students and even to a significant portion of teachers.

The network of computer clubs was built up in the republic in order to expand access of the population to ICTs. Thus, there are 63 computer clubs and 25 publicly shared points of ICTs in Minsk, with its population of 1728.9 thousand people as of he beginning of 2003. There are about 8 thousand potential clients per one computer club in Minsk, in the towns of Bobruisk and Baranovichi this indicator exceeds 125 thousand clients.

Fig. 2.5 shows the results of the “Computer Access at the familiar To You Educational Institutions” Index assessment, one of the eighteen indexes, set in the poll at tut.by site according to [1]. 1759 visitors of the site (tut.by) responded, including 492 ICT specialists, 104 education and science representatives, 446 students and school children, 277 managers and 440 people engaged in other activities.

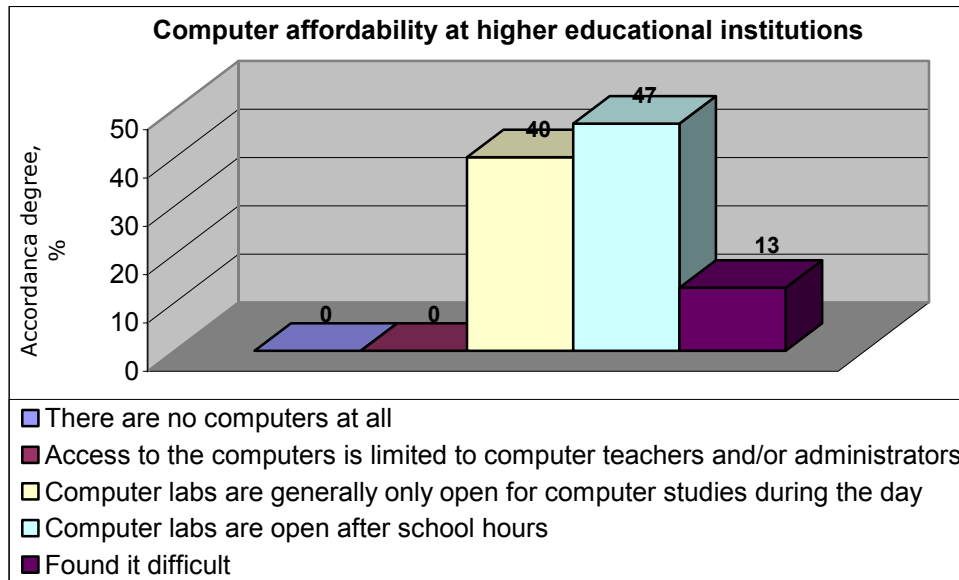


Fig. 2.4

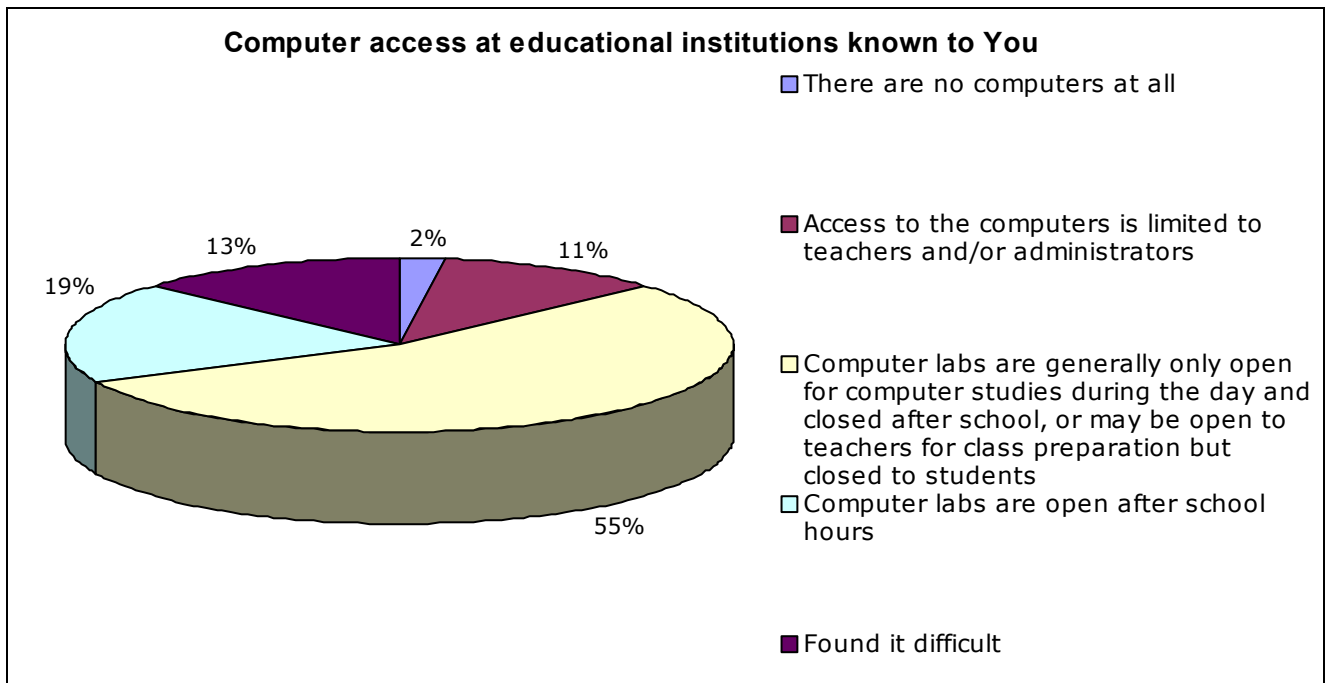


Fig. 2.5

2.1.3. Computers and local networks at education institutions

In order to maintain learning process the locally networked computers are usually installed at schools. The networks are basically one-loop. A dedicated server may be installed at some institutions, which provides access to shared resources and configured hardware (hard drive, printers, etc.) (Fig. 2.6).

At higher schools, computers are connected into a local network within a study-room. If there are several computerized study-rooms, they are integrated into one high school network (Fig. 2.7). Such networks have different topology, a multi-loop one as a rule, whereby all the existing network operating systems are practically employed. The intensity of network technologies usage varies depending on the training style and specialization of a high school.

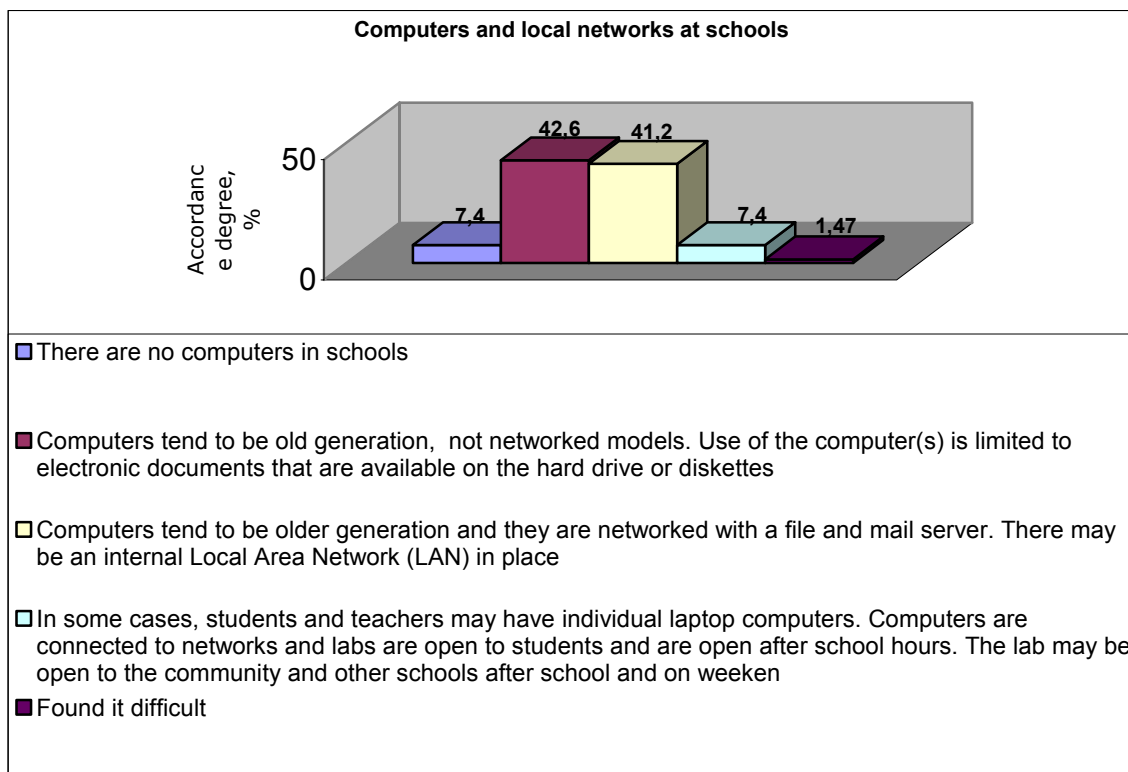


Fig. 2.6

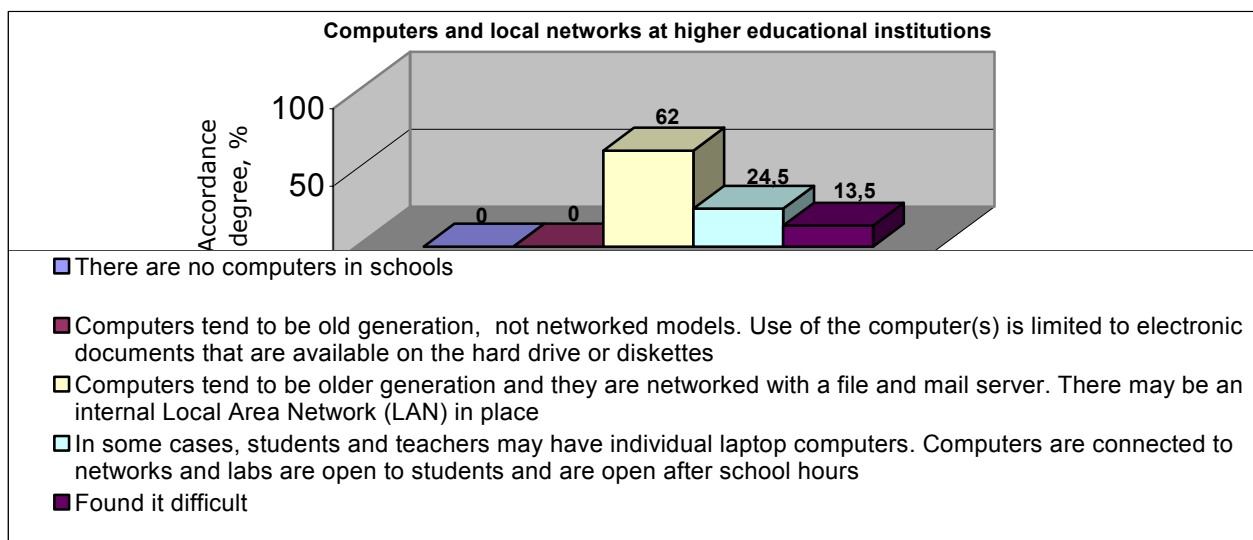


Fig. 2.7

2.1.4. Education Institutions Connectivity to External Networks

Currently three republican computer networks are oriented to scientific and educational sector, namely UNIBEL education and science network, BSU network of Belarusian State University and BASNET, the network of the National Academy of Sciences of Belarus. These networks are integrated in the united scientific and informational computer network (NIKS) of the Republic of Belarus.

Proper access to external networks is limited due to inadequate quality of communications and low speed of data transfer through data communication lines, albeit these services are offered at high rates. For example, the rates for Internet access in Belarus is about 3-4 times higher than in Russia and 2-3 times higher than in Ukraine. At the same time, there is a positive progress in rates reduction for the data transfer network. Also, the costs differ to some extent (by 10 to 20%)

depending on principal activity of the customer - whether it is business or scientific and educational institutions.

Mainly store-and-forward e-mail is extensively used at schools. The qualitative access to external networks (Internet network) is usually provided only at urban schools (Fig. 2.8).

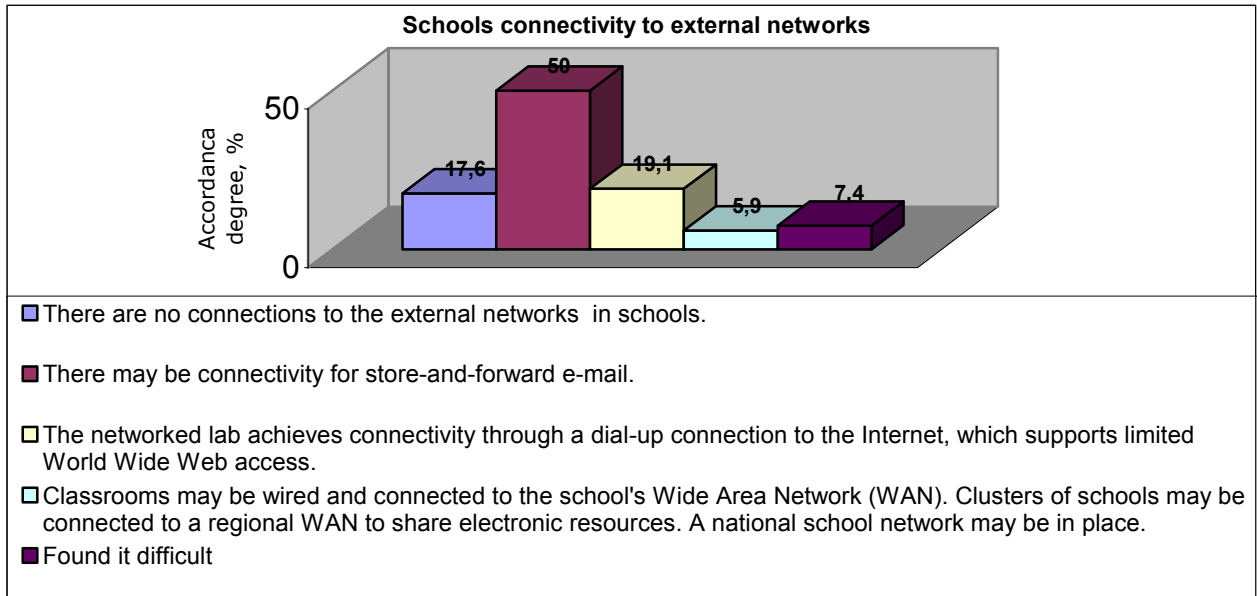


Рис. 2.8

The majority of high schools has a leased line for Internet access. Some high schools present own educational resources for shared access (Fig. 2.9).

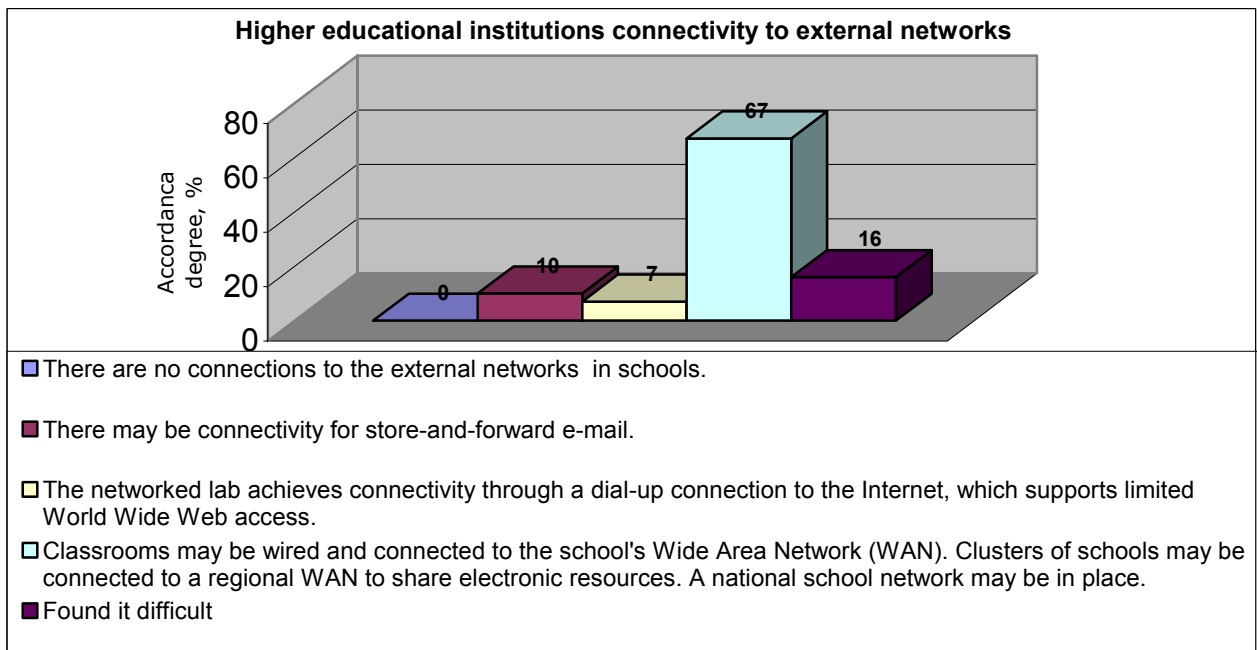


Рис. 2.9

2.2. Enhancing Education with ICTs

2.2.1. Level of using computers (ICTs) in curricula

At comprehensive schools, computers or computer hardware is basically employed only on Computer science classes. About 38% of schools have the software for teaching other subjects using ICTs (in primary forms, while learning humanitarian or natural and scientific subjects). Employment of computers in the learning process is restricted by the lack of modern computers in sufficient

quantity, absence of advanced software and ICT-related manuals, and by the teachers with low ICT skills (Fig. 2.10). On the average, 36 % of all subjects are taught using ICTs .

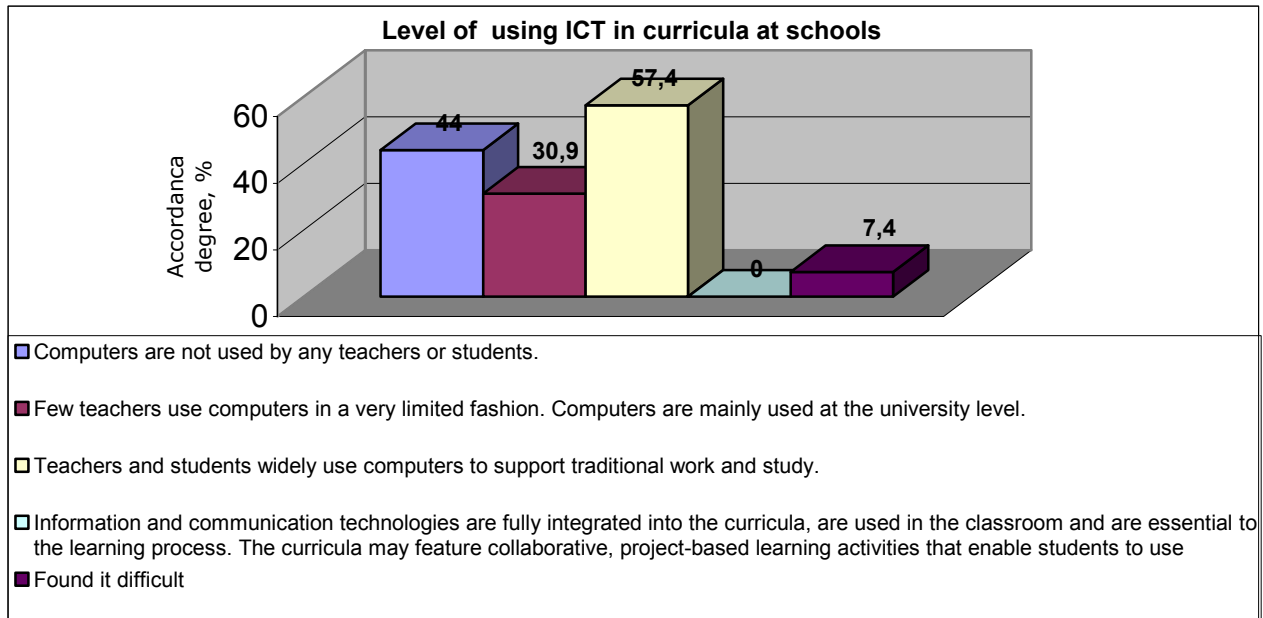


Fig. 2.10

In the majority of high schools, teachers use computers during classes and while preparing for them (Fig. 2.11). Printouts of the lectures are rarely available though due to the high costs of printing.

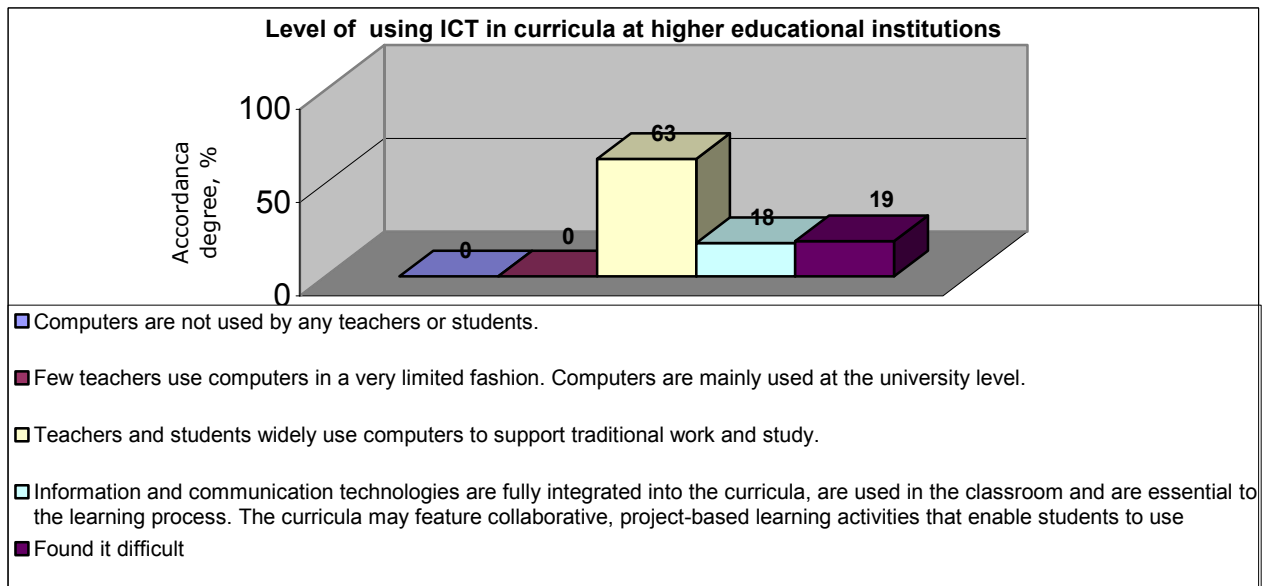


Fig. 2.11

Fig. 2.12 shows the total results for the “Level of Using Computers in Curricula at the familiar To You Educational Institutions” assessment carried out during the poll at tut.by. It somewhat differs also from experts’ opinion as it is based on the integrated opinion survey of all population strata.

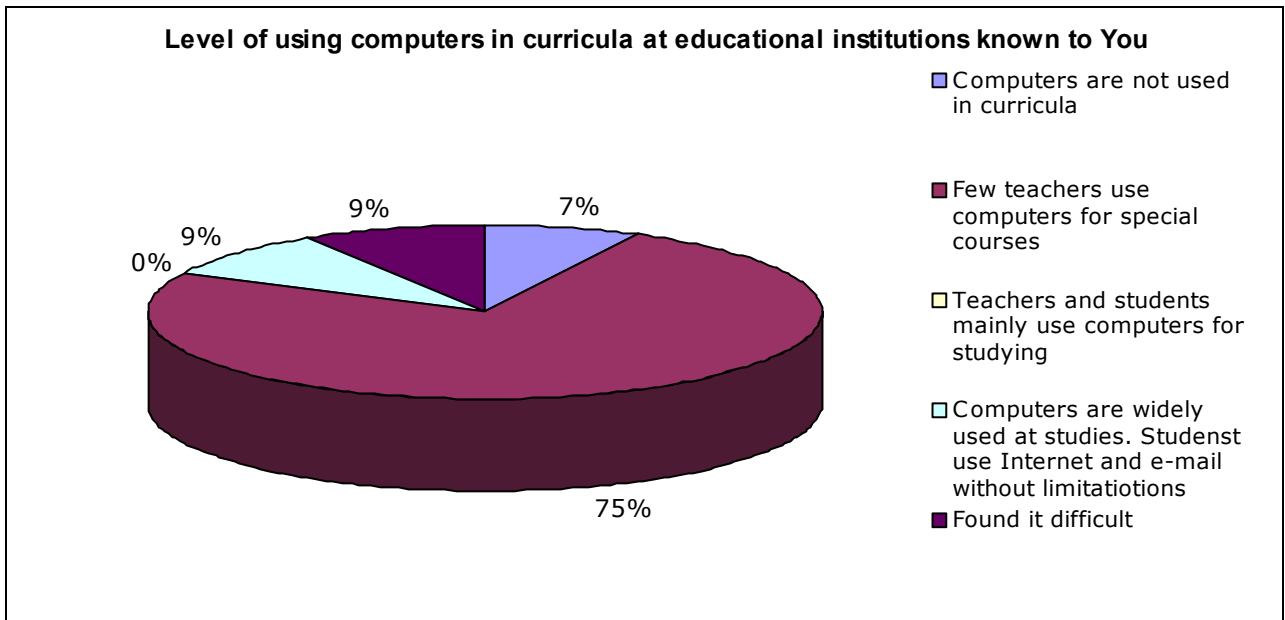


Fig. 2.12

At present leading higher schools of the republic possess basic facilities for developing distance training technologies. The concept of distance education process elaboration and development in the Republic of Belarus has been already worked out; it presumes creation of a basis for such education.

2.2.2. Level of teachers' computer skills

Most of the schoolteachers have basic computer skills. However, the computers are not widely used since access is rather limited. The computer science teachers, 4 to 5 % of teachers of other subjects and primary school teachers are well trained to employ a computer (Fig. 2.13).

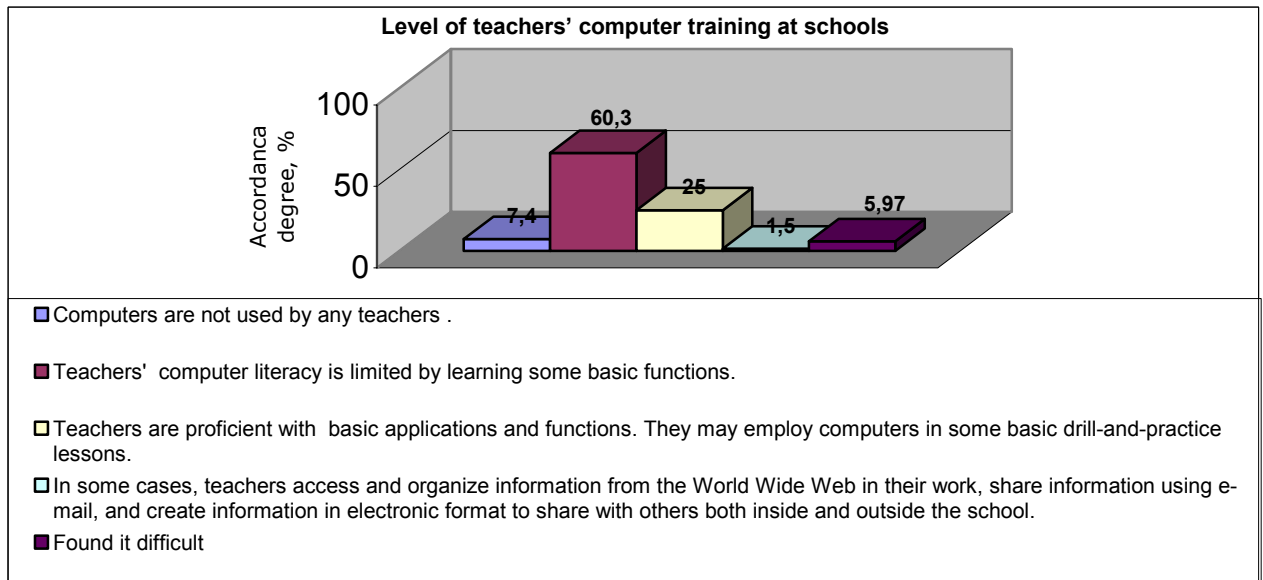


Fig. 2.13

The teachers of higher schools usually have good computer skills and employ machines to prepare for the lectures or during the classes (Fig. 2.14). Usually, the younger the teacher is, the better he / she operates a computer. International experience is another important point. Familiarity with international educational standards promotes their implementation in the motherland.

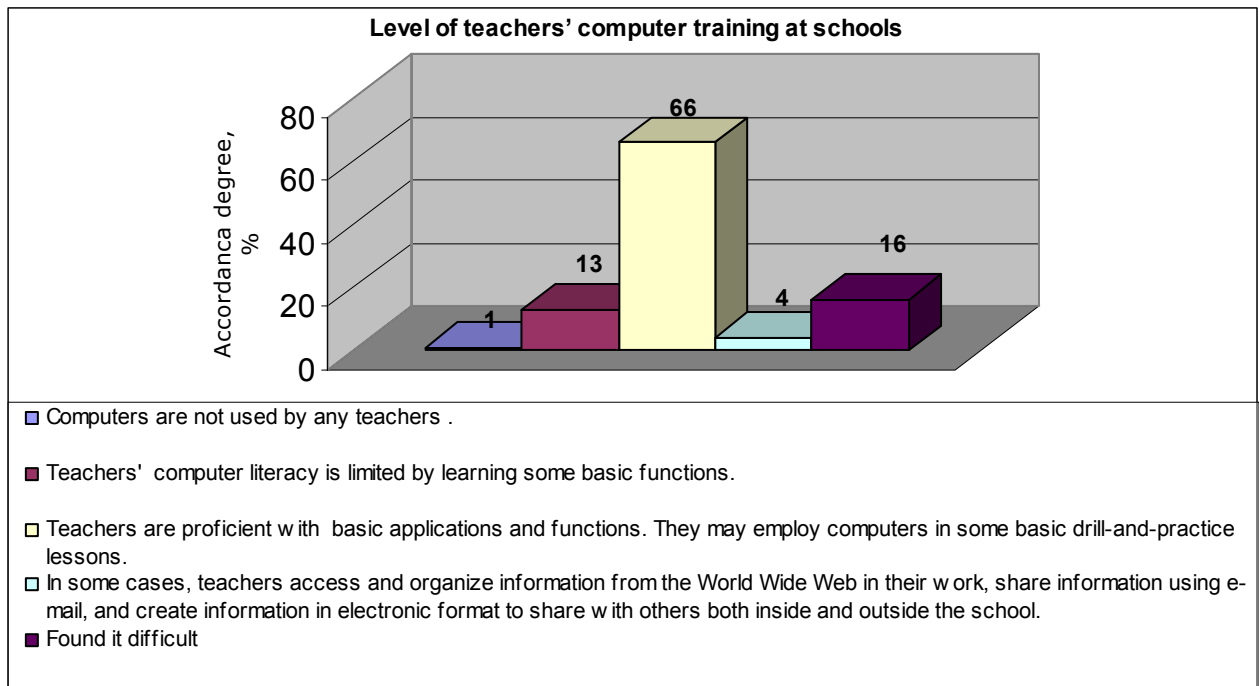


Fig. 2.14

Fig. 2.15 shows the total results of the “Level of teachers’ computer skills” Index assessment, set in the poll at tut.by site.

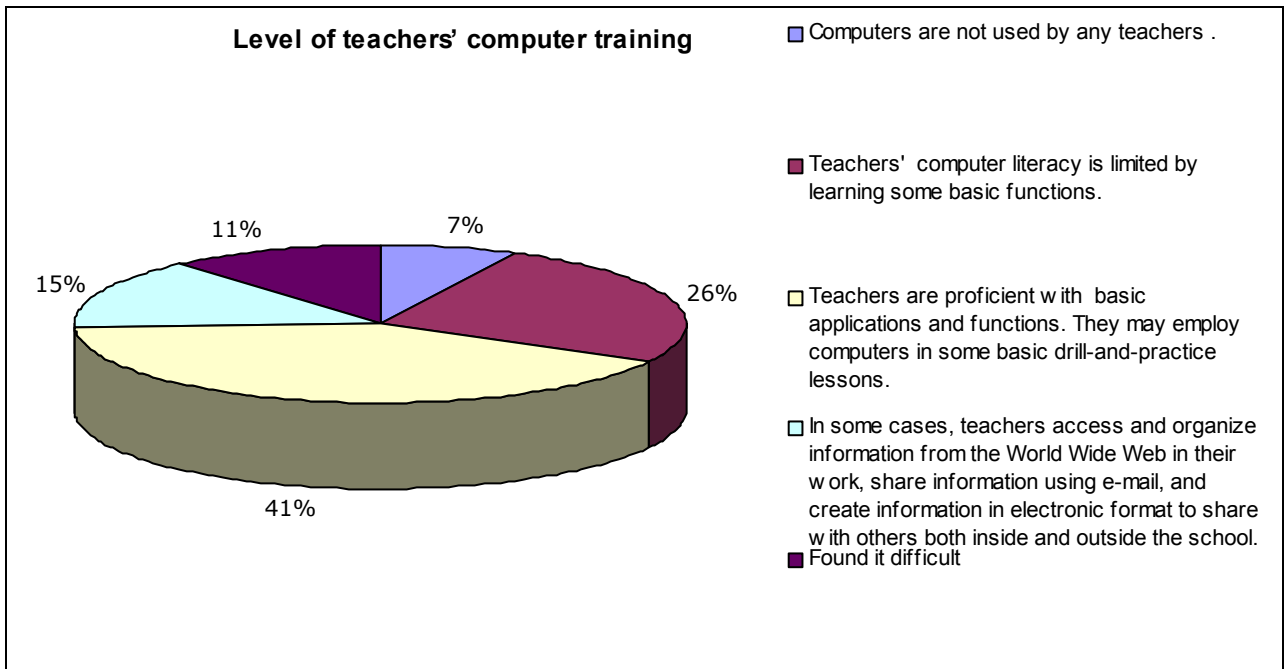


Fig. 2.15

2.3. Developing the ICT Workforce

2.3.1. Opportunities for advanced and continuing training for ICT development

In high schools, development, integration and support of new networked technologies is carried out by specialized departments: computer system and network divisions (hardware and networked systems), networked computing centers or ICT (informatization) centers. There are four main lines in the operation of the centers:

- telecommunications and networked technologies;
- software and automated management systems development and support;
- computer hardware maintenance and repair;

- ICTs in education.

2.3.2. Ways of ICT skilled specialist training

The main form of advanced training for comprehensive schools (Fig. 2.16) and high schools (the Fig. 2.17) teachers is a full-time training at special advanced training courses. The ICT specialists undergo advanced professional training at Academy of Post-Graduate Education, Republican institute of professional training, Republican institute of higher school of Belarusian State University, regional and Minsk specialized institutes for advanced professional training and retraining of executive officers and education specialists, at a number of professional skill raising courses at principal high schools.

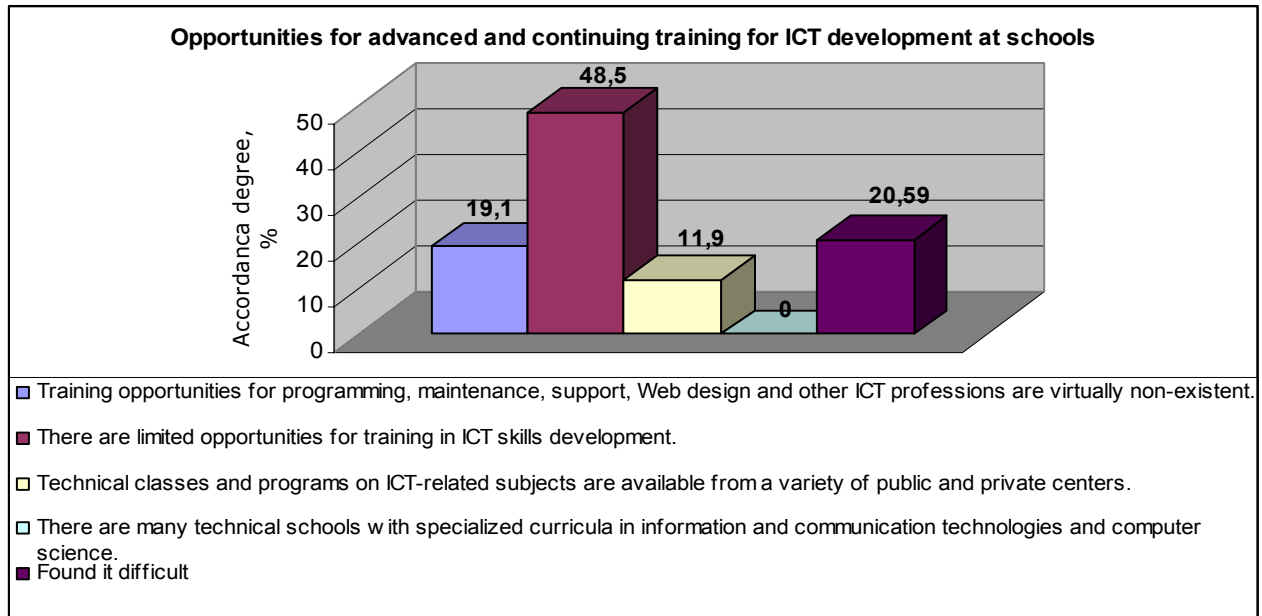


Fig. 2.16

The advanced training of the teachers and managing staff in ICTs field is carried out on a continual basis at the specialized curricula institutes for advanced professional training and retraining of the executive officers and education specialists. The target courses on the most important issues of ICT development and application are regularly held for the computer science teachers. However, the advanced training for ICT professions is not yet target-guided and systematic (Fig. 2.18). To boost, the newly obtained skills are sometimes hard to implement due to the lack of up-to-date hardware and software at the workplace.

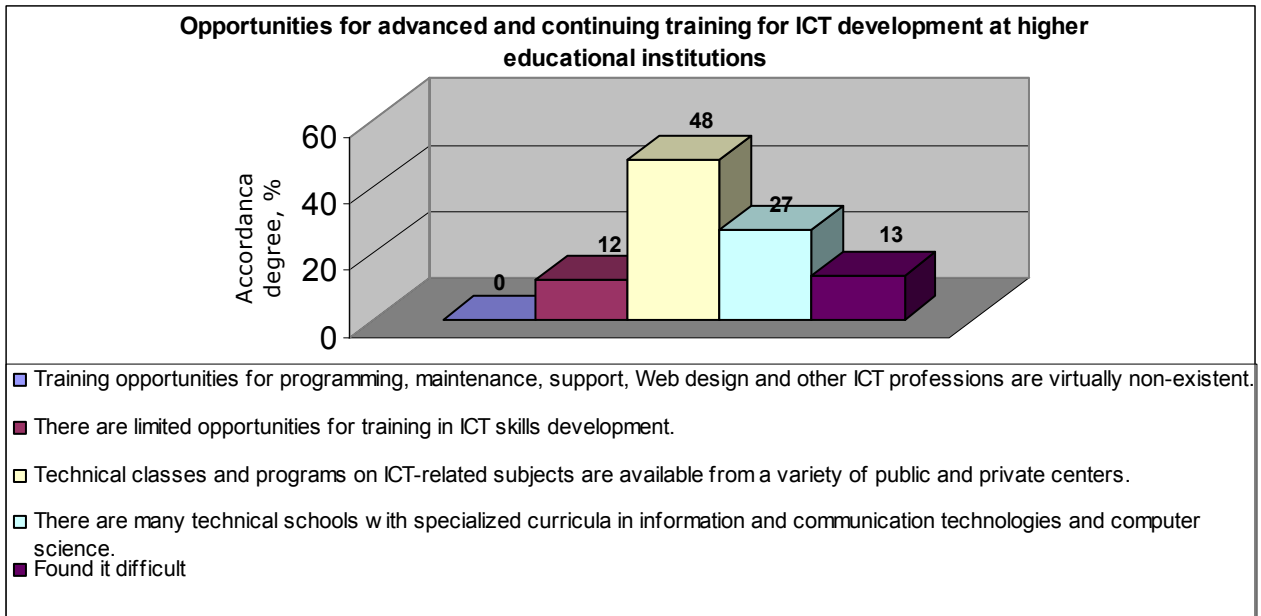


Fig. 2.17

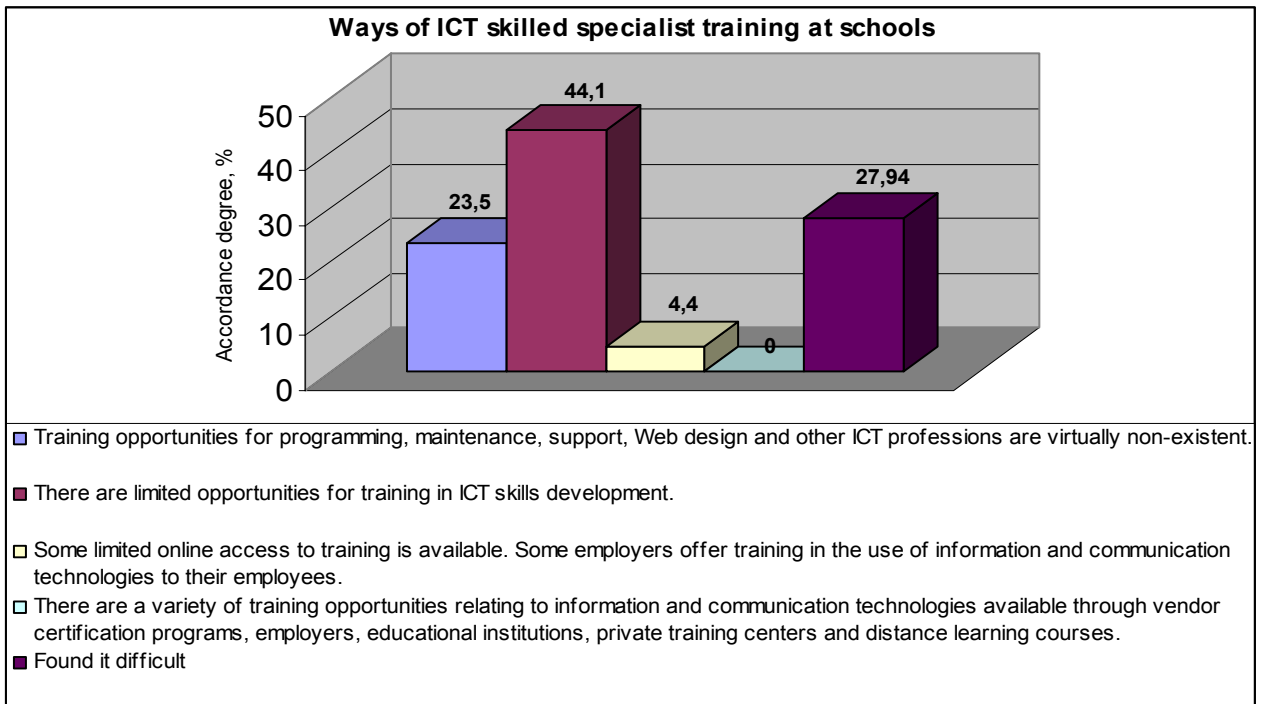


Fig. 2.18

The system of high school teachers' retraining in ICT development and application is available mostly at faculties for advanced professional training at higher educational institutions. There is an Internet education center established in the republic, which provides for Internet-technology targeted training for teachers (Fig. 2.19).

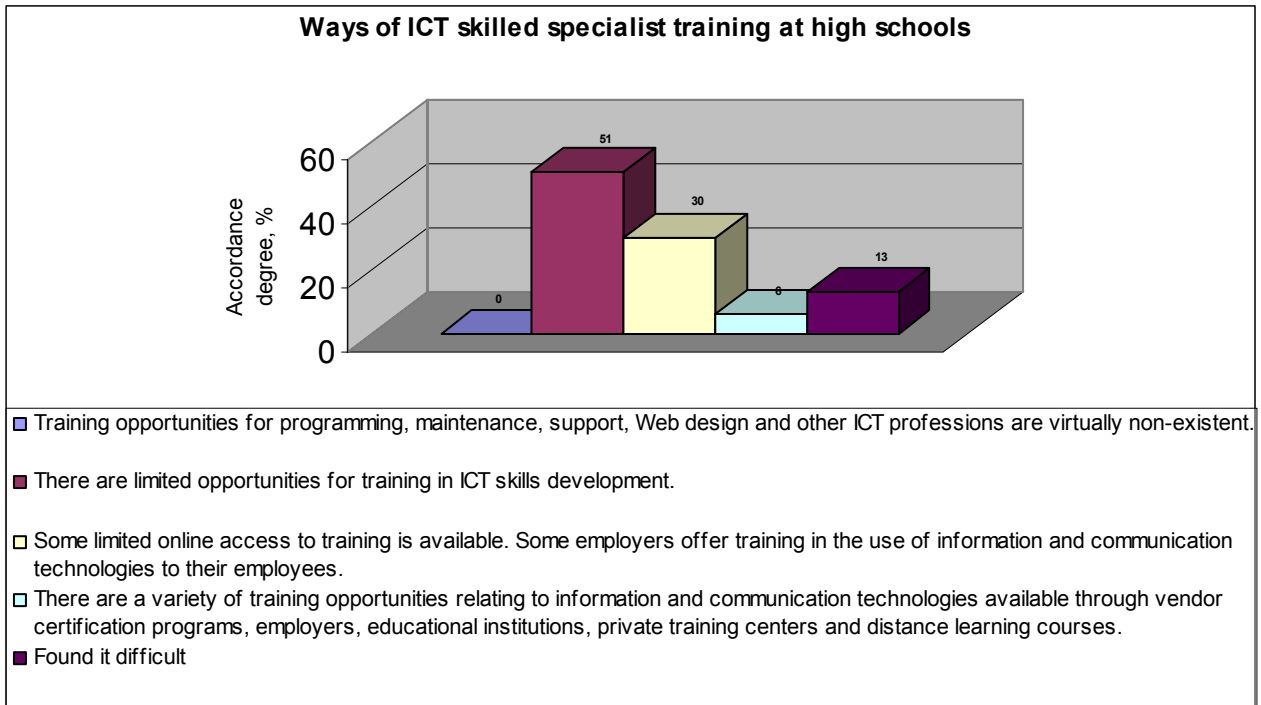


Fig. 2.19

Overall scores for the Network Learning Component Index estimations carried out at comprehensive and higher schools of the Republic of Belarus are shown, accordingly, in Fig. 2.20 and Fig. 2.21.

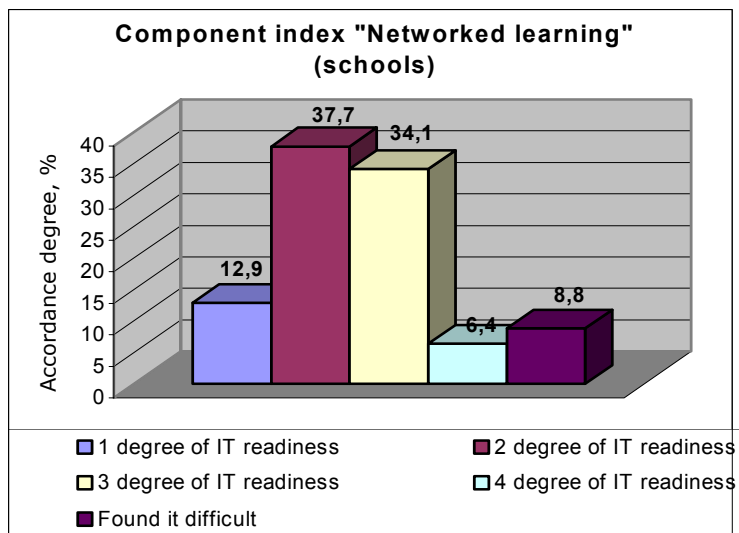


Fig. 2.20

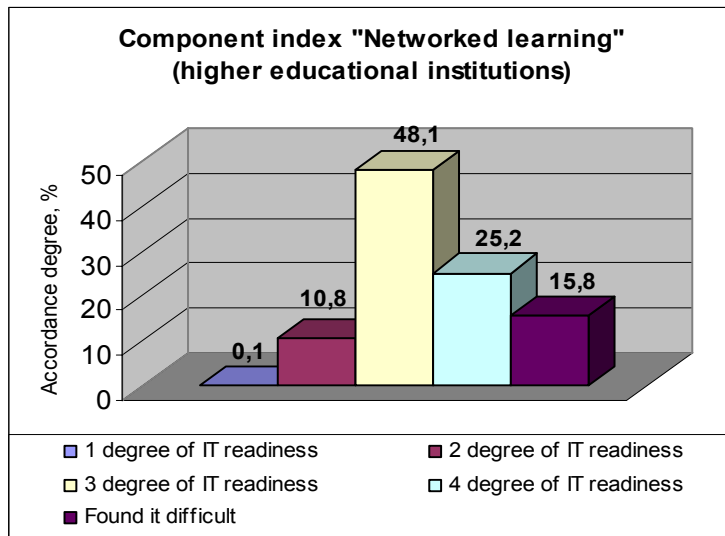


Fig. 2.21

An overall estimation of electronic readiness of the Republic of Belarus based on the Network Learning Component Index is presented in Fig. 2.22.

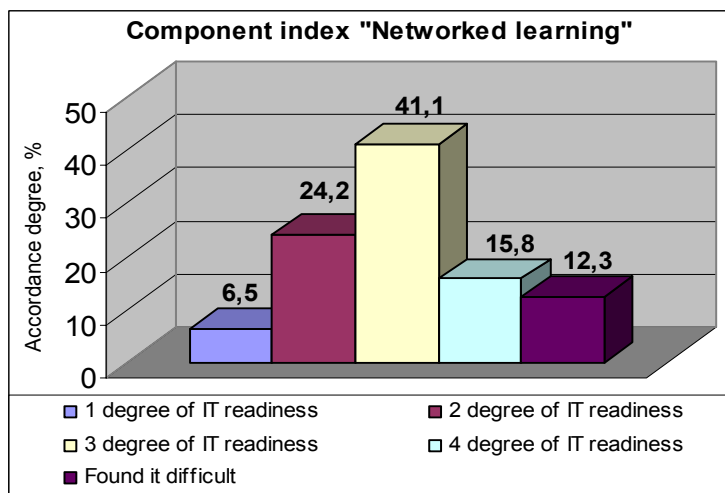


Fig. 2.22

Summary. The described above average estimation of the e-readiness level based on the Network Learning Component Index is 2.76. However, the estimation differs essentially for comprehensive and higher schools, actually by one level: 2.37 and 3.16, accordingly. This practically means, that higher educational institutions have reached the 3-rd level of development as assessed by the ICT indices, whereas comprehensive schools are at the 2nd level.