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ABSTRACT

Since 1917, the higher education system in the Soviet Union has been developing as a completely democratized system. All citizens have equal rights to education, and secondary and higher education are accessible to all citizens of the Soviet Union regardless of property, social status, nationality, sex, religion, or political convictions. Such democratization of education leads inevitably to certain problems, especially the problem of space and funds for quality education for all who might desire a higher education. Thus, careful planning is needed to anticipate the numbers of students who will wish to enroll in the higher education institutions of the Soviet Union. This document presents some guidelines and principles of educational planning as are used in Russia, and a description of the types of institutions that are now in existence and their various functions both in terms of serving students and in terms of research. (HS)

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No. 39 SOME PROBLEMS IN THE PLANNING OF HIGHER EDUCATION IN THE USSR

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by

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This lecture is part of 'Fundamentals of Educational Planning; Lecture-Discussion Series' a controlled experiment undertaken by the International Institute for Educational Planning in collaboration with a limited number of organizations and individuals aiming at the development of efficient teaching materials in the field of educational planning. By their very nature these materials, which draw upon tape recordings, transcriptions and summary notes of seminars, lectures and discussions conducted by IIEP as part of its training and research programme, are informal and not subject to the type of editing customary for published documents. They are therefore not to be considered as 'official publications'.

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First, I would like to mention some of the principles and aims of higher education in the Soviet Union. Second I will discuss some of the problems against a background of factual information. Higher education is the most advanced sector of the educational system. It is very closely connected with secondary education. The Soviet system of higher education has been developing for more than 50 years, since the great October socialist revolution in 1917; it is founded on several important democratic principles. The whole development of the system of higher education during the last 50 years has been in the direction of democratization. This process started in 1918 with Lenin's decree of 2 August 1918, in which the main principles guiding the development of the system of higher education were formulated.

For the first time in history the doors of institutions of higher learning were opened to the working people and their children. Not only was tuition at universities made free, but the students were to be provided for by the state. Both teachers and students were to take part in governing the universities and other institutions for higher learning.

As a practical measure for bringing workers and peasants into higher educational institutions, preparatory courses were organized for them. Later, those courses were transformed into 'workers departments', which played an important role in helping to create a Soviet intelligentsia (see Appendices I and II). Lenin's principles were implemented and developed in the process of the growth of the educational system.

First, it was decreed that all citizens should have equal rights to education; primary and secondary education is now compulsory for all children and adolescents.

Second, secondary and higher education are accessible to all citizens of the Soviet Union regardless of property, social status, nationality, sex, religion, or political convictions. This equality of rights has been created by the abolition of fees for education. Tuition is free at all stages of education from kindergarten to higher education or post graduate education. Certainly, students have to support themselves to pay for food, etc., but they also have some privileges. Most students (more than 75 per cent) get scholarships which take care of living expenses; students' dormitories are practically free of charge (students pay 1.5 roubles, or about 7.5 French francs, per month); the university or institute libraries have the necessary numbers of textbooks and other learning materials for their students; there are special student canteens, etc.

Third, all stages of education and all types of schools, for both general, vocational, and specialized secondary and higher education should form part of a co-ordinated educational system. This means that from the very beginning the Soviet Government tried to solve the problem of integration of the different stages of education and of different types of education into a unified system of education.

A further important principle of the Soviet educational system is the unity between instruction and up-bringing. This is a very important principle, because the system of education is considered not only as a tool for giving knowledge to people, but also as a tool for their up-bringing. At the same time education and upbringing are linked with practical, useful work. Because of this principle, the problem of the combination of scientific, technological, and humanitarian education is solved, and in all stages and in all kinds of educational institutions, students learn not only scientific and technological disciplines, but also social sciences and humanities.

The next principle of higher education in the Soviet Union is that education is based on science - on the newest results of scientific research - and is kept up to date to accord with the practical needs and the growing requirements of the people.

Another very important principle of higher education, and indeed, of education in general, is that education should be conducted in the native language, or that there should be a choice of languages for education in the different parts of the Soviet Union. In all, the Soviet Union consists of fifteen national Soviet Socialist republics, in which there are more than one hundred different nationalities and languages. That is why the problem of the language in which education is conducted is very important. In the Soviet Union this problem has been solved in that education is conducted in the native language or there is a choice of languages - a native language and Russian, for example, or a native language and the language of the Republic, etc.

The next principle I would mention is that education should be secular - separated from the church and intended to inculcate a scientifically-oriented atheistic outlook in students. This does not mean the violation of the right of freedom of religion. It creates the same conditions for people who belong to different religions. These are some of the most important Leninist principles guiding the system of education in the Soviet Union.

I will now turn to some planning problems and to consideration of the main aims of planning in higher education. When we speak about the planning of educational systems, or the planning of higher education, we cannot confine ourselves to the economic problems of higher education or the economic

problems of education in general. Education is a very specific field of human activity. That is why, when we formulate the main aims and purposes of planning higher education, we have to take into consideration all aspects - political, economical, social, and cultural. When we consider problems of higher educational planning it is also necessary to distinguish between macro or national planning of higher education and micro-planning; by micro-planning I mean the planning of individual higher educational institutions. I think there are some general principles of macro or national planning of higher education in the Soviet Union which are very important. I have tried to put them together in another list of principles.

First of all, the plan of higher educational development is an integral part of the national economic plan, as far as manpower planning is concerned. This is because higher educational institutions, universities, and specialized institutions are the only sources of highly qualified specialists for all the branches of the national economy, government activities, and cultural life in the country. This is true for all countries because only at universities is the process of training highly qualified specialists carried out.

When we consider plans for higher educational development I think we should also recognize that one of the main principles of higher educational planning in the USSR is to create conditions for giving opportunities to the maximum number of people to have higher education, using resources which are available at defined stages of social and economic development. The Ministry of Higher and Specialized Secondary Education of the Soviet Union pays much attention to this principle and keeps a careful watch on the economic aspects of higher educational planning, since the system of higher education has increased so much, resources are limited and balance must be maintained between the increase in the number of students and the maintenance and improvement of the standard of education.

The next principle of higher educational planning is the creation of optimum proportions between different types of higher educational establishments, such as universities and specialized institutions, and between different forms of training, such as full-time, part-time, evening, and correspondence training, taking into consideration the economic efficiency of these different types of training. This is a very important principle of higher educational planning because in choosing between different types of higher educational establishments and of training one has to take into consideration the cost aspects of the problem in order to achieve maximum results with limited resources.

Another principle of higher educational planning is that it is necessary to achieve the optimum proportions and inter-relationship between teaching processes and scientific research activity in order to achieve the best use of the scientific potential of higher educational establishments. More than one-third of all scientists, highly qualified people, research workers, are concentrated in universities and higher educational institutes. When the plan of higher educational development is drawn up, close attention is given to the problem of optimum use of the great scientific potential for the national economical, social and cultural development of the country.

A further principle of higher educational planning is the rational distribution of higher educational establishments over the territory of the country, taking into consideration economic, political, national, social, and cultural factors. The Ministry of Higher Education and the planning bodies of the Soviet Union follow this extremely important principle in order to remedy imbalances as between the different nations and regions of the country. Before the revolution different nationalities of the Soviet Union were at different stages of cultural and social development. It was necessary to create conditions for their development in order to achieve a general high cultural, economic, and social level. That is why educational institutions such as universities and specialized institutions are developing much faster in those Socialist Republics which were under-developed before the October revolution, and why the rate of growth of numbers of students is higher in those republics than in the Russian republic. It is very important to create real equality between the different nations making up the Soviet Union and the allocation of different higher educational establishments over the country is an essential task.

In accordance with this principle and after 50 years of progress, all the national republics have their own universities with high standards of education. They all possess polytechnical and technological institutions, agricultural institutions, medical institutions, pedagogical institutions, and so on. Certainly when the problem of the distribution of higher educational institutions over the country is discussed, one must take into consideration regional economic needs as a function of plans for economic development in the regions. Thus if you look at the 'higher education map' of the Soviet Union, you will observe that many more new higher educational institutions are being established on the eastern part of the Soviet Union - in Siberia and in Asian Soviet republics and also in the Urals, and that the very high and undesirable concentration of educational institutions in Moscow, Leningrad, and Kiev, is being offset by these new developments as a corollary to the development of those areas.

It is not only important from the economic point of view to create better conditions for the population in these developing parts of the country for access to universities, but also from the point of view of cultural development. Before the revolution, higher educational institutions were situated in only 24 different cities and towns in Russia, mostly in the European part. Today higher educational institutions, universities and their branches are situated in more than 500 cities and towns, all over the country. When many cities, or even small towns, have higher educational institutions, it creates a new cultural atmosphere for really equal conditions for the development of the Soviet people as a whole.

The next principle on my list is the principle of rational concentration, specialization, and co-operation in the system of higher education. For example, when specialists in the same field are trained in different institutions in the same city, it is sometimes rather irrational, since the cost per student is higher than if they were trained in one institution. At the same time it is necessary to pay proper attention to the problem of specialization: concentration and specialization of educational institutions creates better conditions for closer co-operation among different institutions, especially in the new fields of science developing around existing fields. However, concentration cannot be unlimited. Thus, in planning the development of the system of higher education one must take into consideration the optimum dimensions of higher educational institutions, a problem discussed at length in educational circles in the Soviet Union.

The last principle for planning higher education to ensure development of higher educational systems in accordance with the main trends of scientific and technological development and social progress. When you work out the higher educational system plan you have to take into consideration not only existing needs but also future ones, because people who enter the universities this year will participate actively in economic, political and oultural life in only five, six, or seven years. You have to foresee the trend of scientific, technological and social development in order to give students the necessary knowledge for a future period in time. Certainly, it is very difficult, but when plans for higher educational development are worked out this principle is taken into consideration.

As for 'internal' planning, or 'micro' planning, I think that it is necessary to take into consideration at least three of its aspects: (a) curricula, or planning of the teaching process; (b) planning of researoh work and combination and co-ordination of research work with the teaching process; and (c) financial and cost planning which is very important for the development of higher educational institutions - namely the achievement of the best possible results with limited resources.

Higher educational institutions play the leading role in the system of education in the Soviet Union, as, I think, in other countries, because higher educational institutions and universities train teachers for the rest of the educational system. Higher educational institutions are the main source of textbooks for the whole system of education, and they create the national standards for the educational system.

These are some of the general principles involved in planning higher education, taken into consideration in the process of over-all economic and social planning in the Soviet Union. I do not think it necessary for me to describe the process of access to higher education in the Soviet Union. I just want to say that in the Soviet Union there is a system of competitive entrance examinations, which means that all those who want to enter university or specialized institutions apply to the university or even to a definite part of the university, faculty or department, and then have to pass an examination. This is the only requirement for the candidates. They have to demonstrate their knowledge and abilities to learn at a higher level. This system of access to higher education exists because the Ministry of Higher and Specialized Secondary Education plans the number of specialists which the national economy or other branches of social activities will need in several years. That is why every year higher educational institutions have a definite number of places in order to create better conditions for the learning process, because if one has an unlimited number of students one cannot supply all of them with adequate conditions for learning. In the Soviet Union as any other country the resources for higher education or for any other branch of national economy are limited at a definite period in time. The number of places in the universities is less than the number of people who wish to enter, sometimes with a ratio of two or three candidates to one place. It depends on the field, and on other sociological and cultural factors. During recent years, for example, we had many candidates for specialities in physics and electronics, because everyone wanted to know what they were about. The candidates who pass their entrance examinations are accepted at the universities and are enrolled as students. The others may try again the next year, they can work, or they can spend their year in different sorts of preparatory courses at various institutes, in order to prepare themselves better for next year's examination.

Now I think perhaps I should discuss the historical and numerical development of the higher educational system in the Soviet Union. If you look at Appendices III and IV, you can see that the higher educational system in the Soviet Union is developing very quickly. You can see that during the last 50 years the number of higher educational institutions, including universities and specialized institutions, increased 7.5 times, and the number of students 34 times - a very high rate of growth. At the same time the system of secondary specialized schools was also developing. (Appendices V and VI.) One of the big social problems is the problem of

access of women to universities. It is one which existed in Tsarist Russia, when only a small proportion of the students were women; now, as you can see from Appendix VII, the percentage of women enrolled in higher and specialized secondary institutions in the Soviet Union is very high - 45 per cent in the 1966/67 academic year. As you can see from Appendix VII, in some fields such as economics and law or in medical and pedagogical institutions, the percentage of women is higher than that of men.

I should again like to draw your attention to Appendix IV which gives numbers of graduates from higher educational institutions in the Soviet Union. The average number of graduates from higher educational institutions is growing from year to year; in 1967 the number was 479,400. In general, for the period 1918 to 1967, 7.4 million specialists came out of higher educational institutions, most of whom are still active members of society.

Now I will give you some ideas of the structure of the higher educational system in the Soviet Union. There are three main types of higher educational establishments in the Soviet Union: universities, in the broad sense of the word; polytechnical institutes, or polytechnical universities; and specialized higher educational institutions - technological, industrial, medical, pedagogical, economic, etc. In 1966 there were 42 universities in the Soviet Union with 433,000 students (or about 10 per cent of all the students). Despite their rather modest part in the total number of higher educational establishments, the universities play the leading role in the higher educational system because they combine the teaching process with very intensive research work. Research activity goes on in other higher educational establishments as well, but in universities it is concentrated both in theoretical and applied fields - in sciences, humanities, and social sciences. The universities are the only educational establishments which combine sciences, social sciences and humanities at the same time. For example, in specialized technological institutions, social sciences and humanities are taught, but, as a rule, there is not as high a level of research activity in these branches of knowledge. The universities usually have faculties in natural sciences - mathematics and theoretical mechanics, physics, chemistry, biology, and in geology; then between natural and social sciences is geography; there are social sciences - economics, philosophy, history; most universities have faculties of law and such faculties as philology and oriental studies; and the leading universities such as the University of Moscow and the University of Leningrad now have special departments of psychology.

The combination of different fields of research and training creates the best conditions for the development of new branches, especially interdisciplinary, of different fields of knowledge, because the universities are the only places where one can combine social studies, sociological or economic studies and research in economics with mathematics, physics, and

so on. That is why the universities were the places in which such fields of sciences as economic cybernetics, physical biology, physical chemistry, and chemical physics and so on were developed. They are a result of a combination which can only be achieved at universities. There is a creative atmosphere in universities which enables students to get knowledge under better conditions than in other places.

Much attention is paid by universities and other educational institutions to the problem of the rational combination of general scientific education and specialized education. It is obvious that when we have very rapid development of science and technology, when we are in the midst of a scientific and technological revolution it is impossible to supply the students with all the knowledge which they will need the rest of their lives. That is why it is necessary to create such conditions at higher educational institutions in which students will learn how to work individually. A solid general scientific and cultural background on which to base specialized knowledge is very important; with that an individual can in several years choose a new field and adapt to it without special long-term retraining.

The next group of higher educational establishments are polytechnical institutions or polytechnical universities. There are 53 such institutions in the Soviet Union, situated in different parts of the country, in which are taught different engineering disciplines. These are grouped together and have a broad common scientific theoretical basis.

The third part of the structure of the higher educational system is specialized higher educational institutions - technological, medical, pedagogical, economic, etc. You can see from the title 'specialized' that these institutions work in one definite field. Certainly the development of science and technology creates new needs, new fields, etc. That is why even specialized institutions such as technological institutions or engineering institutions now become more engineering universities, as do medical institutions. Twenty years ago, for example, most of the medical institutions had therapeutical departments, dentistry departments, and special departments dealing with child illnesses. But today medical institutes have become real medical universities, with even such things as cybernetical laboratories.

As for the system of management of higher educational institutions, there is the Ministry of Higher and Specialized Secondary Education responsible for the planning of higher educational development in the Soviet Union in general and for the methodological part of higher educational development. It is also responsible for preparing textbooks for higher education, which creates a general equal nation-wide standard for higher education.

Some higher educational establishments are under specialized ministries such as the Ministry of Health, which is responsible for medical institutions; or the Ministry of Agriculture, which is responsible for agricultural institutions; but at the same time, the Ministry of Higher Education is responsible for the system of higher education in general. That is why agricultural institutions are in practice under two ministries: from the special point of view they are under the Ministry of Agriculture, but from the methodological and pedagogical point of view, they are under the Ministry of Higher Education. The internal management structure is different in different types of educational institutions.

In the Soviet Union there are three types of teaching and training in higher educational establishments - full-time (for day study), part-time (for students who work and learn at the same time) - of which there are two kinds, evening and correspondence. These latter two were created in the Soviet Union in the 1930's because it was necessary to train more and more people as more specialists were needed for economical development, for industry, and for agriculture. For this reason, new types of higher educational training were invented and used. Now almost half of all students in higher educational establishments are evening or correspondence students.

As for the full-time students, they spend all their time at the universities, they attend lectures, they participate in practical work, in seminars, in different discussions, in laboratory work, and so on. The same is true for evening and correspondence students. Tuition is free for all types of education, and 75 per cent of day or full-time students have scholarships from the Government. Most students who come from different parts of the country live in dormitories, where they pay a symbolic payment of 1.5 roubles per month.

Part-time students have paid examination leave of one month per year, during which they participate in lectures and examination courses at the university; correspondence students are usually invited twice a year to the university to listen to lectures, participate in seminars, do laboratory work, and so on. Students in their last year of education usually may have four months paid leave for writing their diploma papers and for preparing the State exam. They can also have one day a week for this purpose, for which they are paid 50 per cent of their salary. Thus part-time students are supplied with certain important conditions to facilitate their learning.

The period of training at higher educational institutions is four to five years, or sometimes five-and-a-half or six years (in medical institutions, for example).

The success of higher educational institutions depends mostly on the qualities of the teaching staff, one of the obvious reasons why programmes of teaching staff formation are very important in the planning of the development of a higher educational system. In the Soviet Union professors of all ranks are elected by academic councils. They apply to the Rector or the Dean of the faculty and then have to pass through an election system. Terms of employment last five years, after which a professor must be re-elected. The teaching staff is thus kept in good condition - professors must maintain high standards of teaching, as well as pay attention to research work and to their own capacities and qualities as teachers. Although it is rare that a person is not elected, it nevertheless happens, and the system works well enough. Deans are elected for three years by the academic council of the faculty, and after that by the academic council of the university. Rectors are appointed by the Ministry of Higher Education.

In order to train the research and teaching specialists, the most advanced universities, polytechnical institutions, and specialized institutes have graduate courses; and graduates from universities or other higher educational institutions can pass competitive exams and become graduate students. (See Appendix VIII.) There is a system of exams for graduate courses also; a system of competitive exams. After three or four years of graduate courses they have to pass through 'candidate exams' - very stiff exams, and they also have to write a thesis, or dissertation, on one of the important problems in the field they are studying. After that they have to defend their thesis publicly at the academic council meeting. Two official opponents are appointed; the discussion is very serious, as it is the final exam for the candidate. I think, from my experience, that this corresponds with the age and number of years of training for the American Ph.D. Graduates from graduate courses can work at research institutions or can teach at universities and specialized institutions as assistant professors. To be a full professor, it is necessary as a rule to get the next scientific degree - Doctor of Sciences, which is higher than the Ph.D. To get this degree one generally must have done intensive research work in definite fields and have achieved some important developments which make a substantial contribution to the development of science; one must write a special Doctor's thesis and defend it publicly before official opponents. People with the Doctor of Science degree can become full professors or chairmen. Appendix IX gives data on the structure of research workers' body.

I will summarize this degree system in order to bring it clearly to your mind. Graduates from universities and higher educational institutes get a diploma, for which they have to pass a State examination and defend their diploma work; they receive the certificate called a diploma. The next degree is 'candidate of sciences' which corresponds to Ph.D., and the following one is Doctor of Sciences (some universities in the United States have such a degree). As for the teaching staff, they also have scientific

titles. A university graduate with a diploma can become an instructor or an assistant professor, and those with graduate degrees can become assistant or associate professors; people with the degree of Doctor of Sciences can become professors.

In order to keep the system of higher education on the frontiers of science and knowledge, we have in the Soviet Union a system of retraining and improving professional skills of the teaching staff of higher educational institutions, which has been created in recent years. We have special institutes and faculties within universities and polytechnical institutions solely for improving professional skills of young professors. There they spend six months having lectures with important scientists and professors, discussing problems, reading literature, etc. This system of special institutes and faculties creates better possibilities - especially for young professors or teachers - to improve their professional skills or to move to the next degree. There are several specialized institutes and faculties at universities for improving professional skills for the teaching staff in social sciences, mathematics, physics, and other fields.

I now have to mention the international links of the Soviet universities and higher educational institutions with foreign universities and institutions. After the Second World War there were many foreign students in Soviet universities and institutions; we now have several thousand foreign students in different Soviet universities, mostly in Moscow, Leningrad, Kier, and Tashkent, but also in other cities. At the University of Leningrad alone there are foreign students from 64 countries. Thus students from different parts of the world come to learn at Soviet higher educational establishments. The Soviet universities have very good exchange relations with many Asian, African, Latin American, North American, and European universities. Almost all countries have students in Soviet educational establishments. These international links have been rather successful.

There are some problems certainly in this field, for example the problems of equality of diplomas, etc. But they are not the problems of the USSR higher education. They are mostly internal problems of those countries who send students to the Soviet Union. This is an important problem and it is necessary to work out a certain international standard in order to avoid any sort of discrimination of those people who possess diplomas from other countries. This is a very important problem which should be worked out among nations.

APPENDICES

Appendix I. Number of specialists with higher and specialized secondary education in the soviet national economy (given in thousands; excluding military personnel)

Year	To'	From that number: ith higher education	with specialized secondary education
1913	190	136	54
1941 (Jan. 1)	2 401	909	1 492
1950 (July 1)	3 254	1 443	1 811
1955 (July 1)	5 133	2 184	2 949
1960 (Dec. 1)	8 784	3 545	5 239
1965 (Nov. 15)	12 066	4 891	7 175
1967 (end of year est.)	13 855	5 565	8 290

Note: At the end of 1967 there were 19.5 million Soviet citizens with completed higher and specialized secondary education (including housewives, pensioners, and military personnel).

Source: USSR in figures in 1967, Moscow, 1968, p. 122.

Appendix II. Number of students in different kinds of training (at the beginning of academic years; (in thousands)

	1914/15	1940/41	1950/51	1967/68	1967/68 % increase relative to 1914/15	1967/68 % increase relative to 1940/41
Total number	10 588	47 547	48 770	75 924	720	160
- In general educational schools	9 656	35 552	34 752	48 910	510	140
- In vocational and professional technical schools	106	717	882	2 130	2 010	300
- In specialized secondary schools	54	975	1 298	4 166	7 710	420
- In institutes of higher learning (university level)	127	812	1 247	4 311	3 400	530
- Other forms of education	645	9 491	10 591	16 416	2 540	170

Source: USSR in figures in 1967, p. 125.

Appendix III. Number of higher educational institutions and of students (beginning of academic year)

	1914/15	1940/41	1950/51	1967/68	1967/68 % increase relative to 1914/15	1967/68 % increase relative to 1940/41
Number of higher educational institutions	105	817	880	785	750	-
Number of students (thousands)	127	812	1 247	4 311	3 400	530
Including:						
full-time students (thousands)	127	558	818	1 887	1 460	340
evening students (thousands)	-	27	27	654	-	2 420
correspondence students (thousands)	-	227	402	1 770	-	780
Admissions into higher educational institutions (thousands)	-	263	349	888	-	340

Source: USSR in figures in 1967, p. 126.

Appendix IV. Number of graduates from higher educational institutions by groups of institutions (thousands)

	1940	1950	1967
Total number of graduates (including those from higher educational institutions)	126.1	176.9	479.4
In: Industry and construction	24.2	30.0	168.4
Transport and communication	5.9	6.1	21.7
Agriculture	10.3	12.7	39.2
Economics and Law	5.7	11.4	38.6
Medicine and Sports	17.4	20.0	33.5
Pedagogy	61.6	94.1	172.6
Arts and Cinema	1.0	2.6	5.4

In 1914 the number of graduates was 12 200. During the period 1918-1967 the number of graduates was 7 426 000.

Source: USSR in figures in 1967, p. 127.

dix V. Number of specialized secondary schools, and number of students (at the beginning of academic year)

	1914/15	1940/41	1950/51	1960/61	1965/66	1966/67	1967/68	1967/68 % increase relative to 1914/15	1967/68 % increase relative to 1940/41
Number of specialized secondary schools	450	3 773	3 424	3 328	3 820	3 980	4 074	900	110
Number of students (thousands)	54	975	1 298	2 060	3 659	3 994	4 166	7 710	430
Including :									
full-time students (thousands)	54	787	1 065	1 091	1 835	2 111	2 249	4 170	280
evening students (thousands)	-	32	52	370	628	677	716	-	2 240
correspondence students (thousands)	-	156	181	599	1 196	1 206	1 201	-	760
Admissions into specialized secondary schools (thousands)	-	383	426	769	1 100	1 216	1 233	-	320

Source : USSR in figures in 1967, p. 127.

Appendix VI. Number of graduates from specialized secondary schools according to groups of schools (thousands)

	1940	1950	1960	1965	1966	1967
Total number of graduates	236.8	313.7	483.5	621.5	685.2	805.9
Including graduates from specialized secondary schools of:						
Industry and construction	21.7	85.4	189.9	250.7	273.6	310.9
Transport and communication	8.3	18.9	36.6	50.9	58.4	64.9
Economics and law	21.5	48.7	80.2	88.1	92.1	118.0
Agriculture	7.2	24.9	56.5	81.3	91.8	106.4
Medicine and sports	90.4	54.2	64.2	75.9	79.8	103.3
Pedagogy	85.7	76.6	48.9	59.7	74.4	85.9
Arts and Cinema	2.0	5.0	7.2	14.9	15.1	16.5

Source: USSR in figures in 1967, p. 128

Appendix VII. Percentage of women in the student bodies of higher institutions and specialized secondary schools in the U.S.S.R.

	1914/15	1927/28	1960/61	1966/67
IN HIGHER INSTITUTIONS		28	43	45
In higher institutions of industry, construction, transports and communications	1	13	30	32
Agricultural	5	17	27	26
Economics and law		21	49	57
Medical, sports		52	56	55
Pedagogical, arts and cinematography		49	63	65
IN SPECIALIZED SECONDARY SCHOOLS		38	47	51
Industry, construction, transports and communications		9	33	37
Agricultural		15	38	35
Economics and law		36	75	81
Medical and sports		89	84	88
Pedagogical, arts and cinematography		53	76	81

Source : 50 years of the USSR, Moscow, 1967, p. 282 (in Russian only)

Appendix VIII: Number of graduate students in the USSR

	1940	1945	1960	1966
Total (end of the year)	16 863	9 794	36 754	93 755
Full-time graduate students	14 425	8 676	22 978	52 936
Part-time graduate students	2 438	1 118	13 776	40 819
In higher educational institutions	13 169	6 857	20 406	55 026
full-time	11 506	6 101	13 463	34 509
part-time	1 663	756	6 943	20 517
In research institutions	3 694	2 937	16 348	38 729
full-time	2 919	2 575	9 515	18 427
part-time	775	362	6 833	20 302

Source: 50 years of the USSR, Moscow, 1967, p. 286 (in Russian only)

Appendix IX. Number of research workers (in thousands; at the end of year)

	1947	1950	1960	1965	1966	1967
Total number of research workers	145.6	162.5	354.2	664.6	712.4	769.6
Including people with scientific degrees of:						
Doctor of Science	7.7	8.3	10.9	14.8	16.6	18.3
Candidate of Science	36.9	45.5	98.3	134.4	152.4	169.3
Number of people possessing scientific titles of:						
Academician, corresponding members of academy, professor	8.9	8.9	9.9	12.5	13.6	14.7
Associate Professor	20.2	21.8	36.2	48.6	52.8	56.9
Senior Research Worker	9.8	11.4	20.3	28.7	30.2	32.4
Junior Research Worker and Assistant	25.6	19.6	26.7	48.9	47.7	46.3

Source: USSR in figures in 1967, p. 130.