

# Dynamics Analysis of the Main Indicators of the Higher Education System in the Regions of the Volga Federal District

## Análisis dinámico de los principales indicadores del sistema de educación superior en las regiones del Distrito Federal del Volga

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## Abstract

The relevance of the chosen topic is due to the present rise of humanity to a new wave of scientific and technological progress, which is based on various achievements in high technologies of informatics, microelectronics, nanotechnology, genetic engineering, space exploration, etc. In these conditions, the education sector, which acts as a supplier of personnel, has become a priority direction of the state economic social policy of highly developed countries.

**Keywords:** higher professional education, Volga Federal District, number of students, full-time education, independent educational institutions.

## Resumen

La relevancia del tema elegido se debe al actual ascenso de la humanidad a una nueva ola de progreso científico y tecnológico, que se sustenta en diversos logros en altas tecnologías de la informática, microelectrónica, nanotecnología, ingeniería genética, exploración espacial, etc. En estas condiciones, el sector de la educación, que actúa como proveedor de personal, se ha convertido en una dirección prioritaria de la política social económica estatal de los países altamente desarrollados.

**Palabras clave:** educación profesional superior, Distrito Federal del Volga, número de estudiantes, educación a tiempo completo, instituciones educativas independientes.

## Introduction

We have chosen the Volga Federal District to analyze changes in the main indicators of the higher education system.

Volga Federal District (VFD) is a federal district of the Russian Federation, formed by the Decree of the President of the Russian Federation of May 13, 2000. The Volga Federal District includes 14 constituent entities of the Russian Federation.

The territory of the district is 6.06% of the territory of the Russian Federation. The population of the Volga Federal District is 29,287,683 people according to data for 2020 or 19.96% of the population of Russia. The majority of the population is urban dwellers (72.19%), which is somewhat lower than the national average (74.66%).

The administrative center and the largest city in the district is Nizhny Novgorod.

The share of industrial production in the Volga Federal District in the Russian economy is 23.9% - the highest indicator (the Central Federal District ranks place). Also, in agriculture, the Volga Federal District occupies leading positions in both crop and livestock production.

The composition of the Volga Federal District is shown in Table 1.

**Table 1.** Composition of the Volga Federal District

Seq.No	Subordinate entity of the Federation	Area, sq.km	Population (ppl.)	Administrative centre
1.	The Republic of Bashkortostan	142 947	4 038 15	Ufa
2.	The Kirov region	120 374	1 262 402	Kirov
3.	The Mari El Republic	23 375	679 417	Yoshkar Ola
4.	The Republic of Mordovia	26 128	790 197	Saransk
5.	The Nizhny Novgorod region	76 624	3 202 946	Nizhny Novgorod
6.	The Orenburg region	123 702	1 956 835	Orenburg
7.	The Penza region	43 352	1 305 563	Penza
8.	The Perm region	160 236	2 599 260	Perm
9.	The Samara region	53 565	3 179 532	Samara

10.	The Saratov region	101 240	2 421 895	Saratov
11.	The Republic of Tatarstan	67 847	3 902 642	Kazan
12.	The Udmurt Republic	42 061	1 500 955	Izhevsk
13.	The Ulyanovsk region	37 181	1 229 824	Ulyanovsk
14.	The Chuvash Republic	18 343	1 217 818	Cheboksary

The above data show that the Volga Federal District is one of the largest federal districts of the Russian Federation, important both in industrial and agricultural terms.

The volume of investments in the Volga Federal District is 15.3% of all investments in Russia.

This confirms the importance of providing the region with highly qualified specialists, the development of the higher education system in the region. The data on higher education in the Volga Federal District are given on the basis of statistics provided on the website of the Ministry of Education (<https://minobrnauki.gov.ru>).

As Table 1 shows, the Republic of Tatarstan ranks 7th among 14 entities of the Volga Federal District in territory size and first in population.

## Results and Discussion

In terms of the number of institutions of higher professional education and students, the Volga Federal District is one of the leaders in the Russian Federation, which can be seen from Table 2. Table also shows that the Volga Federal District is second only to the Central Federal District in both these indicators.

It should also be noted that the top 100 universities in Russia included 15 universities in the Volga Federal District. Among them are four universities of the Republic of Tatarstan (Kazan (Volga Region) Federal University, Kazan State Medical University, A.N. Tupolev Kazan National Research Technical University - KAI, and Kazan National Research Technological University - KKhTI); three universities of the Samara region (Academician S.P. Korolev Samara National Research University, Samara State Medical University, Samara State Technical University); two of the Republic of Bashkortostan (Ufa State Aviation Technical University, Bashkir State University) and two - Saratov Region (V.I. Razumovsky Saratov State Medical University, N.G. Chernyshevsky Saratov National Research State University). This includes universities with the best conditions for quality education, a high level of demand for graduates by employers and a level of research activities.

**Table 2.** The number of students by federal districts (people) and the number of institutions of higher professional education (HPE) in 2019 (<https://minobrnauki.gov.ru>)

Seq.No	Region	The number of students, people	The number of educational institutions of HPE
	The Russian Federation	4068327	724
1.	The Volga Federal District	807917	112
2.	The Central Federal District	1268510	262
3.	The North-Western Federal District	418905	87
4.	The Southern Federal District	404562	59
5.	The North Caucasus Federal District	208610	43
6.	The Urals Federal District	299190	49
7.	The Siberian Federal District	475879	72
8.	The Far Eastern Federal District	184754	40

However, analysis of changes in the number of independent educational institutions of higher professional education (HPE) shows that over the past five years the number of educational

organizations of HPE in the Volga Federal District has decreased by 15%. This can be seen from the data in Table 3.

**Table 3.** Number of educational institutions of HPE

Seq. No	Region	2015	2017	2018	2019
	The Russian Federation	896	766	741	724
	The Volga Federal District	131	117	116	112
1.	The Republic of Bashkortostan	11	10	10	10
2.	The Mari El Republic	3	3	3	3
3.	The Republic of Mordovia	3	3	3	2
4.	The Republic of Tatarstan	25	24	23	22
5.	The Udmurt Republic	7	7	7	7
6.	The Chuvash Republic	5	4	4	4
7.	The Perm region	12	10	10	10
8.	The Kirov region	6	4	4	4
9.	The Nizhny Novgorod region	13	11	11	10
10.	The Orenburg region	5	5	5	6
11.	The Penza region	4	4	5	5
12.	The Samara region	25	20	19	17
13.	The Saratov region	7	7	7	7
14.	The Ulyanovsk region	5	5	5	5

This reduction affected the Samara region the most, where 5 military-industrial organizations were closed in 5 years.

This applies to an even greater extent to private independent educational institutions of higher professional education, where the reduction over 5 years in the Volga Federal District was 25%.

The reduction in the number of educational institutions went hand in hand with the reduction in the number of students, as the data in Table 4 show.

**Table 4.** Dynamics of the number of students in educational institutions of higher professional education, people ([www.fiilledu.ru](http://www.fiilledu.ru))

Seq. No	Region	2015	2017	2018	2019
	The Russian Federation	4766479	4245885	4161672	4068327
	The Volga Federal District	946023	851728	828791	807917
1.	The Republic of Bashkortostan	114417	103552	100525	97187
2.	The Mari El Republic	19645	19038	18357	17267
3.	The Republic of Mordovia	30148	27813	26365	25461
4.	The Republic of Tatarstan	163201	149927	146913	143941
5.	The Udmurt Republic	51290	45690	44054	43388
6.	The Chuvash Republic	38349	35403	34387	34458
7.	The Perm region	66369	56572	55169	54033
8.	The Kirov region	36202	32854	31199	28911
9.	The Nizhny Novgorod region	98192	88173	84776	83490
10.	The Orenburg region	53322	46315	45891	43510
11.	The Penza region	40159	33648	33296	32503
12.	The Samara region	110963	99850	96920	94568
13.	The Saratov region	84494	75998	74594	73611
14.	The Ulyanovsk region	39272	36895	36345	35589

The total number of students in the Volga Federal District has decreased by 14.5% over the past 5 years, which roughly coincides with the decrease in the number of students in the Russian Federation - 14.6%.

Part-time students underwent the greatest reduction, which is most represented by the data in Table 5, namely, 33% in the Russian Federation and 30.6% in the Volga Federal District.

**Table 5.** The number of students enrolled in part-time education, people ([www.filledu.ru](http://www.filledu.ru))

Seq. No.	Region	2015	2017	2018	2019
	The Russian Federation	2237789	1730417	1636297	1500272
	The Volga Federal District	465699	369346	347851	323063
1.	The Republic of Bashkortostan	56357	47564	46459	44169
2.	The Mari El Republic	9359	7727	6855	5727
3.	The Republic of Mordovia	14177	11641	10382	9408
4.	The Republic of Tatarstan	79547	62901	58033	52286
5.	The Udmurt Republic	29201	23309	22183	21273
6.	The Chuvash Republic	20150	16293	15814	15788
7.	The Perm region	32082	23299	21439	19786
8.	The Kirov region	19049	15806	13703	11798
9.	The Nizhny Novgorod region	46024	36605	33691	31387
10.	The Orenburg region	30118	22715	21984	19885
11.	The Penza region	19291	12686	12557	12003
12.	The Samara region	49725	40921	38572	35426
13.	The Saratov region	41376	31507	30760	29893
14.	The Ulyanovsk region	19243	16372	15419	14234

As Table 6 shows, part-time students of private universities have undergone the maximum reduction: 63.2% in the Russian Federation, and 74.6% in the Volga Federal District.

**Table 6.** The number of part-time students in private universities, people (<http://obrnadzor.gov.ru/>)

Seq. No	Region	2015	2017	2018	2019
	The Russian Federation	570100	317578	269562	209599
	The Volga Federal District	100624	48130	35450	25593
1.	The Republic of Bashkortostan	12030	7317	5934	4022
2.	The Mari El Republic	2923	1940	1068	480
3.	The Republic of Mordovia	4271	2452	1434	1155
4.	The Republic of Tatarstan	31989	18618	14903	11460
5.	The Udmurt Republic	6381	1697	530	461
6.	The Chuvash Republic	4386	2903	2498	2078
7.	The Perm region	6033	1881	829	561
8.	The Kirov region	3491	1686	1309	645
9.	The Nizhny Novgorod region	7858	2842	1232	806
10.	The Orenburg region	4873	1480	1003	746
11.	The Penza region	2768	310	597	375
12.	The Samara region	6810	3678	2998	2124
13.	The Saratov region	4533	1131	888	563
14.	The Ulyanovsk region	2278	195	227	117

State funded students have undergone the lowest reduction over the last five years: 2.2% in the Russian Federation, and 4.3% in the Volga Federal District (Table 7).

**Table 7.** The number of students whose training was paid for at the expense of the federal budget, people (<http://obrnadzor.gov.ru/>)

Seq. No	Region	2015	2017	2018	2019
	The Russian Federation		1843016	1849256	1827862
	The Volga Federal District		361127	359493	352462
1.	The Republic of Bashkortostan	41624	39468	38863	38251
2.	The Mari El Republic	11672	12347	12505	11825
3.	The Republic of Mordovia	15134	14576	14112	13434
4.	The Republic of Tatarstan	59057	58067	57836	56986
5.	The Udmurt Republic	19054	19981	20026	19586
6.	The Chuvash Republic	13133	12459	12189	12308
7.	The Perm region	29135	29514	29626	29470
8.	The Kirov region	13902	13829	13521	12823
9.	The Nizhny Novgorod region	36312	36119	36308	36265
10.	The Orenburg region	22291	20724	20667	19909
11.	The Penza region	16653	14925	14874	14466
12.	The Samara region	42020	41026	40693	40193
13.	The Saratov region	31930	31511	31499	30423
14.	The Ulyanovsk region	16495	16581	16774	16523

We shall consider the possible reasons for a decrease in the number of university students and higher education institutions.

One of the reasons for the decline in the number of students could be the demographic situation associated with the consequences of the Great Patriotic War and the crisis of the 90s.

**Table 8.** Admission of students to HPE, people (<https://br-analytics.ru>)

Seq. No	Region	2015	2017	2018	2019
	The Russian Federation		1141988	1147932	1129381
	The Volga Federal District		227968	225312	221045
1.	The Republic of Bashkortostan	29911	28105	26363	26244
2.	The Mari El Republic	5223	5751	5399	4676
3.	The Republic of Mordovia	7577	7040	6751	6293
4.	The Republic of Tatarstan	44119	41166	41807	42725
5.	The Udmurt Republic	15027	13977	12810	12263
6.	The Chuvash Republic	9406	8550	8958	8843
7.	The Perm region	16089	14468	15562	14621
8.	The Kirov region	9263	8482	7852	7312
9.	The Nizhny Novgorod region	24368	24240	22490	23392
10.	The Orenburg region	12337	11783	11975	10065
11.	The Penza region	9588	8656	8360	8125
12.	The Samara region	29903	26177	27390	26908
13.	The Saratov region	22321	20299	20240	20909
14.	The Ulyanovsk region	10131	9274	9355	8669

**Table 9.** Data on the number of 11th grade school leavers and admission to universities, people (<https://br-analytics.ru>)

Seq. No	Region	2015	2017	2018	2019
1.	The number of 11th grade school leavers of general educational institutions of the Russian Federation, thousand people	730.9	716.9	729.1	733.0
2.	The number of 11th grade school leavers of general educational institutions of the Volga Federal District, thousand people	160.7	157.6	160.3	161.3
3.	Admission of students to Universities of the Russian Federation, thousand people	1221.8	1142.0	1147.9	1129.4
4.	Admission of students to Universities of the Volga Federal District, thousand people	245.3	228.0	225.3	221.0

However, comparison of the birth rate and the numbers of student enrollment (Tables 8 and 9) shows that 1997, when the majority of university applicants were born, is the year of the minimum birth rate, which started growing later. This is also indicated by the number of 11th grade graduates from general educational institutions, which also, as a rule, grew in the years indicated.

### Summary

In our opinion, the main reasons may be the drop in the living standards of the residents of the Russian Federation in the indicated years and, as a consequence, the lack of the necessary funds to receive education on a paid basis. This is also indicated by the practical invariability of the number of federal state students and a sharp decrease in the number of students of private universities, part-time students and students of state universities studying on a paid basis. Another possible factor may be an administrative approach aimed at closing private universities, where the cost of education is significantly lower than in public ones.

The reduction in the number of universities and students inevitably led to a reduction in the number of teaching staff (Table 10).

**Table 10.** The number of teaching staff, people (Zuev & Gretchenko, 2013)

Seq. No	Region	2015	2017	2018	2019
	The Russian Federation	279758	245078	236057	229334
	The Volga Federal District	51447	44854	42714	41336
1.	The Republic of Bashkortostan	6001	5240	5077	4884
2.	The Mari El Republic	1004	938	932	887
3.	The Republic of Mordovia	1929	1626	1502	1468
4.	The Republic of Tatarstan	8711	7864	7394	7220
5.	The Udmurt Republic	2382	2105	2011	1981
6.	The Chuvash Republic	1860	1515	1417	1363
7.	The Perm region	3951	3448	3309	3200
8.	The Kirov region	1553	1350	1285	1224
9.	The Nizhny Novgorod region	5870	5000	4839	4719
10.	The Orenburg region	2698	2351	2149	2058
11.	The Penza region	2070	1767	1696	1678
12.	The Samara region	6338	5632	5320	5039
13.	The Saratov region	5019	4289	4095	3968
14.	The Ulyanovsk region	2061	1729	1688	1647

The number of teaching staff in the Russian Federation has decreased over the past 5 years

by 18%, and in the Volga Federal District by 20%.

Another important moment is a drop in the number of Ph.D. and candidates of science among teaching staff at universities (Tables 11 and 12). Thus, the number of Ph.D. teaching in the universities of the Russian Federation has decreased over 5 years by 14.3%, and in the Volga Federal District by 14.2%. An even greater reduction took place among candidates of sciences. In the Russian Federation, the number of candidates of science has decreased by 16.9%, and in the Volga Federal District by 17.6%.

**Table 11.** The number of doctors of science in universities, people (Zuev & Gretchenko, 2013)

Seq. No	Region	2015	2017	2018	2019
The Russian Federation		42357	38386	37126	36283
The Volga Federal District		7497	6806	6619	6436
1.	The Republic of Bashkortostan	959	875	841	819
2.	The Mari El Republic	129	120	123	117
3.	The Republic of Mordovia	279	247	234	224
4.	The Republic of Tatarstan	1263	1165	1141	1120
5.	The Udmurt Republic	322	304	293	280
6.	The Chuvash Republic	207	186	179	170
7.	The Perm region	514	475	473	460
8.	The Kirov region	175	153	140	142
9.	The Nizhny Novgorod region	833	781	764	735
10.	The Orenburg region	323	313	302	288
11.	The Penza region	317	258	260	254
12.	The Samara region	926	868	850	830
13.	The Saratov region	972	831	803	781
14.	The Ulyanovsk region	278	230	216	216

**Table 12.** The number of candidates of science in universities, people (Zuev & Gretchenko, 2013)

Seq. No	Region	2015	2017	2018	2019
The Russian Federation		159965	141662	136528	132938
The Volga Federal District		30771	27375	26033	25356
1.	The Republic of Bashkortostan	3628	3278	3143	3032
2.	The Mari El Republic	649	607	593	568
3.	The Republic of Mordovia	1342	1164	1075	1037
4.	The Republic of Tatarstan	5229	4758	4471	4412
5.	The Udmurt Republic	1461	1281	1224	1213
6.	The Chuvash Republic	1120	931	866	842
7.	The Perm region	2121	1988	1898	1882
8.	The Kirov region	951	876	862	828
9.	The Nizhny Novgorod region	3386	2902	2818	2749
10.	The Orenburg region	1697	1514	1406	1350
11.	The Penza region	1294	1106	1043	1033
12.	The Samara region	3625	3275	3113	2983
13.	The Saratov region	3049	2622	2485	2414
14.	The Ulyanovsk region	1219	1073	1036	1013

As a result, the number of students per teacher, Ph.D. and candidate of sciences on average has significantly increased. For the Volga Federal District, the ratio in 2015 was 18.4, 126.2, and 30.7, respectively, and in 2019 - 22.9, 147.0, and 31.9, respectively. This indicates a decrease in the provision of qualified teachers, despite the decrease in the number of students.



## Conclusions

In this regard, to identify the qualitative component of satisfaction with the availability and quality of higher education in the regions of the Volga Federal District, we conducted a content analysis of the information presented in the media about the availability and quality of higher education. We selected five information portals of the largest socio-political publications of the Volga Federal District (Strategy for the development of education in the Republic of Tatarstan for 2017-2021 and up to 2030): Business-online (Republic of Tatarstan), Bashinform.rf (Republic of Bashkortostan), Saratovnews.ru (Saratov region), Ulyanovskaya Pravda (Ulyanovsk region), and Vyatka oblastnaya (Kirov region).

Content analysis was carried out for the period from 01.01.2019 to 31.01.2019 inclusively.

The choice of these sources is due, firstly, to their popularity among readers - the selected publications were included in the TOP-20 of the most cited media in the Volga Federal District (Kalimullin et al., 2016), and, secondly, informational Internet portals, electronic versions of newspapers have an almost unlimited audience of readers.

The categories of content analysis were the quality of higher education and the availability of higher education (Vershinskaya et al., 2020; Berestova et al., 2020). An article was taken as a unit of account, that conveys a negative, neutral or positive attitude towards the studied characteristics of the higher education system. Table 13 presents the results of the conducted content analysis.

**Table 13.** Content analysis of media publications that characterize the quality and availability of higher education in 2019

№№ п/п	Source	The availability of higher education			The quality of higher education		
		«-»	«0»	«+»	«-»	«0»	«+»
1.	"Business online"	15	35	31	20	12	23
2.	Bashinform.rf	31	18	13	16	14	22
3.	"Nizhny Novgorod online"	13	20	16	8	12	14
4.	Orenburg.ru	18	16	10	8	10	16
5.	"Mariyskaya pravda"	13	17	19	10	14	8

The largest number of publications related to higher education was posted in Business Online - 136, the smallest - in Mariyskaya Pravda - 79. The largest number of "positive" publications both on the availability and the quality of higher education were posted in Business Online. This is quite understandable - the Republic of Tatarstan is one of the leaders in terms of the number of students and their provision with budget places. In general, the number of "negative" reviews regarding the availability of higher education slightly exceeds the number of "positive" ones (90 and 89, respectively). The assessment of the quality of higher education shows an opposite situation - 83 "positive" and 62 "negative". The problem of accessibility of higher education interests the media much more than the quality of education (285 publications versus 207). In general, the picture corresponds to a study conducted in 2015 on the availability and quality of education (Kvon et al., 2019; Ignateva et al., 2019).

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