Evaluation of Undergraduate Teaching Quality in Local Colleges and Universities Based on the Discreteness of Postgraduate Entrance Examination Results

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Abstract. The results of analysis not only can be used as a means of teaching quality evaluation, but also is an important basis for teaching research. Based on the examination results analysis of the use of feedback mechanism, will help to improve the quality of education and teaching. In order to study the evaluation of undergraduate education in basic courses and professional courses and teaching quality, this paper use the principle and methods of educational statistics to apply for graduate students, from the entrance exam of this perspective, through a school for nearly three years, the entrance examination sample for statistical processing and discrete analysis, discusses the reform of undergraduate teaching effect, different problems and basic courses and professional courses, and draw conclusions and suggestions with reference value and practical significance.

Keywords: Graduate entrance examination results · Discreteness
Local colleges and universities · Quality of undergraduate teaching

1 Introduction

China higher education has been basically the transition from elite education to mass education stage, also is in the transition from scale expansion to quality period of. The national Ministry of education and the Ministry of Finance issued on "12th Five-Year" during the implementation of undergraduate teaching quality and teaching reform project opinions in 2011, and in Colleges and universities across the country to carry out undergraduate teaching quality audit, which fully shows that the undergraduate teaching quality problems have aroused the attention of the country [1].

This paper studies the master of a local college entrance exam scores of students, through the discrete analysis of the graduate entrance examination scores, main problems of undergraduate teaching quality in the teaching of basic courses, different professional courses and teaching and how to improve the teaching quality of undergraduate education [2–4].

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2 The Application of Average and Standard Deviation in the Analysis of Performance

2.1 The Theory of Mean Value and Standard Deviation

The overall situation of a collective test should include two aspects: one is the average of the sample and the other is the standard deviation of the sample [5].

The average of the sample:

$$\overline{x} = \frac{1}{N} = \sum_{i=1}^{N} x_i. \tag{1}$$

The standard deviation of the sample:

$$\sigma = \sqrt{\frac{1}{N}\sum_{\mathrm{i}=1}^{N}(x_i - x)^2}. \tag{2}$$

Where N is number of samples.

The average value of the data is described from statistics, the standard deviation is the description of the data dispersion statistic average value equal to standard deviation of different groups, there are obvious differences in the distribution of students marks, only the mean and standard deviation of two statistics to that of a set of data in the picture [6]. The value of standard deviation that shows the extent of discrete data is larger, more uneven distribution of data, more broadly, that individual role is significant, the overall quality of teaching need to be examined. Therefore to discuss the main problems of undergraduate teaching quality in the teaching of basic courses teaching and different professional courses, to graduate students in the statistical analysis of the mean and variance of test results is an important channel [7].

2.2 Sample Mean and Standard Deviation

How to evaluate the quality of undergraduate teaching, distribution of graduate entrance examination scores may bring some inspiration. The following respectively from 2014, 2015 and 2016 at a local university students to participate in the unified national graduate entrance examination scores overall, random sample of 30 samples were analyzed. For statistical analysis, the specialized courses and specialized courses for two of the mean and standard deviation is the list of original score conversion.

As can be seen from the data in Table 1:

$$\bar{x}_{Political\ 14} = 59.87, \bar{x}_{English\ 14} = 45.93, \bar{x}_{Business\ 1\ 14} = 51.16$$
$$\bar{x}_{Business\ 2\ 14} = 78.23, \bar{x}_{Total\ grade\ 14} = 299.87$$
$$\sigma_{Political\ 14} = 9.00, \sigma_{English\ 14} = 12.24, \sigma_{Business\ 1\ 14} = 22.83$$
$$\sigma_{Business\ 2\ 14} = 19.05, \sigma_{Total\ grade\ 14} = 61.73$$

Table 1. Random sample of local university students to participate in the unified national graduate entrance examination in 2014

Sample	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Political	58	61	48	65	58	72	70	66	53	64	59	63	38	48	71
English	35	24	31	50	53	43	61	21	47	53	41	50	54	53	32
Business 1	110	137	22	113	120	123	126	126	22	92	88	71	35	45	23
Business 2	124	102	108	120	126	109	127	90	108	133	119	139	61	118	139
Total grade	327	324	209	348	357	347	384	303	230	342	307	323	188	264	265
Sample	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Political	67	53	53	59	67	58	56	65	59	58	56	70	67	45	74
English	72	55	28	64	53	43	51	57	42	36	35	55	44	38	61
Business 1	92	83	28	100	51	76	82	111	60	37	52	83	81	49	70
Business 2	138	142	138	132	121	116	113	131	140	119	134	126	134	65	150
Total grade	369	333	247	355	292	293	302	364	301	250	277	334	326	197	355

Table 2. Random sample of local university students to participate in the unified national graduate entrance examination in 2015

Sample	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Political	49	49	27	47	47	75	75	66	74	56	71	43	63	77	54
English	30	21	24	28	45	61	53	48	72	14	56	51	55	55	57
Business 1	61	17	36	79	124	127	107	105	130	54	112	65	124	133	132
Business 2	73	17	142	40	120	102	127	131	128	23	131	40	109	122	132
Total grade	213	104	229	194	336	365	362	350	404	147	370	199	351	387	375
Sample	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Political	76	52	70	64	66	67	64	55	53	44	63	56	40	69	60
English	66	49	47	41	66	58	63	55	40	30	57	66	27	44	68
Business 1	133	99	115	108	137	122	130	93	48	59	45	77	25	83	129
Business 2	141	111	128	119	121	120	108	99	75	118	123	148	52	132	145
Total grade	416	311	360	332	390	367	365	302	216	251	288	347	144	328	402

As can be seen from the data in Table 2:

$$\bar{x}_{Political\ 15} = 59.07, \bar{x}_{English\ 15} = 48.23, \bar{x}_{Business\ 1\ 15} = 62.45,$$
$$\bar{x}_{Business\ 2\ 15} = 78.64, \bar{x}_{Total\ grade\ 15} = 306.83$$
$$\sigma_{Political\ 15} = 12.19, \sigma_{English\ 15} = 10.21, \sigma_{Business\ 1\ 15} = 24.07,$$
$$\sigma_{Business\ 2\ 15} = 24.32, \sigma_{Total\ grade\ 15} = 58.67$$

Table 3. Random sample of local university students to participate in the unified national graduate entrance examination in 2016

Sample	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Political	74	59	46	70	65	51	48	76	52	61	62	55	52	59	62
English	41	44	55	49	44	58	41	45	36	33	58	39	39	36	57
Business 1	103	105	45	118	124	133	111	147	92	71	93	111	36	42	71
Business 2	108	106	63	121	137	143	59	144	48	140	67	106	59	140	137
Total grade	326	314	209	358	370	385	259	412	228	305	280	311	186	277	327
Sample	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Political	65	47	69	65	67	55	54	54	58	52	66	66	36	59	64
English	47	43	43	59	52	46	39	35	38	50	49	30	27	38	39
Business 1	77	28	35	83	107	47	51	24	56	53	64	81	22	87	71
Business 2	145	124	121	129	144	87	101	95	139	129	95	118	50	130	132
Total grade	334	242	268	336	370	235	245	208	291	284	274	295	135	314	306

As can be seen from the data in Table 3:

$$\bar{x}_{Political\ 16} = 58.97, \bar{x}_{English\ 15} = 48.67, \bar{x}_{Business\ 1\ 15} = 53.98,$$
$$\bar{x}_{Business\ 2\ 15} = 78.86, \bar{x}_{Total\ grade\ 15} = 307.80$$
$$\sigma_{Political\ 5} = 8.77, \sigma_{English\ 15} = 8.32, \sigma_{Business\ 1\ 15} = 20.38,$$
$$\sigma_{Business\ 2\ 15} = 15.04, \sigma_{Total\ grade\ 15} = 52.43$$

2.3 The Discrete-Time Analysis of Graduate Entrance Examination Results

In 2015, the local university held a school since one of the largest teaching work conference, the unity of thinking, adhere to the "four priority", namely the work on priority funding priority investment, resource allocation policy priority, priority support, earnestly implement the central position of undergraduate teaching, and the "three a satisfied with" teaching satisfaction, teacher satisfaction and student satisfaction as a measure of the standard of work departments at all levels. In specific work, by the Ministry of education for the implementation of the "quality project" of the east wind, carried out a series of undergraduate teaching reform. How to reform from the past three years school students to participate in the national postgraduate entrance exams for discrete analysis this point. According to the above 2014–2016 years of school students to participate in the national postgraduate entrance examination scores sampling statistics:

$$\bar{x}_{Total\ grade\ 14} < \bar{x}_{Total\ grade\ 15} < \bar{x}_{Total\ grade\ 16}$$

$$\sigma_{Total\ grade\ 14} > \sigma_{Total\ grade\ 15} > \sigma_{Total\ grade\ 16}$$

the sample average increases, and the sample standard deviation is decreased, the overall performance of students in grades improve, dispersion significantly reduced, indicating that the overall effect of undergraduate teaching in improving the teaching effect, tended to be concentrated. Sample mean and standard courses of political theory and foreign language achievement scores difference Changes are like Table 4.

Table 4. Sample mean and standard courses of political theory and foreign language achievement scores table

Year	2014	2015	2016
$\bar{x}_{Political}$	59.87	59.07	58.97
$\bar{x}_{English}$	45.93	48.23	48.67
$\sigma_{Political}$	9.00	10.19	8.77
$\sigma_{English}$	12.24	12.21	8.32

As can be seen from the data in Table 4, the sample mean volatility is not political theory courses from 2014–2016 for 3 years, the corresponding standard deviation is basically similar to that of the school students' political theory education is relatively stable, the overall political literacy of students better. English scores of the sample mean increases the corresponding the standard deviation is gradually decreased, indicating that the teaching effect of the school English class has risen, the discreteness of student achievement in the reduced teaching effect tends to focus on the overall performance of the students, to improve English achievement, but the mean is small, that the English teaching is still the school base. There is still much room for improvement in the quality of English teaching. The further improvement of the quality of English teaching can not only effectively promote the overall teaching level of the school, but also further improve the proportion of the students taking the postgraduate's further education.

Changes in sample mean and standard deviation of business class one and business class two, such as Table 5.

Table 5. sample mean and standard deviation of business class one and business class two table

Year	2014	2015	2016
$\bar{x}_{Business\ 1}$	51.16	62.45	53.98
$\bar{x}_{Business\ 2}$	78.23	78.64	78.86
$\sigma_{Business\ 1}$	22.83	24.07	20.38
$\sigma_{Business\ 2}$	19.05	24.32	15.04

As can be seen from the data in Table 5, the results of sample mean in 2015 two a business class and business class have increased significantly, but the standard deviation is suddenly increased, the overall student grades have improved, but also increase the differentiation of students from 2014–2016 for 3 years, schools with the actual

analysis, the possible reason is the school of undergraduate teaching at the beginning of reform deepening educational reform work, eager to seize the key points, which led to the students to see the results of polarization, such as grading teaching measures of schools take is perhaps one of the reasons leading to polarization; after the timely adjustment and improvement to a business class in 2016 and business class two grade sample mean increased, especially the standard deviation was also decreased, indicating the teaching effect tends to focus on the reform of undergraduate teaching, and achieved remarkable results; statistical data from two business class, 2014–2016 standard deviation is large, the relevant examination and subject difference, different difficulty and other factors, but the sample mean is relatively high, indicating that the professional teaching and the students are better. From 2014–2016 of the sample mean, business class two was significantly higher than that of the business class, the school in the teaching of solid foundation, students' learning and application ability. But the theoretical foundation is relatively weak, and the school has a greater promotion space in basic theory education.

3 Conclusions and Suggestions

The national postgraduate entrance examination is a unified standard, authoritative examination has high evaluation level, by the students of a local university in discrete analysis of the national graduate admission test scores, school evaluation based on the results of statistical analysis to the quality of undergraduate teaching, summed up the three aspects of the following conclusions can be drawn:

(1) The central position of undergraduate teaching has been strengthened and the effect of teaching has been greatly improved.
(2) The quality of the professional course is relatively stable and the teaching effect is ideal. It shows that the quality of the school is stable in the training of professional teaching and professional talents.
(3) Basic course teaching has greatly improved space, teaching methods, teaching methods and teachers to be further strengthened, reflects the basic quality of students is not high school, basic research and basic ability is not strong enough, also influence the school students graduate enrollment.

According to the statistical analysis of the situation, as the foundation to enhance the ability of local undergraduate teaching quality and students, teaching and Research on the basic theory of strengthening is recommended. First of all, should attach importance to cultivate the basic theory and the ability of correcting "training theory and the ability of investment, quick slow wrong thinking", to medium thick foundation, heavy ability of undergraduate talents; secondly, investment should tilt to the foundation of teaching, increase the basic laboratory construction, improve the weight based teaching in the teaching evaluation index system of the basic theory, the introduction of high-level leading talent, through the education effect of teacher driven basic theory teaching in the whole body level; moreover, strengthen guidance and education for students, let the students understand the basic ability is the foundation and guarantee of professional competence, professional and academic field to the road to go farther,

must have a solid foundation of theory; finally, we should give play to the talents cultivation advantages, explore the basic theory of new ideas into teaching more in theory teaching, make relatively dry with professional practice fusion and more energetic.

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