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Quantitative research and analysis based on Matlab integration of English teaching

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ABSTRACT

By using mathematical software Matlab, the random research objects are descriptive analysis, correlation analysis and regression analysis, in order to further the quantitative data analysis English integrated course teaching, and from the perspective of the cognitive process and improve the English teaching. Finally based on the main result of this paper, we give the constructive Suggestions of teaching. Integration teaching closely around the implementation of the new curriculum of "knowledge and skills, process and methods, emotional attitude and values" goal design, from stimulating the enthusiasm of students' autonomous learning, from the Angle of students learning process, to give inspiration, guide the student to carry on the reflection and evaluation, feedback on the learning process. It broke the traditional mode, establish the multidirectional communication mode, form the three-dimensional network of communication; Reflects the students are the main body of learning, pay attention to the students' self-study, promote students to learn, to learn again, so learning to learn, learn to explore; Implementation to the teacher as the center to take the student as the center, in the process of teaching to fully demonstrate the student thought processes, can fully mobilize the enthusiasm and initiative of student learning, create conditions for students' learning, improve the quality of learning and the students' science literacy. Can develop students' individual character and can make its comprehensive development, causes the student to learn easily, the teacher teach well, make the teaching to the benefit of both parties. Reduced integration teaching classroom recessive waste, greatly improving the efficiency of classroom teaching, improve class yield rate.

KEYWORDS

Matlab simulation; Multiple linear regressions; Correlation analysis; English teaching.



INTRODUCTION

Traditional English teaching mode light weight on practice. Teaching needs to keep pace with The Times. As the pace of economic globalization, the needs and requirements of the larger and larger. This requires pay more attention to the cultivation of practical ability in teaching English, but some of teachers' practical ability, such as will not create close to student life, are not good at accurately express or organization of classroom teaching in English, not good at blackboard writing, not proficient in the use of modern teaching means, etc. This leads to students feel no interest, does not have attains. This serious deviation from the university of the ultimate goal of teaching, cultivate students is difficult to meet the requirements of society and era. So to combining theory with practice. However, pay attention to integrated curriculum theory with practice, improve the relationship between the student and teacher, to cultivate the students' comprehensive quality, improve the students' employment rate.

STUDYING METHODS

In order to get a more comprehensive data, the 30 students selected randomly from different undergraduate majors serve as study object in the paper according to the actual situation of each, among whom there are 24 boys and 6 girls. Their course grades are collected, which includes "College English", "Comprehensive English", "Practical Career English" and "Advanced English."

Use Matlab mathematical software 7.0 to analyze data, study the collected materials from the Institute, and use quantitative research methods. Quantitative research methods are generally carried out to acquire the overall statistical results for the specific study object, which mainly includes statistical analysis, its description and analysis and forecasting for built econometric model.

DATA ANALYSIS

Matlab mathematical software is software for standard data analysis and graphing recognized by the international scientific publishing industry, which has powerful function and can be easily operated from a Lab company for Matlab mathematical software in the U.S. Its advantages are recognized as easily learning, powerful function and flexible operation. Its two main functions for the software are analysis and drawing.

TABLE 1 : Grades from 30 students

Student ID	College English	Comprehensive English	Practical Career English	Advanced English	Student ID	College English	Comprehensive English	Practical Career English	Advanced English
1	69	83	69	71	16	71	75	62	90
2	66	84	61	82	17	63	87	77	88
3	76	85	70	81	18	70	80	72	85
4	72	90	80	90	19	60	79	77	77
5	73	84	74	68	20	69	82	66	85
6	79	85	68	65	21	72	87	84	87
7	65	93	81	88	22	76	86	77	76
8	74	84	77	85	23	75	78	69	87
9	74	85	70	81	24	71	87	73	70
10	70	84	70	75	25	68	78	72	90
11	75	80	75	88	26	75	87	70	83
12	68	88	67	76	27	60	89	76	88
13	71	89	77	92	28	69	82	71	76
14	68	85	80	77	29	77	80	71	81

15	61	74	85	89	30	64	90	52	71
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Firstly, in TABLE 1 the data's are typed into the software Matlab mathematical software, and then analyze and process the results. The analytical methods are used in this paper including:

Descriptive Analysis: The collected data's are organized, summarized and described, and commonly used means include amount and range.

Correlation analysis: analysis for distinction degree, degree reliability of test questions.

Regression Analysis: multiple linear regression analysis mainly is applied.

MAIN RESULTS

Descriptive analyses

First, work out the amount, average mark, range, standard deviation of the four courses, and then input the scores of the four courses into Matlab mathematical software to gain statistics for columns, which are shown in TABLE 2.

TABLE 2 : Descriptive data analysis

course	amount	average mark	range	standard deviation	Lowest score	highest score
College English	30	70.03	19	5.09	79	60
Comprehensive English	30	84	19	4.54	93	74
Practical Career English	30	72.43	33	6.96	85	52
Practical Career English	30	81.4	27	7.50	92	65

From TABLE2, standard deviation of Comprehensive English is 4.54, which is lowest in four courses, and the average mark is 84, which is the highest. It can be seen from the Table that the test questions in Comprehensive English are easier. Finally, normal distribution anlysis is made using Matlab mathematical software, for which TABLE3 shows like:

TABLE 3 : Normal distribution analysis

Course	N	W	P value	Decision
College English	30	0.95867	0.32715	Normal at 0.05 level
Comprehensive English	30	0.97482	0.71430	Normal at 0.05 level
Practical Career English	30	0.95960	0.34452	Normal at 0.05 level
Practical Career English	30	0.92802	0.05031	Normal at 0.05 level

From TABLE 3, the grads for these four courses are close to normal distribution.

Correlation analysis

Statistical correlation analysis is to study correlation among random variables, mainly to determine correlative relations by the correlation coefficient. If the two variables x and y has its respective sample values x_i and y_i , the correlation coefficient between them is:

$$r_{xy} = \frac{\sum_{i=1}^n (x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\sum_{i=1}^n (x_i - \bar{x})^2} \sqrt{\sum_{i=1}^n (y_i - \bar{y})^2}} \in [-1,1]$$

$$\bar{x} = \frac{1}{n} \sum_{i=1}^n x_i, \bar{y} = \frac{1}{n} \sum_{i=1}^n y_i$$

Absolute value of r_{xy} is close to 1, which indicates the close relationship of the two variables; however, their relationship is not close when the value is close to 0.

There are two main analysis steps mentioned in the paper, which are analysis on distinction degree and reliability degree of test questions.

First, Analysis on distinction degree of test questions

Distinction degree is one of the key indexes to measure the quality of test questions, mainly for the discernment of the questions. When distinction degree is higher, the different levels of the participants can be distinguished, thus, the value of used test questions is greater. But that does not mean the higher distinction degree is, the greater difficulty is. If the item difficulty is too high or too low, different levels of individuals will be not well distinguish. So when the problems are at medium difficulty, the distinction degree is highest.

Commonly used computation methods for distinction degree are shown in the two following ways:

$$D = PH - PL$$

$$D = \frac{XH - XL}{N(H - L)}$$

For the same method, the distinction degree of a certain test question in “Advanced English” is anal sized. The detailed analysis is shown in TABLE 4.

TABLE 4 : The distinction degree of a certain test question

Students ID	Total score	The score of the question	Students ID	Total score	The score of the question
1	71	18	16	90	11
2	82	14	17	88	15
3	81	15	18	85	16
4	90	16	19	77	12
5	68	13	20	85	13
6	65	14	21	87	16
7	88	14	22	76	14
8	85	13	23	87	13
9	81	16	24	70	16
10	75	14	25	90	17
11	88	14	26	83	14
12	76	15	27	88	17
13	92	14	28	76	16
14	77	13	29	81	14
15	89	17	30	71	15

The distinction degree of advanced English is too high by using Matlab mathematical software, which achieves 0.75392.

Secondly, reliability degree of test questions.

Usually the reliability of measurement results is called reliability degree, i.e. consistency credibility degree or reliable degree of the measurement results. Therefore, the test questions of high reliability can be used as a measure of standard of student achievement. Reliability mainly includes test-

retest reliability, split half reliability, alternate form reliability, Kuder Richardson reliability, clone Bach reliability and inter-scorer reliability. In this paper, the reliability is measured by using Internal Consistency Reliability, namely the split half reliability, its calculation formula is:

$$r_{xx} = \frac{n \cdot r_{x_1x_2}}{1 + (n-1)r_{x_1x_2}}$$

Among it, $r_{x_1x_2}$ shows the respective scores and correlative coefficients, n is multiple test questions relative to the original length change, calculate the reliability when $n=2$ is taken.

The test questions are divided into odd and even problems, then calculate the two part test score, calculate reliability coefficient using the correlation coefficient of two group scores, then the correlative coefficient is the internal consistency coefficient. Take reliability in "College English" for example, it is as shown in TABLE 5.

TABLE 5 : reliability degree analysis in College English

Student ID	College English	Score for odd question	Score for even question	Student ID	College English	Score for odd question	Score for even question
1	69	39	30	16	71	45	26
2	66	36	30	17	63	33	30
3	76	40	36	18	70	40	30
4	72	39	35	19	60	35	25
5	73	37	36	20	69	39	30
6	79	49	30	21	72	40	32
7	65	29	36	22	76	38	38
8	74	40	34	23	75	38	37
9	74	44	30	24	71	42	29
10	70	35	35	25	68	38	30
11	75	35	40	26	75	42	33
12	68	38	30	27	60	36	24
13	71	40	31	28	69	35	34
14	68	28	40	29	77	45	32
15	61	35	36	30	64	29	35

It can be seen that the reliability degree of College English is not high by using Matlab mathematical software, which is just 0.75392. Similarly, the reliability degree of another three courses can be obtained as follows:

TABLE 6 : The reliability degree of the three courses

course	Comprehensive English	Practical Career English	Advanced English
reliability degree	0.31002	0.47532	0.57013

From TABLE 6, the reliability degree of College English, Comprehensive English, Practical Career English and Advanced English are not high, among which Comprehensive English is 0.31002 as the lowest one, and that of Advanced English as the highest one is, 0.57013, even so, the result is not satisfying and optimistic.

Regression analysis

Correlation analysis and regression analysis are closely linked, which not only have the same research object, and often complement each other. Correlation analysis is the basis and premise for regression analysis, while regression analysis make s relevant analysis continue and deepen. In this paper, multiple linear regression analysis is used mainly. The called multiple linear regression analysis refers to the analysis for a linear relation between a dependent variable and multiple independent variables. The general form is:

$$Y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \cdots + \beta_m x_m + \varepsilon$$

Among it, β_0 is intercept, $\beta_1, \beta_2, \cdots, \beta_m$ are regression coefficients, ε is Residual.

According to sample data, the estimation value of the parameter of the model is obtained, the expression of the relationship between dependent variable variables and independent variables can be also obtained, and that is, the multivariate linear regression equation is as follows:

$$Y = b_0 + b_1 x_1 + b_2 x_2 + \cdots + b_m x_m .$$

When the "Advanced English" is considered as the dependent variable, and the "College English", "Comprehensive English" and "practical English" are considered as independent variables, find out the correlation between "Advanced English" and the other three courses. by Using Matlab mathematical software, multiple linear regression equation can be obtained as follows:

$$Y = 40.30975 - 0.10001x_1 + 0.379x_2 + 0.0963x_3 .$$

From the multiple linear regression equation, the relationship between "Advanced English" and the other three courses can be also obtained. Therefore, as long as the scores of three courses is known, the score of the fourth course can be estimated and predicted.

CONCLUSION

In this paper, with the help of Matlab mathematical software, a random sample of 30 students and four courses of descriptive analysis, correlation analysis and regression analysis, get the following results: (1) the four course grades are close to normal distribution, and this, full range, and other indicators are in reasonable range; (2) the degree of differentiation of some course exam is too high, "advanced English", for example, some questions of differentiation is beyond 0.7; Four classes (3) questions the reliability is not high, the highest "advanced English", but also only 0.57013; (4) the correlation between the lower course.

The significance of this paper is that the teaching Suggestions. Based on research results, this paper gives some Suggestions in the future English teaching: (1) about the course setting, consider the correlation between high, junior curriculum. (2) hold good exam degree of differentiation, should control the degree of differentiation in 0.3 above. But the higher the degree of differentiation does not mean that the higher the difficulty. (3) grasp the reliability test items.

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