Quantitative Research of Integrated Curriculum Teaching and Related Analysis based on the Origin

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Abstract. Using Origin Software, this paper analyzes the randomly selected thirty students and their four courses with descriptive analysis,correlation analysis and regression analysis,in order to further understand the quantitative data analysis of English integrated curriculum teaching, and cognitive and improve the English teaching process. Finally, this paper gives a few teaching suggestions.

Introduction

The traditional English teaching mode pays attention to lectures and underrates practice, but teaching needs of the times. With the increased pace of economic globalization, the society growing needs and demands of a foreign language. English teaching requires more attention to the actual ability, but the lack of practical ability of some teachers, for example, not creating the scene close to the student life, not good at accurately in English expression or organization of classroom teaching, not good at writing on the blackboard, not proficient in the use of modern teaching methods, and so on. This will cause students to feel no interest in learning nil, and so on. This is a serious deviation from the ultimate goal of university teaching and educating, and the students are difficult to meet the requirements of the society and the times. So We need to integrate theory with practice. However, Integrated curriculum system focus on linking theory with practice, improves the relationship between students and teachers, trains the overall quality of the students and increase the employment rate of students.

Origin Software Description

Origin is developed by American OriginLab and its function is powerful and easy to operate. Origin software was recognized by the international scientific publishing community as standard data analysis and graphing software, and its feature is easy to learn, powerful, and flexible operation. Two main functions of Origin are data analysis and mapping.

Research Methods

(1) In order to make the data collected more comprehensive, this paper randomly selects research object from the students of various professional undergraduate course. We choose thirty students including twenty four boys and six girls, and their four course grades including *College English, Comprehensive English, Practical workplace English* and *Advanced English.*

(2) This article uses Origin7.0 software to analyze and research of the data collected.

(3) This paper uses the quantitative research method. Quantitative research method is generally carried out in order to draw statistical results of the overall objects of specific study, including Statistical analysis,description and the establishment of econometric models, and forecast.

Data Analysis

This paper inputs the data (Table 1) into Origin software, and then analyzes and processes the results. The analysis method used in this paper includes:

Descriptive analysis, correlation analysis and regression analysis

(1) Descriptive Analysis: collate,summarize and describe the collected data.

(2) Correlation Analysis: Discrimination analysis and reliability analysis.

(3) Regression Analysis: Multiple linear regression analysis.

Where course1-4 are respectively College English, Comprehensive English, Practical workplace English and Advanced English.

Main Result

A. *Descriptive Analysis*

First, this paper calculates the four course's amount, range and so on, and then input the four course grades into Origin and use column statistics, so we get Table 2.

From Table 2, we get that the Standard Deviation of *Comprehensive English* is 4.54 for the smallest of the four courses and average score is 84 for the highest. It can be concluded that the test paper of Comprehensive English is a little simple.

Finally, we use Origin software for normal distribution analysis, and get Table 3.

TABLE III. 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 workplace English	30	0.95960	0.34452	Normal at 0.05 level
Advanced English	30	0.92802	0.05031	Normal at 0.05 level

From Table 3, we can get that the four courses of the scores were close to normal distribution.

B. *Correlation Analysis*

Correlation Analysis is the Statistical analysis method for studying correlation between the random variable, and we mainly use correlation coefficient to determine correlation. First we give two variables x and y . If their sample values are respectively x_i and y_i , then their correlation coefficient are:

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

If the absolute value of r_{xy} is closer to 1, the relationship between the two variables is more closely. If the absolute value of r_{xy} is closer to 0, the relationship between the two variables is not more closely.

In this paper, we give two step: First step, discrimination analysis of test paper; Second step, reliability analysis of test paper.

First step: Discrimination analysis of test paper

Discrimination is one of the main indicators for measuring quality of test paper,

and we call it discernment. Discrimination is higher, this test paper the more distinguishes the different levels of participants. This shows that the value of adopted test paper is greater. But the higher of discrimination does not mean that the higher of the difficulty. If the difficulty of test paper is too high or too low, test paper can't distinguishes the different levels of participants very well. So the difficulty of test paper is middle level, discrimination is the best.

Calculation methods of discrimination are two:

$$D = PH - PL$$

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

Due to practice consistent, so we only analyze the discrimination of one question in the "Advanced English" exam, see Table 4.

TABLE IV. DISCRIMINATION OF QUESTION

ID	Total score	This question score	ID	Total score	This question score
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

Using Origin software, we can have that discrimination of *Advanced English* is too high, reached 0.75392.

Second step: Reliability analysis of test paper

It is known that the reliability of the measurement result is usually called reliability, that is the consistency degree or credibility degree of the measurement result. So test paper of higher reliability can be used as a measure standard of the student's grade. Reliability mainly contains test-retest reliability,alternate form reliability,split-half reliability,Kuder—Richardson reliability,Cronbach reliability and inter-scorer reliability. In this paper, we use the internal consistency coefficient to measure the reliability, that is the split-half reliability and the formula is:

$$r_{xx} = \frac{n \cdot r_{x_1 x_2}}{1 + (n-1) r_{x_1 x_2}}$$

where, $r_{x_1 x_2}$ is score and correlation coefficient of two halves of question, n is the multiple of length of the original paper relative to changing paper, and usually calculating the reliability, we take $n = 2$.

First, we put the test paper into odd-and even-numbered questions. Second, we

calculate scores of two part questions. Finally, we use scores of two part questions to find out reliability coefficient, so this reliability coefficient is the internal consistency coefficient of test paper. For example, the reliability of *College English*.

TABLE V. RELIABILITY OF COLLEGE ENGLISH

ID	College English	Odd score	Even score	ID	College English	Odd score	Even score
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

Using Origin software, we can have that reliability of College English is not well and only 0.34587. We can similarly get another three course reliability.

Course	Comprehensive English	Practical workplace English	Advanced English
Reliability	0.31002	0.47532	0.57013

From above table, reliability of College English, Comprehensive English, Practical workplace English and Advanced English are all not very well, where

Comprehensive English is the lowest 0.31002, Advanced English is the highest and only 0.57013.

C. *Regression Analysis*

Correlation analysis and regression analysis are closely linked. They not only have the common research object, and often complement each other. Correlation analysis is the basis and premise for regression analysis, and regression analysis is correlation analysis further and further. In this paper, we mainly use multiple linear regression analysis. The so-called multivariate linear regression analysis is analyzing the linear relationship between one dependent variable and more independent variable. The General form is

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

where, β_0 is intercept, $\beta_1, \beta_2, \cdots, \beta_m$ is regression coefficients, ε is residuals.

According to the sample data, we obtain the estimated value of model parameters, and then get the expression of relationship between variables and independent variables, that is multiple linear regression equation:

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

We take *Advanced English* as dependent variable, and *College English*, *Comprehensive English*, *Practical workplace English* as independent variables. Then we can find out the correlation between *Advanced English* and other three course.

Using Origin software, we get the multiple linear regression equation:

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

This equation tells us that their relationship: if we know three course grades of four course, then we can estimate and projection other course grade.

Conclusion

Using Origin Software, this paper analyzes the randomly selected thirty students and their four courses with descriptive analysis,correlation analysis and regression analysis,and get the following results: (1) The four courses grades are close to normal distribution, and the indexes (for example amount, standard deviation, range and so on) are in the Reasonable interval; (2) Discrimination of some courses are too high, for example *Advanced English*, discrimination of some questions beyond 0.7; (3)

Reliability of four courses are all not very well, where *Advanced English* is the highest and only 0.57013; (4) Correlation between courses is low.

In view of the above results, we give some teaching suggestions in English teaching: (1) About setting of course, we should take into account the correlation between high age and low grade curriculum; (2) We should control discrimination very well, and the discrimination should be controlled in more than 0.3. But the higher of discrimination does not mean that the higher of the difficulty; (3) Reliability should be controlled well.

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TABLE I. SCORE OF THIRTY STUDENTS

ID	Course 1	Course2	Course3	Course4	ID	Course1	Course2	Course3	Course4
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

TABLE II. DESCRIPTIVE DATA ANALYSIS

Course	Amount	Average	Range	Standard Deviation	Min	Max
College English	30	70.03	19	5.09	79	60
Comprehensive English	30	84	19	4.54	93	74
Practical workplace English	30	72.43	33	6.96	85	52
Advanced English	30	81.4	27	7.50	92	65