Application of Developmental Evaluation Method in Rural Internet Education

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Abstract - Rural internet education is developing quickly, however there are many problems on teaching evaluation. In order to solve these problems, combined with Excel software, mathematical formulas and Likert scale, this paper does research on the application of developmental evaluation method. The study shows that this method could solve some problems about teaching evaluation, it is very available for analysis of evaluation results, and also could improve the teaching quality of rural internet education.

Index Terms - Internet education; Developmental evaluation; Developmental evaluation method; Likert scale

1. Introduction

Carrying out the evaluation of rural internet education starts from Shandong Province. In 2005, the leadership coordination group office of modern distance education of Shandong Provincial Party Committee took the lead in organizing to establish the examination and evaluation index system of modern distance education. Because the indicators are comprehensive and specific, Hunan, Guizhou, Jilin, Jiangsu, Gansu and many other provinces that carried out distance education project take it for example[1]. From the vertical perspective, the evaluation contents relate to making and collecting situation of teaching resources, the construction of administrator team for basic level site, the teaching management system, etc; from the landscape orientation, each assessment project consists of multi-level indicators, starting with level one, drill-down decomposition refinement. However, there are many problems on evaluation of teaching quality in rural area. At present, the evaluation method is often used that set up evaluation group first, then to collect evaluation data through some traditional channels, such as reported discussion, consulting archives, and field study, and finally, evaluate evaluation indicators one by one. These traditional evaluation methods would cause the waste of human, money, material and other resources in the process of collecting, sorting and analyzing evaluation data. It is generally known that the teaching evaluation mainly evaluates teaching content, teaching organization, learning effect, practical application, etc. Because strengthening teaching organization management and improving teaching quality are very important links of education, it is necessary to explore a scientific, available evaluation method for the rural internet education.

2. Application of Developmental Evaluation Method

Developmental evaluation as a latest evaluation concept focuses on learners' development, through comparing the change of ability, analyze learners' advantages and disadvantages to encourage and promote them develop faster and better [2,3,4,5]. Developmental evaluation can overcome the shortcoming about overemphasizing and selecting excellent learners, and also conclude quality education, human-oriented education, individualized method of instruction, diversified development and many other scientific concept obviously, so it has been recognized a scientific evaluation method. The concept of developmental evaluation appeared in the higher educational world in China in the 1990s. Up to thirty years, it has been applied to universities, secondary schools, primary schools and other teaching stage widely, and also been used a variety of subjects, such as English, physics, sports, music, etc, and even be-gin to be applied to the field of distance education [2,6]. Now, there are communication evaluation method, case analysis method, performance evaluation method and portfolio evaluation [3, 7]. We have insight into the scientificalness of developmental evaluation concept and the status quo that is widely used in the field of education, this paper attempts to continue to explore the application of developmental evaluation method, in order to solve the assessment problems what the teaching evaluation in rural internet education encountered .

The evaluation method refers to a kind of method and way to determine the weights of evaluation indicators, and the collection, collation, analysis and interpretation of the assessment contents in the evaluation process [8]. The developmental evaluation method that is made in this paper is: firstly, use modern information technology and network technology means to collect evaluation data for each evaluation indicator; Secondly, through comparing the actual state with the past situation lengthways, manage a large number of evaluation data; finally, calculate the results of evaluation, and make teaching effect clearly using Excel software, mathematical formulas and Likert scale. The procedures are as follow:

Step 1: Based on modern information technology and network technology means, database collection and the collection of electronic questionnaires as two kinds of channels to obtain evaluation data will be used. Many rural remote education platforms of provinces and municipalities take full advantage of the feathers of flexibility and convenience that the network has, based on .net or .java technologies, build a variety of databases to do real-time

monitoring and data capture for the whole process of teaching activities. This provides convenient conditions for some assessment indicators to collect evaluation data from the database. In addition, for those assessment indicators which could not collect evaluation data directly from the database, we should give play to the convenience of the web-based survey system, using electric questionnaire method, to collect evaluation data from the teaching organizers and participants of rural internet education. We use scoring form to answer questions, in order to make the respondents answer questions commodiously, and to batch processing the huge amounts data.

Step 2: Manage historical evaluation data for each evaluation indicator, and calculate the average value using simple arithmetic mean method. The computation model is:

$$\overline{X_j} = \sum_{i=1}^{n} X_{ij} / n \qquad (1)$$

Where $\overline{X_j}$ represents the average value of historical evaluation data of index content of item j, j is equal to 1, 2, …, m (the same below); X_{ij} refers to the historical evaluation data of index content of item j, i is equal to 1, 2, …, n (the same below); n stands for the total number of the historical evaluation data of index content of item j.

Step 3: After giving identical score for the result of computation model (1), compare the current and historical evaluation data, and then calculate the score of each evaluation indicator using linear equation solving method. The computation model is:

$$P_j = A_j \cdot Y / \overline{X_j} \cdot Q_j \qquad (2)$$

Where P_j represents the score of index content of item j; A_j refers to the current evaluation data of index content of item j; Y stands for the given score; Q_j represents the weight of index content of item j.

Step 4: Summarize the result of computation model (2), and calculate the score of evaluation project. The computation model is:

$$W = \sum_{j=1}^{m} P_j / m \qquad (3)$$

Where W represents the score of evaluation project; P_j refers to the result of computation model (2), m stands for the total number of evaluation indicators.

Step 5: Classify the result of computation model (3) using Likert scale [9], and then describe the extent that teaching effect has achieved. If the historical evaluation data would be given 60 points (the given score does not have practical significance, it just to compare current teaching effect with the historical, so it can be set arbitrarily), Likert scale for 5 grades to describe the teaching effect, can be made easily as shown in Table1.

TABLE 1   Likert Scale for Teaching Effect

over100 points	80-99 points	60-79 points	40-59 points	below39 points
best	better	good	bad	worse

3. Application Effect Analysis

Taking rural internet education plat-form—Beijing Great Wall Network (http://www.bjcc.gov.cn) as an example, analyze application effect of the developmental evaluation method.

A. Case Introduction

The evaluation project is teaching effect of website teaching column from January to December in 2012. There would be 5 evaluation columns. They are image-text part, video part, BBS forums, SNS learning communities and blog. There would be 6 evaluation indicators. They are teaching resources quantity, column access flow, website user number, interactive information number, watch video time and number. Evaluation data was collected from the teaching management background database of Beijing Great Wall Network and managed by Excel software. The procedures are as follow:

Step 1: Evaluate the teaching effect for one month, such as December, 2012. The learning and using data about each column or each indicator is all from the database (see Table 2 "current data").

Step 2: Manage the historical data for each indicator of each column. The historical data refers to the learning and using data of 22 months, that is from the opening of website in March , 2009 to December , 2010 (Due to limited space, the list does not show). Calculate the learning and using situation in the past using (1) (see Table 2 "historical average data").

Step 3: Based on "current data"and "historical average data"work out the score for each indicator of each column using (2), (ignoring indicator weight). For example, the score of teaching resources quantity in the image text part is: 547*60/360=91.2 (see Table 2 "score").

Step 4: Calculate the evaluation result for each column using (3). For example, the average score of the image-text part is: （91.2+62.4）/2=76.8 (see Table 2 "average score"). Calculate the final result in December using (3) again. It is （76.8+66.8+73.0+123.7+73.1）/5=82.7.

Step 5: Based on the result in step 4, and the Liker scale in Table 1, it is known that the teaching effect in December, 2012 is better.

Use above five steps, work out the evaluation results for other eleven months (see Table 3).

TABLE 2　Evaluation Results in Dec.2012

indicator / column	evaluation data	teaching resources quantity	column access flow	website user number	interactive information number	watch video time	watch video number	average score
image-text	current data	547	10400	-	-	-	-	76.8
	historical average data	360	10000	-	-	-	-	
	score	91.2	62.4	-	-	-	-	
video	current data	567	22700	1534	71	13615	19600	66.8
	historical average data	430	20000	1400	70	12000	20000	
	score	79.1	68.1	65.7	60.9	68.1	58.8	
BBS	current data	1159	142	-	2742	-	-	73.0
	historical average data	1000	90	-	3000	-	-	
	score	69.5	94.6	-	54.8	-	-	
blog	current data	414	4227	22	894	-	-	123.7
	historical average data	170	1700	12	600	-	-	
	score	146.1	149.2	110	89.4	-	-	
SNS	current data	764	793	107	1082	-	-	73.1
	historical average data	600	800	70	1000	-	-	
	score	76.4	59.5	91.7	64.9	-	-	

Note: "-" represents default value.

TABLE 3　Evaluation Results Every Month

months	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
score	40.9	53.0	80.1	83.3	100.2	69.8	89.8	68.5	62.3	57.6	74.4	82.7
effect	bad	bad	better	better	best	good	better	good	good	bad	good	better

B. Application Effect

Based on the case study, the application of developmental evaluation method has effect below:

It is available to solve the existing problems. Using developmental evaluation method, it is not necessary to set up the evaluation group. The evaluation result can be worked out quickly just using above three of computation models, therefore, it does not require to input a large number of human, money, material and other resources.

It is easily to grasp the teaching effect. Based on the evaluation results of each month (see Table 3), it is not difficult to grasp the teaching effect on the whole for a period of time. Except January, February and October, the teaching effects for other nine months in 2012 are good or even better. In addition to, the teaching effects for each teaching part can also be understood from the detail. As shown in Fig.1, the variation trends of the teaching effect in five evaluation columns are all unstable, and affected by some factors which are hidden in the teaching process.

It is beneficial to analyze the evaluation results deeply. It is easily found that "blog" and "SNS" are more unstable than other columns from Fig.1, and we could deduce that "website user number" is the most important factor to control the stability of teaching columns from Fig.2. In order to check this speculative result is right or wrong, we could continue to analyze them deeply using data in Table 2. Just shown in Fig.3 and Fig.4, "blog" and "SNS" have larger changes in learning and using situation, and the number of website user is the most important factor to the teaching effects of five columns. If there were a lot of user to be in learning of this column, more articles in the "blog" or "SNS" would be published, read and evaluated. So through deep and layer by layer analysis, evaluators could find out different kinds of unstable factors that influence the teaching effect, and then assist educators to decision- making, and improve the teaching quality continuously.
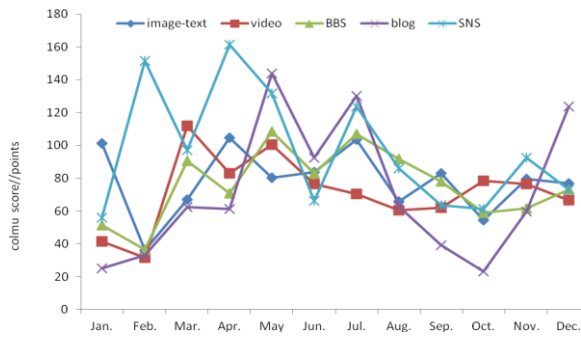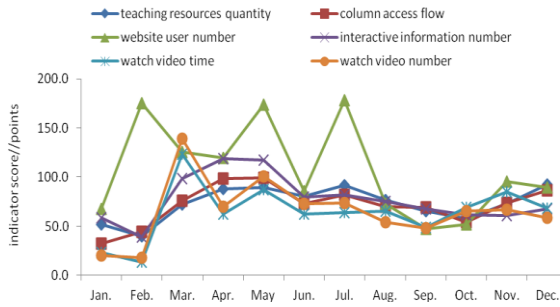
Fig. 1 Variation Trend of the Teaching Column

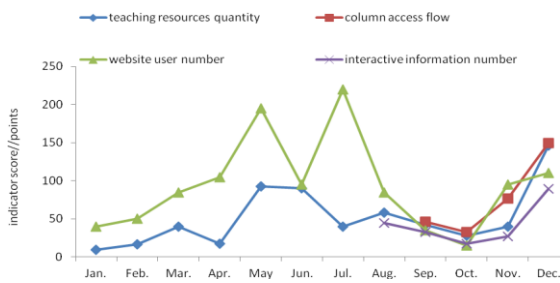
Fig. 2 Variation Trend of the Teaching Indicato

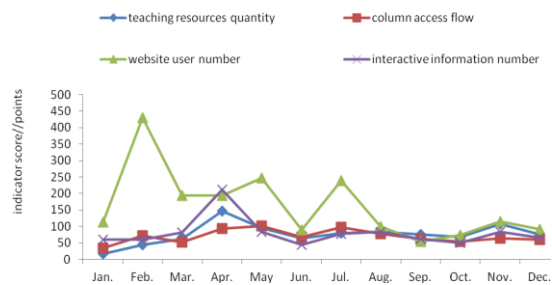Fig. 3 Variation Trend of Each Indicator in Blog

Fig. 4 Variation Trend of Each Indicator in SNS

4. Conclusion

From the above, the application of developmental evaluation method can not only solve the problems of resource consuming and implementation difficulties on the evaluation of rural internet education, but also analyze evaluation results deeply. It is beneficial to find out and solve problems for evaluators, and improve the teaching quality.

5. References

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