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TEST AND EVALUATION ANALYSIS ON RURAL TRAINING SCHEME OF IN-SERVICE TEACHER

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ABSTRACT

This paper puts forward the implementation feasibility as the fourth dimension parameter to balance 3 d parameters of training quality, cost and time aiming at the selection of rural in-service teacher training scheme. It designs the implementation feasibility and the hierarchical structure model of implementation feasibility index. It puts forward implementation feasibility probability of every implementation feasibility index and calculation method of rural teaching level influence degree after the success of implementation. It establishes the basic steps of project evaluation based on rural in-service teacher training practical scheme of Hebei province and provides certain references for the final choice.

Keywords: *Countryside, In-Service Teachers, 3d Parameters, Feasibility, Hierarchical Structure Model, Calculation Method; Training*

1. INTRODUCTION

China's rural population accounts for 80% of the total population. The emphasis and difficulty of e-Education are in the countryside. The state council held the national rural education work conference in September 2003 which decided to "implement the distance education project of elementary and secondary schools modern in urban and rural areas, promote the sharing of high quality education resources and improve the rural education quality and benefit". Premier Jiabao Wen stressed to perfect the teacher training system and developed a number of masters and the leader in the field in 2010. Thus it can be seen that the national education policy also inclined to the rural areas. It is needed to strengthen and deepen the training mode of countryside elementary school. Due to in-service teacher training program evaluation is a complicated work[1]. It can use the hierarchical structure model for research in addition to the ways of questionnaire feedback, interviews, understanding, sampling tracking and evaluation measures. This thesis tries to use hierarchical structure model to evaluate the feasibility based on the rural in-service teacher training plan.

At present, Teacher ability evaluation must get rid of idea and restriction of the traditional exam-oriented education , positively facing quality education and making a positive and effective reform, evaluating correctly learning abilities of students , on the basis of having a comprehensive and detailed understanding to workers of each student and other aspects, to change in direction to the teaching method of quality education , seeking for a reasonable scientific evaluation with the objective and actual attitude , make teaching ability of teachers, methods of teaching students and the evaluation of other aspects adapt to the new demand of the curriculum reform of quality education[2].Therefore, teachers should constantly improve their own comprehensive teaching ability, grasp the habits of student's learning and thinking , in order to adapt to the new requirements of education to cultivate new talents , in order to cultivate integrated innovation talents of socialist society , so as to promote reform and innovation development of quality education in China.

2. THE OUTLINE OF RURAL IN-SERVICE TEACHER TRAINING PLAN

2.1 Virtual scheme

Virtual rural teacher training scheme tests teacher training teaching level and gives the teaching level index value after the teacher training in the training premise of many existing teacher training scheme on a batch of teachers. At the moment, the training teaching level improve index value does not provide the teaching level improve index value after a practical teacher training rather than a feasibility reference index of training plan. The actual training improve index can be calculated by a series of matrix and virtual calculating model in ordinary teaching process of the teachers and students' reaction and students' learning information conditions. It generated a teacher

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level improve index value similar to the software model.

2.2 Practical Scheme

The paper discussed the rural in-service teacher training plan of Hebei province. Due to the need of professional teachers currently, it has put forward many teacher training plans. Such as Yang Guiting, Zhao Mingbin, Wang Huan put forward the continue education training mode in the paper of "Continue education training mode of rural primary and secondary school teachers" to enhance teachers' expertise and change some training mode problems. First they analyzes some problems of current education in teaching process, as shown in Figure 1. And we analyzes the reasons of the problems. According to the reasons, they put forward reform opinions in the view of current rural teacher training. In the actual scheme, it analyzes the original training plan using the data of investigation and statistics idea and proposes a new scheme for continue education training of rural primary and secondary school teachers.

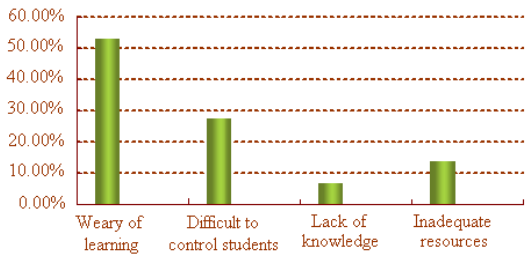

Figure 1: The Statistics Of Teaching Problems

3. FEASIBILITY TEST AND EVALUATION OF THE SCHEME

3.1 General Idea

The feasibility of paper refers to the quality influence degree of successful probability of training scheme and implementation of rural teaching based on certain training quality, cost, time. According to the definition of feasibility, the test feasibility R of training solution is the C function of training plan implementation success probability P and the rural teaching level influence degree after the success which is shown as follows[3]:

$$R = f(P, C) \quad (1)$$

Feasibility factor Rf is the likelihood estimation of feasibility function. Through certain mathematical methods we can get the following formula[4]:

$$R_f = P_f + C_f - P_f C_f \quad (2)$$

In this formula (2), P_f the probability factor after successful implement training plan, C_f influence factor on rural teaching level after the successful implement training plan.

Usually, in the practical cases, a comprehensive feasibility of a scheme is combined by multiple feasibility indexes. Comprehensive feasibility factor is calculated by feasibility index factors and weights in training scheme.

The paper tests and evaluates the above two sets of feasibility assessment according to related feasibility assessment theory. It has three steps:

First, it analyzes the above two sets of scheme and sets feasibility index after analysis. It establishes the feasibility index of the hierarchical structure model. It weights every feasibility index in each scheme in the process of implementation feasibility.

Second, it determines the influence degree of feasibility probability of each feasibility index and the rural teaching level after implementation. It calculated feasibility factors of each feasibility index through the above formula.

Third, it calculates the influence weight of each feasibility index and feasibility factors. It is concludes the comprehensive feasibility factor of each scheme after the calculation. Usually we think that the feasibility is high when $R_f > 0.7$, the feasibility is low when $R_f < 0.3$ and the feasibility is medium when R_f is between 0.3 to 0.7 according to certain materials.

3.2 The Construction Of Feasibility Evaluation Indicators And Hierarchical Model

Training plan implementation feasibility index main contains the below several factors, through the analysis of the training plan such as training plan maturity is feasible, training scheme complexity is feasible, training scheme standard degree is feasible, training scheme is feasible, and plenty of training plan security condition is feasible and so on. The importance quantitative valuation table of feasibility indexes is shown in table 1:

Table 1: Importance Quantitative Valuation Table Of Feasibility Indexes

Relative importance value	assignment	Between intermediate state
equal	1	<2
Slightly important	3	<4
More important	5	<6
Very important	7	<8
great important	9	

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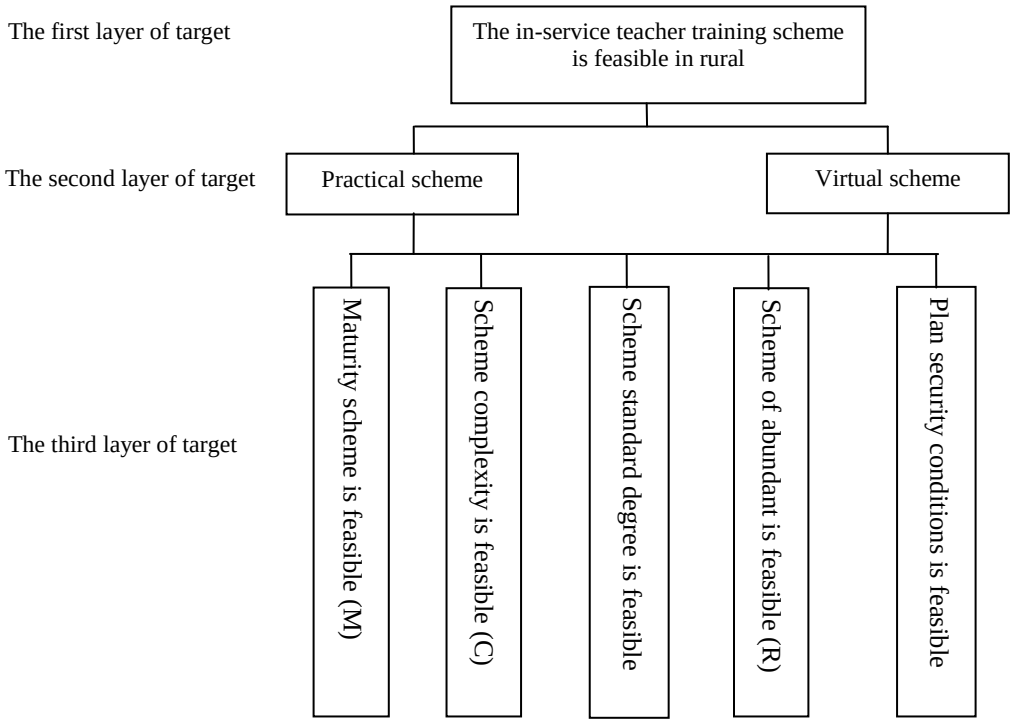

Figure 2: The Feasibility Evaluation Level Structure

3.3 The Feasibility Factors Calculation Of Feasibility Index

We can calculate the feasibility probability of feasibility index. In order to evaluate the feasibility probability Pf of feasibility index in the last section, this paper evaluates this using weighted scoring method. This paper takes the training plan of mature feasibility for an example. It considers setting influence factors U={Hardware, software, application } of the feasibility of the scheme. Factors set is composed for five levels of value vector in the view of evaluation set W (shows in table 2).The vector is listed as follows:

W= {0.1，0.3，0.5，0.7，0.9}

The weight vector of each parameter corresponding in factors set is shown as follows:

A={0.4,0.4,0.2}

At last, it establishes evaluation matrix E based on the above steps and its feasibility probability is listed below[5]:

$$P_f = \sum_{i=1}^{3}\sum_{j=1}^{5}(\alpha_i e_{ij} w_j) = A \cdot E \cdot W^T \qquad (3)$$

Table 2: The Value Assignment List Of Feasibility Probability Evaluation Set

value	Hardware	software	application
0.1	all is met in the market	The market has a supporting software	This major cases of the application are already existed
0.3	It needs to process a small amount of non-critical parts	It needs to prepare a few interface software	similar professional application has been already used
0.5	It needs to process a small amount of individual parts	It needs to process unit software	Application research material is rich
0.7	Main components should be developed	It needs to program system control software	limited reports has been used
0.9	Critical processing have difficulty	It needs to develop full set of software	It has no widely used

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Finally, this paper begins to valuate the influence degree C of each feasibility index of index layers using fuzzy evaluation method. And it takes the same maturity feasibility of training scheme for example. Here we consider reliability, evaluation error level implementation cost as factors of element sets V which is shown as follows[6]:

V= {Abate reliability, increasing evaluation error, increasing implementation cost} (4)

Evaluation set Q (as shown in table 3) composites by five value vectors of the same magnitude. It is shown as follows:

Q= {0.1, 0.3, 0.5, 0.7, 0.9} (5)

The weight vector which the parameters corresponding in V is B which is shown as follows:

B= {0.5, 0.3, 0.2} (6)

We also can establish evaluation matrix R according to the above steps. Its fuzzy comprehensive evaluation matrix is listed below[7]:

D=B*R (7)

Its successful influence degree is[8]:

$C_f=D*Q^T$ (8)

Table 3: Feasibility Index Consequences Influence Degree Factor Set Value Assignment List

value	Reliability	Precision assurance	Implementation costs
0.1	No effect	No effect	Cost change is not obvious
0.3	very small effect	very small effect	Costs increased slightly but the increase is less than 10%
0.5	small effects	small effects	Costs increased slightly but the increase is less than 20%
0.7	Great influence	Great influence	Costs increased slightly but the increase is less than 40%
0.9	Plan can not be implemented	Unable to meet the requirements	Cost increases, an increase of more than 60%

4. THE FEASIBILITY CALCULATION OF RURAL IN-SERVICE TEACHER TRAINING SCHEME

The paper compared the five important feasibility indexes of scheme 1 according to the above analysis. Due to the training plan feasibility maturity is easy to control but more multifarious in the implementation of teacher training program implementation steps and have relatively high demand for some material indemnificatory, we can get the judgment matrix of plan 1 which is listed as follows:

$$B_1=\begin{bmatrix} 1 & \frac{1}{4} & \frac{1}{2} & \frac{1}{3} & \frac{1}{5} \\ 4 & 1 & 2 & 2 & 1 \\ 2 & \frac{1}{2} & 1 & \frac{1}{2} & \frac{1}{3} \\ 3 & \frac{1}{2} & 2 & 1 & \frac{1}{2} \\ 5 & 1 & 3 & 2 & 1 \end{bmatrix} \quad (9)$$

The paper researches scheme 2 and compare the five important feasibility indexes. Methods used in scheme 2 have no practical application in teacher training. Its virtual algorithm is not standard, so we should pay attention to the maturity and feasibility of training plan. The cost of this scheme in the implementation process is low. According to the above information, we can get judgment matrix of scheme 2 which is shown as follows:

$$B_2=\begin{bmatrix} 1 & 4 & 2 & 3 & 5 \\ \frac{1}{4} & 1 & \frac{1}{3} & \frac{1}{2} & 2 \\ \frac{1}{2} & 3 & 1 & 2 & 4 \\ \frac{1}{3} & 2 & \frac{1}{2} & 1 & 3 \\ \frac{1}{5} & \frac{1}{2} & \frac{1}{4} & \frac{1}{3} & 1 \end{bmatrix} \quad (10)$$

Now, we can calculate the two schemes and get their feature vector which is listed below:

$$B_1=\begin{bmatrix} 0.065 \\ 0.296 \\ 0.119 \\ 0.184 \\ 0.336 \end{bmatrix}, B_2=\begin{bmatrix} 0.417 \\ 0.098 \\ 0.263 \\ 0.160 \\ 0.062 \end{bmatrix} \quad (11)$$

We can conclude that judgment matrix has consistency of satisfaction after the operations above and the consistency inspection.

Now, we can discuss each feasibility index. The paper discusses the algorithm of feasibility probability and feasible influence degree and it takes the feasibility maturity of plan for example. The paper adopts opinions of 6 experts. For the hardware of scheme 1, 60% of them are meet all, 20% of them think that a small amount of hardware is not perfect and 20% think it lacks of hardware facilities. For scheme 2, experts think that 20% of it is supporting facilities binding hardware. Experts analyzed the other factors and

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finally got two feasibility probability judge matrixes which are shown as follows:

$$E_1^m = \begin{bmatrix} 0.6 & 0.2 & 0.2 & 0 & 0 \\ 0.4 & 0.4 & 0.2 & 0 & 0 \\ 0.8 & 0.2 & 0 & 0 & 0 \end{bmatrix}, \quad E_2^m = \begin{bmatrix} 0 & 0 & 0.2 & 0 & 0 \\ 0 & 0 & 0.2 & 0.2 & 0.6 \\ 0 & 0 & 0 & 0.4 & 0.6 \end{bmatrix} \tag{12}$$

We can calculate the maturity feasibility probability of two schemes according to the above formula which is shown as follows:

$$P_{1f}^m = \sum_{i=1}^{3}\sum_{j=1}^{5}(\alpha_i e_{ij} w_j) = A^m \cdot E_1^m \cdot W^T = 0.092 \tag{13}$$

$$P_{2f}^m = \sum_{i=1}^{3}\sum_{j=1}^{5}(\alpha_i e_{ij} w_j) = A^m \cdot E_2^m \cdot W^T = 0.516$$

We can evaluate the matrix of rural teaching level influence degree after the success of plan implementation which is shown as follows:

$$R_1^m = \begin{bmatrix} 0 & 0.4 & 0.6 & 0 & 0 \\ 0 & 0.4 & 0.4 & 0.2 & 0 \\ 0 & 0.2 & 0.2 & 0.6 & 0 \end{bmatrix}, \quad R_2^m = \begin{bmatrix} 0 & 0 & 0 & 0.8 & 0.2 \\ 0 & 0 & 0.4 & 0.6 & 0 \\ 0 & 0.4 & 0.6 & 0 & 0 \end{bmatrix} \tag{14}$$

According to the above formulas, we can get the influence degree of two schemes after the success of the rural teaching which is listed below:

$$C_{1f}^m = (B^m R_1^m) \cdot Q^T = 0.109, \quad C_{1f}^m = (B^m R_2^m) \cdot Q^T = 0.757 \tag{15}$$

After the calculation above, we can get maturity feasibility factors of two schemes respectively:

$$R_{1f}^m = P_{1f}^m + C_{1f}^m - P_{1f}^m C_{1f}^m = 0.191, \quad R_{2f}^m = P_{2f}^m + C_{2f}^m - P_{2f}^m C_{2f}^m = 0.882 \tag{16}$$

The paper calculates the feasibility of index factor of the rest of the feasibility at the same time which is shown as follows:

Scheme 1:

$$R_{1f}^c = 0.357, \quad R_{1f}^s = 0.221, \quad R_{1f}^r = 0.249, \quad R_{1f}^e = 0.408$$

Scheme 2:

$$R_{2f}^c = 0.239, \quad R_{2f}^s = 0.761, \quad R_{2f}^r = 0.733, \quad R_{2f}^e = 0.193$$

We can set the weight vector of two schemes as follows:

$$G_1 = \{g_1^m, g_1^c, g_1^s, g_1^r, g_1^e\} = \{0.065, 0.296, 0.119, 0.184, 0.336\}$$
$$G_2 = \{g_1^m, g_1^c, g_1^s, g_1^r, g_1^e\} = \{0.417, 0.098, 0.263, 0.160, 0.062\} \tag{17}$$

At last, we can get two plan implementation feasibilities through calculation which is shown as follows:

$$R_{1f} = g_1^m \cdot R_{1f}^m + g_1^c \cdot R_{1f}^c + g_1^s \cdot R_{1f}^s + g_1^r \cdot R_{1f}^r + g_1^e \cdot R_{1f}^e = 0.327,$$
$$R_{2f} = g_2^m \cdot R_{2f}^m + g_2^c \cdot R_{2f}^c + g_2^s \cdot R_{2f}^s + g_2^r \cdot R_{2f}^r + g_2^e \cdot R_{2f}^e = 0.721 \tag{18}$$

According to the paper above, we can know that the feasibility of the plan 1 belongs to low feasible range; the feasibility of the scheme 2 belongs to high feasible range. The feasibility of the above have certain help to the feasibility of final project implementation and control in the schematic design stage[9].

In the past, China has been implementing the exam-oriented education, claiming mainly that students should give priority to the examination, cope with the examination of basic theory knowledge of school .But with the development of society, China put forward the teaching model of quality education, while the tendence of education has slowly moved from "exam-oriented education" to "quality education"[10].As development and promotion of the trend , obviously, teacher's role has undergone subtle changes, before teaching simply the knowledge, teaching students how to deal with knowledge in each course exam, how to sum up effective knowledge and conduct examination techniques[11].Now, teachers pay more attention to the teaching practice, how to lead students to think independently, how to be organizer ,guider and participant for student in the teaching process. Quality education mainly propose certain requirements for the teacher , not only meet the students' theoretical knowledge in the teaching process, what more importance is to cultivate the students' spirit of innovation, ability of knowledge-learning and practice, pay attention to the harmonious and healthy development of the students in the process of education , respect the students' individualization of learning, not erase the creativity of students[12].Quality education is reformed in many aspects and is boldly innovated in the quality of teaching courses, curriculum evaluation management and teaching effect evaluation and other aspects , but also put forward new test and requirements for teachers . teachers should change their ideas, mainly cultivate students' autonomous learning ability and the ability to create.

5. CONCLUSIONS

The paper tests and evaluates the rural in-service teacher training scheme using the model of establishing hierarchical structure. This method provides certain data support for feasibility control of the implementation plan decision in a certain degree and provides some help for feasibility control of the later stage of implementation plan. The paper used the same method using similar plan feasibility test evaluation which provides some reference for the study of schemes' test and evaluation.

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