

Study on the Establishment of Balanced Development Model of Primary and Secondary Education

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Supported by Chongqing Development and Reform Commission “Research on Standardization in Chongqing Urban and Rural Primary and Secondary School”; Central University Special Funding for Basic Scientific Research Business “Discipline Team Research Project” (2362014xk03); Central University Special Funding for Basic Scientific Research Business “Research on the Public Values of Employment in Chongqing Hukou Reform” (SWU1109061).

Received 14 August 2014; accepted 24 October 2014

Published online 26 November 2014

Abstract

The integration of urban and rural education is aimed at scientific and balanced development together. Based on the evaluation system and significance of urban-rural primary and secondary education, this study analyzes related policies and existing assessment model of urban and rural balanced development, establishes the statistical model of balanced development of urban-rural primary and secondary education evaluated by balanced development coefficient, combined with high scientificity, effectiveness, and operability.

Key words: Balanced development of urban and rural education; Primary and secondary schools; Evaluation model

Chen, B. Y. (2014). Study on the Establishment of Balanced Development Model of Primary and Secondary Education. *Higher Education of Social Science*, 7(3), 126-131. Available from: URL: <http://www.cscanada.net/index.php/hess/article/view/5937> DOI: <http://dx.doi.org/10.3968/5937>

INTRODUCTION

The integration of urban and rural education has become one of the important measures to balance the urban and rural education, and to practice the scientific concept of

development. It refers to the break the urban-rural dual structure under the core values of educational equality, and to integrate the urban and rural education on the basis of retention of their own regional characteristics and advantages, thus promoting the balanced development of urban and rural education together (Hou et al., 2012). Essentially, the integration of urban and rural education contributes to the scientific and balanced development. Consequently, how to evaluate the balanced development of urban and rural education becomes an important task during the integration of urban and rural education. Based on the indicator system in line with “research on the standard of rural primary and secondary education”, this paper establishes an evaluation model with strong scientificity, effectiveness, and operability, in order to analyze situation on the balanced development of urban-rural primary and secondary education, convenient for government and competent departments for current situation acquaintance, policy making, and policy adjustment, etc..

1. EVALUATION INDICATORS, METHODS AND MODEL OF INTEGRATION OF URBAN-RURAL PRIMARY AND SECONDARY EDUCATION

At present, the research of evaluation indicators and models on urban-rural education integration is developing constantly, with different theories and ideas. There are differences in indicators of dimension, where the first-level dimension mainly involves in economy, society, population, space, and the ecological environment, etc.. Even some second-level of the first-level dimensions reach more than sixty (Li et al., 2012). Departments at all levels has positively responded to the national policy, proposed various corresponding measures, issued many documents and standards for standardization of

primary and secondary schools, since the requirements of balanced development of urban and rural education. For instance, Wenweng Experimental School in Chengdu sets an example in the balanced development of urban and rural education, and it is highly praised in public. As another example, Changsha City issued the “Changsha ordinary primary and secondary school standardization criterion” in 2007, which made detailed provisions on site selection, school building, facilities, funding, faculty, management, and quality, etc.. However, these measures are still in doubt. In other words, these measures cannot be judged to meet the requirements of balanced development of urban and rural areas, for the lack of index- evaluation methods. Besides, the existing index- evaluation methods focusses on the policy and management instead of education quality (Li et al., 2012), which is unable to reveal the essence on balanced development of basic education effectively in our country.

Compared with the evaluation indicators on the integration of urban-rural primary and secondary education, the evaluation methods and models of urban-rural integration are relatively mature. They are quantitative weighting processes in essence, mainly including analytic hierarchy process, principal component analysis, factor analysis, clustering methodology, etc.. (Hou et al., 2012) And the corresponding purpose is to handle the internal relations and importance among the evaluation indicators. However, the assessment models of balanced development of urban and rural education mainly consist of analytic hierarchy process (Min et al., 2011), Gini Coefficient (Li et al., 2012), etc.. And these models analyze the internal development of urban and rural education in the longitudinal perspective, and they are unable to evaluate the actual situation of balanced development of urban and rural education effectively. It is because that the balanced development requires the horizontal comparison rather than longitudinal comparison between both urban and rural development. In other words, we should focus on the indicator of balance in urban and rural development instead of weights degree. Undoubtedly, the current related assessment methods and models cannot meet the requirements.

2. THEORETICAL BASIS ON THE ESTABLISHMENT OF BALANCED DEVELOPMENT MODEL

The balanced development of urban and rural education keeps both advantages. Meanwhile it makes up the disadvantages from each other, and achieves the coordinated development (Zhao, 2012). Obviously, the balanced development refers to fullest development based on each malleable development (Zhang & Zhu, 2011), rather than equal development, let alone the development narrowing the gap or high-end development. In other

words, the balanced development of urban and rural education not only includes the extensive development, such as narrowing the urban-rural gap, but connotative development such as effectiveness, efficiency, benefit, etc. Consequently, the assessment model should be based on the extensive development of balanced development. That is, make development oriented by quality and talents, take other factors into account (Zhao, 2012), pay close attention to actual development of students, and reveal the essence of balanced development.

With the fundamental completion of “compulsory education”, the balanced development of compulsory education has become the theme of current basic education. In 2003, the general requirements of basic education, namely active, balanced, sustained and coordinated, were proposed in the National Basic Education Conference for the first time. Later on, Seventeenth Party Congress reported that the balanced development of education laid an important foundation of national development in 2007. Further, in 2010, the “national medium and long-term plan for education reform and development” (2010-2020) put forward to advance the balanced development of urban and rural education, to set up the development mechanism of urban-rural integration on compulsory education, and to promote the balanced development of urban and rural education, etc.. (Zhang & Wu, 2010) These policies laid great stress on the balanced development of urban-rural primary and secondary education in current integrated development of urban and rural basic education. As a result, the scientific and effective evaluation of balanced development of urban-rural primary and secondary education has become one of the vital tasks during the balanced development of urban and rural education.

3. REALISTIC BASIS OF MODEL ESTABLISHMENT OF BALANCED DEVELOPMENT

Various assessment models, in regard to urban-rural integration or balanced development, mainly deal with the digital weights of evaluation indicators, namely the importance degree of indicators in the index -evaluation system. From the existing literature, there are no effective models to evaluate the essence of balanced development of urban and rural education. For example, as a representative research shows, the overall level of integration development of urban and rural compulsory education is evaluated by coefficient of integrated development of urban and rural compulsory education (Li et al., 2012), which is suitable for the development degree of compulsory education, other than actual situation of balanced development of urban and rural areas. That is to say, the balanced development indicates the difference on evaluation indicators between both urban and rural

areas, instead of “high-end development “or” low development”. For instance, if both indicators stay high or low, instead of one high and one low, the balanced development of urban - rural compulsory education is rated fine, despite that both indicators are poor. According to existing representative models, the balanced degree of development will be low if the education develops poor in both areas, such as low investment in education. In fact, although both areas develop poor and balanced, it still accords with the requirements of balanced development. The existing assessment models hardly indicate the essence of urban - rural compulsory education effectively.

4. REFERENTIAL INDEX SYSTEM FOR MODEL ESTABLISHMENT OF BALANCED DEVELOPMENT

The establishment of evaluation indicators lays the foundation of establishment of evaluation model. According to ideas of balanced development of urban and rural education in the “national medium and long-term plan for education reform and development” (2010-2020), this paper learns from the education policy in urban and rural development for the lack of previous studies (Ke, 2011), and it is based on the correct concept analysis and understanding of integration of urban and rural education, guided by talent quality standards and monitoring system in six dimensions and four levels (Zhao, 2012, p.10), as well as evaluation system of integration of urban-rural primary and secondary education. The evaluation system is composed of 5 first-level indicators (A), 15 second-level indicators (B), 44 third-level indicators (C), combined with talents and protection factor. Without a doubt, it indicates that the talents play a core role in the balanced development of urban and rural education, and comprehensively reveals its key basis for now and core concept of connotative development.

5. CALCULATION METHOD OF BALANCED DEVELOPMENT MODEL

The computing process of balanced development model of urban-rural primary and secondary education can be divided into the following steps. And it evaluates the development status of urban-rural primary and secondary education by balanced development coefficient.

5.1 Establish Evaluation Set

According to the actual situation of the established index system, set up the expert evaluation set between third-level indicators and second-level indicators. It takes the form of level rating from 1 to 10, on the basis of full understanding of existing development of each participating experts. Then conduct scoring in accordance with national or local standards on primary school building in urban and rural

areas. If completely qualified, achieve 10 Score. The less coincident existing development is, the lower score it will be. Thus, each quantized value (extensive development) will be achieved in each third-level indicator or second-level indicator.

5.2 Establish Database

Open SPSS (Statistical Package for the Social Sciences), and establish a variable database based on 38 evaluation indicators on the balanced development of urban-rural primary and secondary education. Input the collected quantized values and corresponding variable name, and complete the original database. Except for the variables in corresponding to evaluation indicators, the original database concludes a categorical variable, namely school category including city primary school, rural primary schools, city secondary school, and rural primary school.

5.3 Calculate Mean Values

By means of the data analysis function of SPSS, calculate each mean value to each evaluation indicator, denoted by C_{ijk} , where i, j, k means first-level, second-level and third-level indicators respectively. And i values 1~5, j values 1~15, k values 1~32. Accordingly, each type of school acquires mean value, respectively denoted by C_1 (city primary school), C_2 (rural primary schools), C_3 (city secondary school), C_4 (rural primary school).

5.4 Calculate the Coefficient of Balanced Development

According to calculate mean value of evaluation indicator, calculate the coefficient of balanced development as follows.

$$R_{ijk} = 1 - |C_{ij}/k - C_l/k|,$$

where i, j, k means first-level, second-level and third-level indicators respectively (Ditto for Ranges), h and l stand for the certain school, ranging from 1 to 4. And k is the maximum in evaluation sets of evaluation indicators, thus limiting the mean value from 0 to 1. In this case, k values 10 and the coefficient of balanced development are limited from 0 to 1. The balanced development of urban-rural primary and secondary education is better if R is closer to 1. Otherwise, it is worse. If necessary, it is feasible to calculate the coefficient of balanced development in line with the first-level and second-level indicator, add up all the balanced development coefficients, and work out the total value.

According to the obtained result, the balanced development coefficient can be divided into the following four levels, namely excellent (≥ 0.9), fine (≥ 0.7), middle (≥ 0.5), poor (≤ 0.5).

Calculate the coefficients of balanced development in any dimension (A, B, C) or total, in line with several coefficients of balanced development.

$$R_z = \sum(R_{ijk})/n,$$

where R_z stands for the balanced coefficient in a given dimension. This study mainly concludes the

first-level and second-level indicator, ditto for R_{ijk} . And n means the quantity of sub-indicator in a given dimension. For example, in order to acquire balanced development coefficients of courses setting in urban and rural primary schools, calculate the result as follows.
 $R_{B4}=(R_{C15}+R_{C16}+R_{C17})/3$.

6. CALCULATION EXAMPLES OF BALANCED EVALUATION MODEL

According to the evaluation indicators of balanced development of urban-rural primary and secondary education, we select relevant data of educational development situation in a city (county), and estimate the balanced development by means of model assessment. Refer to Table 2 and 3 in detail.

Table 2 and 3 list the mean values of original data of four types of urban and rural schools on teaching standards and hardware standards, as well as balanced development coefficient (R) be calculated by formula. As indicated from Table 2, in terms of teaching standards and course settings, urban and rural schools develop in a balanced manner ($\cong 0.9$). And there are no huge differences on artistry of information technology. However, with regard to innovation of teaching methods, the urban schools are better than the rural schools, which require improvement. As for the hardware standards, both schools develop balanced ($\cong 0.9$) in student average grants, canteen standards and toilet standards. In terms of nutrition subsidies, the rural schools are accepted subsidy while urban schools are not, which is a huge urban-rural gap ($\cong 0.3$). Besides, there are differences in student-teacher ratio, student average books, teachers' salaries ($\cong 0.72$), as well as student average computers ($\cong 0.26$).

Consequently, objectively speaking, there are no significant differences between both schools in spite of certain poor aspects, such as Traditional methods of teaching methods, artistry of information technology. From the development perspective, both schools develop neck and neck, instead of high-end development. In order to realize the balanced development of urban-rural primary and secondary education, it demands urgent improvement in low coefficients, such as student average computers, student average books, student-teacher ratio, teachers' salaries, etc. And it accords with actual situation of current urban-rural primary and secondary education. As showed in some studies, during the development of integration of urban and rural compulsory education, there is shortage of education funding, school conditions to be improved, unbalanced faculty, etc.. (Lu & Ma, 2011) These differences, improper to connotation of balanced development, are the quantitative comparison, regardless of the comparison to national and local standards.

However, the balanced development coefficients in this model are deduced from construction standards of urban and rural schools, taking account of connotation of balanced development of urban and rural education and both characteristics and advantages, thus revealing the essence of balanced development of urban and rural areas more definitely.

CONCLUSION

This study establishes an evaluation model that reflects the balanced development of urban-rural primary and secondary education effectively, based on its content and evaluation criteria, as well as corresponding policies and theories oriented by personnel quality. It turns out to reveal the current problems in the balanced development process of urban and rural education by calculating examples. However, it needs paying attention to the following problems during the use. (a) Set up a correct concept of balanced development of urban and rural education. It lays the foundation of effective assessment on balanced development of urban and rural education. Essentially speaking, balanced development requires mutual promotion and prosperity of both educations, rather than extensive development of high-end development or narrowing the gap. (b) Improve development standards of urban-rural primary and secondary education. The effective operation of the entire model lies in the scoring criteria of indicators. The educational development standards are established on the basis of local social development and framework of talent quality standards in dimensions and four levels by local authorities, thereby promoting the scientificity, accuracy and validity of scoring. (c) Make sure of the objectivity of expert rating. The expert rating plays a key role in the model. During the actual assessment, conduct monitoring of experts in quality, assessment materials, and assessment methods, etc, in case of invalid ratings. (d) The explanation of balancing coefficients. The coefficients of balanced development measure the situation of urban and rural education, which directly impacts the corresponding decision making and measures in various departments. Consequently, the explanation should be objective, impartial, and science. And it instructs improving the poor conditions, which cannot be reflected in previous models. And it is exactly the core of the model. (e) Advantages and disadvantages of the model. The model excels in analysis of balanced development of both urban and rural education, in horizontal comparison other than vertical way. However, this model is not applicable in internal vertical development of each school in both urban and rural areas. And it demands another assessment model (refers to another evaluation model in our research group).

Table 1
Evaluation System of Balanced Development of Urban-Rural Primary and Secondary Education

First dimension	Second-level indicator	Third-level indicator	Primary school			High school		Balanced coefficient	
			City level	Town level	Village level	City level	Town level		
<i>A</i> ₁ Development standard	<i>B</i> ₁ Student development	<i>C</i> ₁ Morality							
		<i>C</i> ₂ Intelligence							
	<i>C</i> ₃ Sports								
	<i>C</i> ₄ Aesthetic								
<i>A</i> ₁ Development standard	<i>B</i> ₂ Teacher development	<i>C</i> ₅ Speciality							
		<i>C</i> ₆ Comprehensive Quality							
	<i>C</i> ₇ Professional Ethics								
	<i>C</i> ₈ Specialized Knowledge								
<i>A</i> ₁ Development standard	<i>B</i> ₃ School development	<i>C</i> ₉ Teaching Skill							
		<i>C</i> ₁₀ Continuing Education							
	<i>C</i> ₁₁ Appearance change								
	<i>C</i> ₁₂ Spirit								
<i>A</i> ₂ Teaching standard	<i>B</i> ₄ Curriculum	<i>C</i> ₁₃ Social evaluation							
		<i>C</i> ₁₄ Main subjects implementation							
	<i>C</i> ₁₅ Deputy subjects implementation								
	<i>C</i> ₁₆ Curriculum reform								
<i>A</i> ₂ Teaching standard	<i>B</i> ₅ Teaching methods	<i>C</i> ₁₇ Traditional methods							
		<i>C</i> ₁₈ New curriculum approach							
	<i>C</i> ₁₉ Method innovation								
	<i>C</i> ₂₀ Usage								
<i>A</i> ₂ Teaching standard	<i>B</i> ₆ Information technology	<i>C</i> ₂₁ Scientificity							
		<i>C</i> ₂₂ Artistry							
	<i>A</i> ₃ Hardware standards	<i>B</i> ₇ Government Investment	<i>C</i> ₂₃ Average appropriation						
			<i>C</i> ₂₄ Nutrition subsidies						
<i>C</i> ₂₅ Teachers' Salaries									
<i>A</i> ₃ Hardware standards		<i>B</i> ₈ Average condition	<i>C</i> ₂₆ Student-teacher ratio						
	<i>C</i> ₂₇ Student average area								
	<i>C</i> ₂₈ Student average books								
	<i>C</i> ₂₉ Student Average computer								
<i>A</i> ₃ Hardware standards	<i>B</i> ₉ Health standard	<i>C</i> ₃₀ Student average instrument							
		<i>C</i> ₃₁ Canteen standards							
	<i>C</i> ₃₂ Toilet standards								
	<i>A</i> ₄ Culture Criteria	<i>B</i> ₁₀ Educational philosophy	<i>C</i> ₃₃ Scientificity						
<i>C</i> ₃₄ Humanity									
<i>B</i> ₁₁ School characteristics		<i>C</i> ₃₅ Historic							
		<i>C</i> ₃₆ Endemicity							
<i>A</i> ₄ Culture Criteria	<i>B</i> ₁₂ Campus beautification	<i>C</i> ₃₇ Connotations associated							
		<i>C</i> ₃₈ Appearance							
	<i>B</i> ₁₃ System improvement	<i>C</i> ₃₉ Institutional settings							
		<i>C</i> ₄₀ System implementation							
<i>A</i> ₅ Management standard	<i>B</i> ₁₄ Management methods	<i>C</i> ₄₁ Clear							
		<i>C</i> ₄₂ Effective							
	<i>B</i> ₁₅ Evaluation mechanism	<i>C</i> ₄₃ Enforcement departments							
		<i>C</i> ₄₄ Incentive policy							

Note. This indicator system refers to the research results by Zhao Lingli, Deng Cuiju et al. in the same project group.

Table 2
Assessment Scores and Balanced Coefficient Distribution of Education Standards in Balanced Development of Urban-Rural Primary and Secondary Education

Second-level indicator	Third-level indicator	Unban primary school	Rural primary school	Balanced coefficient	Unban secondary school	Rural secondary school	Balanced coefficient
B ₄ Curriculum	C ₁₄ Main Subjects Implementation	9.6	9.2	0.96	9.3	8.9	0.96
	C ₁₅ Deputy Subjects Implementation	8.5	7.4	0.89	9.1	8.8	0.97
	C ₁₆ Curriculum Reform	8.3	7.5	0.92	8.7	7.9	0.92
B ₅ Teaching Methods	C ₁₇ Traditional Methods	6.3	7.4	0.89	6.8	7.5	0.93
	C ₁₈ New Curriculum Approach	8.4	6.5	0.81	8.5	6.2	0.77
	C ₁₉ Method Innovation	8.2	5.7	0.75	8.4	6.2	0.78
B ₆ Information Technology	C ₂₀ Usage	9.2	7.2	0.80	9.5	8.2	0.87
	C ₂₁ Scientificity	8.4	6.9	0.85	8.3	7.1	0.88
	C ₂₂ Artistry	6.2	5.4	0.92	6.4	5.5	0.91

Table 3
Assessment Scores and Balanced Coefficients of Hardware Standards in Balanced Development of Urban-Rural Primary and Secondary Education

Second-level indicator	Third-level indicator	Unban primary school	Rural primary school	Balanced coefficient	Unban secondary school	Rural secondary school	Balanced coefficient
B ₇ Government investment	C ₂₃ Average appropriation	9.2	8.4	0.92	9.4	8.8	0.94
	C ₂₄ Nutrition subsidies	0	8.4	0.16	0	7.5	0.25
	C ₂₅ Teachers' salaries	9.4	6.4	0.70	9.6	6.2	0.66
B ₈ Average condition	C ₂₆ Student-teacher ratio	9.2	5.4	0.62	9.1	6.3	0.72
	C ₂₇ Student average area	7.8	9.6	0.82	7.1	9.2	0.79
	C ₂₈ Student average books	9.5	6.4	0.69	9.3	6.2	0.69
	C ₂₉ Student Average computer	7.4	0	0.26	7.3	5.2	0.79
	C ₃₀ Dormitory standards	8.5	6.3	0.78	8.6	6.8	0.82
B ₉ Health Standards	C ₃₁ Canteen standards	9.2	8.2	0.90	9.4	8.6	0.92
	C ₃₂ Toilet standards	8.8	7.6	0.92	8.1	7.2	0.91

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