The Research on Logistic Model and Its Application in the Association Analysis of Marxism-Leninism and Ideological and Political Education

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Abstract. Using the interdependence theory of population, Logistic Model has been built in this article. After the analysis of stability, the equilibrium point cannot found. From the analysis, we can find that if the equilibrium point $A_1(N_1, 0)$ is stable, the Marxism-Leninism does not exist in the political quality education for the college students theoretically, which means that the political quality education has lost its soul and the equilibrium point $A_1(N_1, 0)$ can't be found. If the equilibrium point $A_3(0, N_2)$ is stable, the political education for college students doesn't appear in the political quality for college students, which does not conform to the Chinese condition. The guide of the Marxism-Leninism theory to the Ideological and political education determines the result of the ideological and political education. Meanwhile the effective results of the ideological and political education will also improve the Marxism-Leninism.

Introduction

Education is the foundation. Colleges and universities are the wisdom source of the development of society and economy. They also take the responsibility of cultivating the talents with good qualities. And the ideological and political education is especially important. With the development of socialist market economy, many new problems and things appear. Now the university students pay much attention to the new problems and things and their outlook on world and life^{[1][2]} has been greatly influenced. But the quality of the information literacy of the college students has a lot of disadvantages^[3], such as weak info awareness, different info processing abilities, which shows the necessity of the ideological and political education.

In the over 60 years since the establishment of our country, the design and reform of college political curriculum show the following disciplines. Now the design of the course has won the attentions from the central government. It designed according to the central task of the Party and the Marxism-Leninism is always the main content of the course^{[4][5]}. Marxism is the basic guiding ideology to consolidate the Party and country and the common ideology foundation of the Chinese people. In broad sense, the Marxism includes Marxism basic theories and Marxism in China. Ideological and political education has the responsibility of teaching the university students the basic theories of Marxism. Since the foundation of China, the college political course has been reformed and the name of the course has been changed. But the basic theories of Marxism and Marxism in China are the main courses and contents of ideological and political education.^[6]

The association analysis of Marxism-Leninism and ideological and political education

In college political quality education, the theories of Marxism and the ideological and political education supplement each other, which is just like two populations existing in the same natural environment depending mutually and living with each other^[7]. The political quality of college students is just like the nature and Marxism and college political therefore are the two populations.

In order to increase political quality, on the basis of keeping the curriculum stable, we must regard the Marxism as the guiding ideology and improve the students' political quality and spread the

Marxism by modifying and supplementing the teaching contents. The impact discipline of ideological and political education to the students' political quality got from Logistic Model is

$$Y_1(t) = \gamma_1 y_1 (1 - \frac{y_1}{N_1} + b_1 \frac{y_2}{N_2}) \quad (1)$$

$Y_1(t)$ is the influence quantity of ideological and political education at the time t ; γ_1 is the update rate of the ideological and political education; N_1 is the highest requirement of the ideological and political education to the students' political quality; b_1 is the impact of Marxism to the ideological and political education reforms concerning the present Chinese condition; N_2 is the highest requirement of Marxism theory to the college students' political quality.

The impact of Ideological and political education to the students' political quality is influenced by the teaching materials and the contents of the materials are influenced by the Chinese conditions. Similarly, when the students receive the political education, the Marxism can be improved. The relation between the two aspects is mutual improvement, which can be shown in Fig. 1.

Figure 1. The Improvement Relation between Marxism and College Ideology and Politics

The Marxism-Leninism is the scientific theory testified by the practice. It is also the guiding ideology of the constructions of socialism with Chinese characters, which is beneficial to the conformation of right concepts of world, life and values. Without the guidance of the Marxism-Leninism, there is no foundation for the ideological and political education. Suppose γ_2 represents the negative impact rate of Marxism-Leninism to the ideological and political education, then the following linear equation can be found

$$Y_2(t) = \gamma_2 y_2 \quad (2)$$

The guidance of Marxism-Leninism theory to the ideological and political education can directly determine the effect of the education. Using the theory of population mutualism, the function of Marxism-Leninism theory and ideological and political education is as below,

$$X_2(t) = \gamma_2 y_2 (b_2 \frac{y_1}{N_1} - 1) \quad (3)$$

Apparently, when $\frac{b_2 y_1}{N_1} > 1$, the ideological and political education benefits the improvement of the students quality, which shows that the Marxism-Leninism and ideological and political education are supplementing to the students quality. It can be shown in formula (4)

$$Y_2(t) = \gamma_2 y_2 (-1 + b_2 \frac{y_1}{N_1} - \frac{y_2}{N_2}) \quad (4)$$

In improving the college students' qualities, the above equations construct the math model of interdependence between the Marxism-Leninism and ideological and political education. In order to make the theory develop, we will study the development trends of the two aspects in a long term by analyzing the equilibrium point stability.

3 The analysis of the stability of the college students political quality

According to formulas (1) and (4), solve the algebra equations

$$\begin{cases} \gamma_1 y_1 (1 - \frac{y_1}{N_1} + b_1 \frac{y_2}{N_2}) = 0 \\ \gamma_2 y_2 (-1 + b_2 \frac{y_1}{N_1} - \frac{y_2}{N_2}) = 0 \end{cases} \quad (5)$$

Then we get the equilibrium point shown as below,

$$A_1 (N_1, 0), A_2 (\frac{N_1(1-b_1)}{1-b_1b_2}, \frac{N_2(1-b_2)}{1-b_1b_2}), A_3 (0, N_2), A_4 (0, 0)$$

According to the math knowledge^[9], to get the stability of the equilibrium point is to get the result of partial derivative of independent variables y_1 and y_2 in the functions of (1) and (4). Then the corresponding coefficient matrix B is

$$B = \begin{bmatrix} Y_{1y_1} & Y_{1y_2} \\ Y_{2y_1} & Y_{2y_2} \end{bmatrix} = \begin{bmatrix} \gamma_1(1 - \frac{2y_1}{N_1} - \frac{b_1y_2}{N_2}) & -\frac{\gamma_1b_1x_1}{N_2} \\ -\frac{\gamma_2b_2y_2}{N_1} & \gamma_2(1 - \frac{b_2y_1}{N_1} - \frac{2y_2}{N_2}) \end{bmatrix}$$

And the coefficient of the secular equation is

$$p = -\gamma_1(1 - \frac{2y_1}{N_1} - \frac{b_1y_2}{N_2}) - \gamma_2(1 - \frac{b_2y_1}{N_1} - \frac{2y_2}{N_2})$$

$$q = \det A$$

The results of p and q the four equilibrium points corresponding to and the condition of stability are listed in Table 1.

TABLE I. THE EQUILIBRIUM POINT AND STABILITY

The Equilibrium Points	p	q	Conditions of Stability
$A_1 (N_1, 0)$	$\gamma_1 - \gamma_2(1 - b_2)$	$-\gamma_1\gamma_2(b_2 - 1)$	Not Stable
$A_2 (\frac{N_1(1-b_1)}{1-b_1b_2}, \frac{N_2(1-b_2)}{1-b_1b_2})$	$\frac{\gamma_1(1-b_1) + \gamma_2(b_2 - 1)}{1-b_1b_2}$	$\frac{\gamma_1\gamma_2(1-b_1)(b_2 - 1)}{1-b_1b_2}$	$b_1 < 1, b_2 > 1, b_1b_2 < 1$
$A_3 (0, N_2)$	$\gamma_2 - \gamma_1(1 - b_2)$	$-\gamma_1\gamma_2(b_1 - 1)$	Not Stable
$A_4 (0, 0)$	$-\gamma_1 + \gamma_2$	$-\gamma_1\gamma_2$	Not Stable

If the equilibrium point $A_1 (N_1, 0)$ is stable, the Marxism-Leninism does not exist in the political quality education for the college students theoretically, which means that the political quality education has lost its soul and the equilibrium point $A_1 (N_1, 0)$ can't be found. If the equilibrium point $A_3 (0, N_2)$ is stable, the political education for college students doesn't appear in the political quality for college students, which does not conform to the Chinese condition. Similarly, the equilibrium point $A_4 (0, 0)$ can not be found

From the table above, when A_2 is stable, $b_1 < 1, b_2 > 1, b_1b_2 < 1$, and the phase rail line equation is

$$1 - \frac{y_1}{N_1} + b_1 \frac{y_2}{N_2} = 0 \quad (6) \quad -1 + b_2 \frac{y_1}{N_1} - \frac{y_2}{N_2} = 0 \quad (7)$$

And the schematic diagram is can be shown in Fig. 2.

The tendency of the arrowhead illustrates that the stable equilibrium point is A_2 , which means the Marxism-Leninism theory supplement the ideological and political education and the college students' quality can be improved constantly.

Figure 2. The Stable Phase Rail Line Diagram

Conclusions

This article, through analyzing the impact of theory of Marxism-Leninism and ideological and political education to the students' political quality by using Logistic model, shows that Marxism-Leninism and the ideological and political education are indispensable to each other. In order to improve the students' political quality, the Marxism-Leninism theory should be applied in the ideological and political education and the Marxism-Leninism can also be improved as well.

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