

Study on ecological balance of Chinese higher education in popularization stage

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Abstract: Since the beginning of Chinese higher education expansion in 1999, higher education in terms of scale, speed and structure has been rapid development and beyond the bearing capacity of its ecological balance, input and output of the unbalanced phenomenon between higher education and social environment, the unbalanced phenomenon also appear in regional distribution, between quantity and quality, between structure and function. The status quo of Chinese higher education has been described in the paper, the unbalanced phenomenon has been analyzed, and the corresponding countermeasures has been proposed for the imbalance in Chinese higher education, it provide reference views for the reform of Chinese higher education.

Key words: higher education; popularization; ecological balance

1. Introduction

Originally scheduled for 2005 to reach 15 percent gross enrollment quotas popular education in China has reached in 2002, it reached 21 percent in 2005. The system, structure, function, quality, academic standards, entry requirements, curriculum, teaching methods, teaching organizational forms and teaching management have changed inevitably with its rapid development, the current popularization of higher education in China is facing a series serious problem such as quality, funding, regional development of balance and fairness, education structure, employment of graduates, how to solve these problems? Education scientists has applied the ecological balance of ideas, principles and methods to social sciences, human ecology, social ecology, cultural ecology. Similarly, they also begin to pay attention to its own development of higher education, use of new perspective and methods to study the phenomenon and cause a variety of higher education, and grasp the law of balance between the development of higher education for the current imbalance in the development of higher education put forward corresponding countermeasures.

2. The meaning of the higher education's ecological balance

Ecology is a dialectical unity between the scientific which study on biological and environmental. Ecological balance means that biotechnology and environment, biological populations achieve high degree of adaptability, coordination and harmonization of state through energy flow, material circulation and transmission of information.

The meaning of the ecological balance in higher education, which emphasizes high degree of adaptability,

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coordination and harmonization of state with environment, mainly includes: firstly, higher education and social environment must be equable though material and energy input and output (QIN Xiao-yun & HE Zu-bing, 2004), then forming a orderly ecological chain between the development of education and social development; secondly, structure and function of eco-system of higher education should be a reasonable balance, emphasizing on open, connected and affinity In the higher education system, different types, different forms of education such as university education and basic education, public education and private education, academic education and non-diploma education.

3. Chinese higher education development

Expansion of China's higher education began from 1999, higher education scale developed unprecedented in the past decade, 15 percent gross enrollment quotas has reached in 2002 marks China's entry into the stage of mass higher education as shown in Table 1: (1) Sharp increased in the number of colleges and universities in the past decade, adult institutions gradually reduced because of not suitable for the development trend. (2) The number of postgraduate, undergraduate and college students who is recruited and the students in school have increased dramatically. Gross enrollment ratio also increase sharp. (3) The number of college faculty and full-time teachers increased with sharp increase the number of student and college, teacher-student ratio in 2002 reached its peak in the 19:1, in 2007, back down to 17.28:1, but it still far higher than that of developed countries.

Table 1 The status of Chinese higher education development in 1999-2007
(from Chinese education cause of statistical bulletin)

Year	1999	2000	2001	2002	2003	2004	2005	2006	2007
Number of colleges and universities	1071	1041	1225	1396	1552	1731	1792	1867	1908
Number of adult colleges and universities							481	444	413
The number of enrolled graduate students	92200	128500	165200	202600	268900	326300	364800	397900	418600
The number of enrolled undergraduate and college students	1596800	2206100	2682800	3205000	3821700	4473400	5044600	5460500	5659200
The number of undergraduate and college students in school	4134200	5560900	7190700	9033600	11085600	13335000	15617800	17388400	18849000
The gross enrollment rate(%)	10.5	11.5	13.3	15	17	19	21	22	23
College faculty	1065100	1112800	1214400	1303600	1452600	1610700	1742100	1872600	1974500
Full-time teachers	425700	462800	531900	618400	724700	858400	965800	1076000	1168300
Teacher-student ratio	13.4:1	16.3:1	18.22:1	19:1	17:1	16.22:1	16.85:1	17.93:1	17.28:1

Table 2 Chinese education funding situation in 1996-2007
(from Chinese education funding implementation of statistical bulletin)

Year	National spending on education (billion RMB)	The state financial spending on education (billion RMB)	Average college student budget expenditure (RMB)	Average college student budget for public funds (RMB)	Budget for education - the financial expenditure ratio(%)	Fiscal spending on education accounted for the proportion of GDP(%)
1996	226.234	167.170	5966.70	2604.36	16.28	2.44
1997	253.173	186.254	6522.91	2865.60	15.67	2.49

(to be continued)

1998	294.906	203.245	6775.19	2892.65	15.36	2.55
1999	334.904	228.718	7201.24	2962.37	14.49	2.79
2000	384.908	256.261	7309.58	2921.23	13.80	2.87
2001	463.766	305.701	6816.23	2613.56	14.31	3.19
2002	548.003	349.140	6177.96	2453.47	14.76	3.32
2003	620.827	385.062	5772.58	2352.36	14.68	3.28
2004	724.260	446.586	5552.50	2298.41	14.90	2.79
2005	841.884	516.108	5375.47	2237.57	14.58	2.82
2006	981.531	634.836	5868.53	2513.33	15.18	3.01
2007	1214.807	828.021	6546.04	2596.77	16.26	3.32

From Table 2, it can be inferred: (1) The state financial spending on education is the main source of the total funding for education, budget for education—the financial expenditure ratio and fiscal spending on education accounted for the proportion of GDP have increased year by year; (2) Average college student budget expenditure and average college student budget for public funds, instead, drop in.

4. Ecological imbalance in higher education

Higher education in the ecosystem has natural ecological attributes such as stable, self-regulation, ecological chain, niche, the development of adaptation and appropriate, to meet the limiting factors, but Chinese man-made unnatural expansion of the popular development of higher education beyond the scope of higher education resources in carrying, it leads serious ecological crisis, it appears phenomenon of higher education imbalance.

- (1) Energy imbalance of input and output between higher education and social environment;
- (2) Local imbalance of higher education ecosystem's structure and function;
 - a. Uneven regional distribution of Chinese higher education (TAN Min & FAN Yi-hong, 2006);
 - b. Imbalance between the number and quality of Chinese higher education;
 - c. Structure and function imbalance of Chinese higher education.

5. Analysis of the root causes of ecological imbalance in higher education

From the analysis above, the imbalance in Chinese higher education has its own springhead. Firstly, popularization of Chinese higher education is not a natural course, but appears under man-made policy request, which spends just ten years reaching 15 percent of gross enrollment quotas, while for US, South Korea, Japan, Brazil, 30, 15, 23, 25 years respectively. Hasty mass higher education will inevitably lead to the above-mentioned imbalance. Secondly Chinese macro-structure of higher education also is not quite reasonable, four-year university education ignored formal vocational education adult education, not a reflection of a variety of popular education and market economy, therefore it leads to contradictions. Thirdly, security system of Chinese higher education is still relatively weak, the rapid increase in the quantity brought about by the decline in quality. Fourthly, Chinese higher education funding for a single, the government is a major source of funding, although there are other forms of funding to fill, but the effort is still far from enough, it leads to higher education substance inputting inadequate in general, and the main reason that cause higher education imbalance.

6. Countermeasures for ecological imbalance in higher education

To achieve the ecological balance of higher education must meet the equilibrium condition, according to the status quo of higher education in China, imbalance phenomenon and balance condition, the following countermeasures can be put forward.

6.1 Make the higher education system adapted to its ecological environment

Eco-system of higher education is an important subsystem of socio-ecological education system. On the one hand it regards other subsystems as their own survival and development environment; and on the other hand, it is itself as the main eco-social environment, substances, energy and information input and output equilibrium between the two systems. When the higher education increases in quantity, it requires to provide appropriate, adequate and sustainable funding for education. it can further increase the diversity of education funding, for example take public school tuition fees system, collection of accommodation and other costs of living facilities, allowing private universities charge the full cost , permitting social groups and individual citizens funding school, social contributions and fund-raising school, diversing financing structure by multiple channels to collect Tuition fees, and adequate input is ensured for higher education system. Meanwhile, Constantly deepening reform of higher education and converting higher education operating mechanism, cultivating talent of urgent need to adapt to social development.

6.2 Adjust its own structure, and make full use of functional advantages

The higher education is adjusted in its management structure, form structure, categories structure, hierarchy structure and so on. Meanwhile, post-graduate education, undergraduate education, college education, vocational education and adult education is vigorously developed; great efforts should be taken to improve the specialty subjects; clear categories that is out of touch with society; the proportion of application-oriented categories, categories of information, biology, new materials, new energy, space technology categories should be increased. The Ministry of Education should make full use of social function, so that subsystem of the ecological system of higher education would coincides with the full development of the practical needs. The comprehensive development of higher education and social harmony is achieved at the same time. Higher education input should be increased in the western region including funding, teacher resources, high human resources, information technology, etc. Information exchange, energy exchange should be also increased between western higher education and other areas.

6.3 Adhere to the sustainable development of the higher education system

It's necessary to adhere to sustainable development of higher education system (WANG Qin-hui, 2007). First of all, it's very important to correctly handle the relationship between human and higher education, the result of education sustainable development is also sustainable development of human. Higher education and sustainable scientific development concept should be established, it's urgent for educators to explore higher education of talent thriving in micro filed; meanwhile, main object of school is formed by setting up and transforming government functions to expand school autonomy, improving education cost-sharing mechanisms and creating sustainable development of security system.

7. Conclusion

Because of short time, irrational macro-structure, weak quality assurance system and single source of funding in the development of popularization of higher education in China, it leads to many serious problems such as the imbalance on the input and out put of material, energy, information; layout imbalance between eastern and

western area, imbalance between scale, quantity and quality; imbalance of structure and function. Persist in using ecological theory, principles, ideas and methods to view the balance and development of higher education of ecosystems in China. Some measures must be taken to keep Chinese higher education healthy, harmonious and balanced, these measures include as follows:

- (1) Establishing ecological concept of higher education.
- (2) Increasing sources of education funding.
- (3) Keeping energy exchange balance between higher education and social ecological environment.

Adjusting its own structure; making full use of functional advantages and Adhering to sustainable development.

References:

- QIN Xiao-yun, HE Zu-bing. (2004). On the ecological balance of the higher education system. *Educational Theory and Practice*, (11), 45-48. (in Chinese)
- TAN Min, FAN Yi-hong. (2006). Analysis and thinking on the development of east-west higher education at the background of popularization. *Education and Science of University*, (2), 12-15. (in Chinese)
- WANG Qin-hui. (2007). *Study on sustainable development of popularization of higher education in our country*. (Master thesis, Harbin Institute of Technology)

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