

Data Thinking for Quality Evaluation of University Internationalization Development in China

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Keywords: Internationalization, China Studies, Quality Evaluation, Higher Education, Data Analysis

Abstract: This paper investigates the internationalization evaluation for colleges and universities in China. We analyze the shortcomings in the construction of informatization platforms for international development quality evaluation. We propose a data view on international development quality evaluation for China's colleges and universities. Several useful suggestions are presented in the paper for implementing the quality evaluation for China's university internationalization. Our research works could be applied in the decision-making procedure of the teaching management department of China's colleges and universities.

1. Introduction

With the development of China's society and economy, the higher education in China has shifted from the elite education to the popular education for several decades [1]. The development goal has also shifted from a large-scale development model with quantity-based to a refined development model with quality [2]. Colleges and universities pay more attention to those indicators that can well reflect the strength of refined development for universities, such as teaching, scientific research, facilities and infrastructure, teacher quality, university rankings, and international development. Compared with the traditional statistical methods which are often complicated and cumbersome, data analysis technology can quantify these indicators more quickly and accurately, by which universities can identify their own goals and positioning, and help to improve the quality of higher education.

The internationalization of China's higher education includes international education concepts, student training objectives, curriculum, personnel exchange, sharing of educational resources and collaborative research. In April 2016, the State Council of the People's Republic of China promulgated the *Several Opinions on Implementation in the Opening-up of Education in the New Era*, pointing out that to do a good job in opening up the education in the new era, we must persist in expanding opening up, further strengthen China's education, and promote humanities exchanges [3]. It is to continuously improve the quality of education, national soft power and international influence. In the current "Double First-rate" construction boom [4], it is of great significance to lead the university to strengthen the international frontier and weak discipline construction, and promote the construction of top-class universities and top-class disciplines.

The application of data thinking will be extremely extensive in the evaluation of international development quality for colleges and universities. It is not only for evaluation, but also for relationship analysis, relationship prediction, etc., and can also judge and solve problems that have already occurred or upcoming. At present, there are many data analysis methods used in the evaluation of international development quality for colleges and universities, including prediction, clustering, relationship mining, isolated point detection, and social network analysis, etc.

The “One Belt and One RoadInitiative” implemented by China clearly puts forward the major strategic concept of opening up to the outside world, and also provides a major strategic opportunity to further promote the internationalization of China's higher education and improve its international influence [5]. The internationalization of China's higher education is one of the important development trends in the new era. How to grasp the new opportunity of university internationalization and implement it well in the quality evaluation system is an important research topic for China's university internationalization in the new era.

2. Related Works

This section summarizes the connotation, motivation, content, problems and strategies of the university internationalization and the related research works in the literature.

In 1997, the Program on Institutional Management of Higher Education (IMHE), affiliated with the United Nations Organization for Economic Cooperation and Development (OECD), and the Academic Cooperation Association (ACA) jointly published the “International Quality Review Procedure (IQRP)”, which is used to evaluate the results and performance of higher education internationalization. The UN evaluation project focuses on two themes of the university. One is the international quality assessment and assurance, and the other is the impact and contribution of the university's internationalization strategies and activities to the overall quality of higher education. The project began in 1995 and conducted a pilot project of nine universities around the world, resulting in a set of evaluation systems consisting of seven primary indicators, 18 secondary indicators, and 87 guiding guidelines.

In the context of globalization, many countries and some international organizations have successively launched their respective university internationalization evaluation index systems, and put them in practice[6]. De Wit [7] pointed out that the definition of internationalization concept is extremely important for the study on the characteristics and indicators of university internationalization. Knight [8] proposed that the internationalization of higher education is a process of integrating international and cross-cultural factors into the teaching, research and service functions of colleges and universities. Msweli [9] illustrates that the internationalization of higher education means that colleges and universities run a program in atransnational, cross-cultural circumstance through their academic activities.

Zhou and Kan [10] pointed out that the talents needed to promote the construction of the “One Belt and One RoadInitiative” are advanced applied professionals who are oriented to social practice and serve the national strategy. The quality of personnel training is directly related to the “One Belt and One RoadInitiative” construction goal. To achieve this, it is necessary to strengthen the quality assurance of higher education during the whole process of personnel training.

Xue and Dong [11] analyzed the dynamics of university internationalization from the perspectives of the existence legality, resource dependence and survival competitiveness of university development. There are three different sources of power for university internationalization as follows: the power based on knowledge potential energy, the power based on external opportunities and the motivation based on competition needs. Song and Wang [12] proceeded from the index system of the university rankings. Combining with the current international competition situation of education, interpreting on a number of indicators, they made suggestions on how to improve the higher education internationalization for China's universities, and cope with the increasingly fierce challenges of international education competition.

Dui [13] pointed out that the university internationalization has become one of the key factors affecting and challenging the higher education. Based on internationalization strategy, goal, measures and effect, the performance evaluation index system provides practical guidance for the university international management. Jin and Wen [14] proposed that the current higher education internationalization in China should be understood as the following process: In order to enhance the international competitiveness and reputation, colleges and universities adopt the core-system strategy

model under the support of national policies, and integrate the internationalization dimension into their teaching, research and management. On the basis of comparative research, Li [15] defined the concept of university internationalization in China, selected the index system of internationalization evaluation from the perspective of China's national conditions, and made some recommendations.

On the basis of discussing the internationalization meaning and development motivation of higher education, Chang [16] focuses on the analysis of the content, strategy and evaluation index system of university internationalization. Feng and Zhan [17] pointed out that the construction of the internationalization evaluation index system of universities in China should adopt a combination of quantitative and qualitative evaluation methods, refine those indicators combined with national conditions, have a development perspective and focus on dynamic changes.

3. Insufficiency on Construction of International Development Quality Evaluation

The implementation of international development quality evaluation in colleges and universities is inseparable from the construction and application of big data informatization platform. At present, from the implementation of the evaluation of international development quality of colleges and universities, there are still many shortcomings in the construction of informatization software and hardware infrastructure.

Some colleges are not ready to meet the era of big data. Due to the insufficiency on the construction of the big data informatization platform for internationalization development quality evaluation management, the data is updated slowly, or the collected data is scattered in different departments and cannot be effectively integrated. Some universities have not even established a platform for data collection and acquisition.

Secondly, the personnel training construction of the internationalization development quality evaluation management is also relatively lagging behind. The teaching management talents with the background of big data processing are still scarce. In this case, the deep exploration and analysis of the big data on international development qualities still lack of necessary thoughts and methods. For most colleges and universities, the construction of such a big data professional talent team is relatively lagging behind, which seriously affects the big data informatization process.

With the arrival of the era of knowledge economy, the university internationalization is more urgently needed, especially in the field of higher education that fosters talents in the future. According to the report of the major member states of the OECD, the promotion of internationalization is emphasized by higher education in the 21st century. Therefore, the improvement of the quality and connotation of higher education depends on international exchanges and cooperation, and more excellent talents and research teams can be nurtured. Concerning with the internationalization of higher education, major countries in the world have spared no effort on the promotion, which has caused a new wave in the field of higher education all over the world. China's universities must catch up with and surpass the top universities in Europe and America in the construction of "Double First-rate." They must make great efforts on international thinking, internationalization strategies, and build an international evaluation index system suitable for themselves in the process of promoting the internationalization of higher education. By checking our own gains and losses, we will continue to improve the internationalization strategy and promote our universities to occupy a place in the international education market.

4. Our Suggestions

Under the background of the "One Belt and One Road Initiative," we should focus on strengthening the quality assurance of higher education from the dimension of international certification of professional education. We believe that the implementation of the "One Belt and One Road Initiative" forces us to comprehensively examine and enhance the quality of China's higher education with a broader international perspective. Only when international standards are achieved in terms of core elements such as majors, courses, teaching, practice, and the students who are trained in the

academic level are substantially equivalent to the students of the same type and at the same level in developed countries, will our higher education be attractive and competitive, and eventually stand out in the countries along the “One Belt and One Road Initiative”.

This study aims to deal with the decision-making of China's higher education internationalization development evaluation, and uses questionnaires to investigate the preference judgments of most decision-makers or experts. The decision-making procedures are: (1) the definition of problems; (2) the composition of people or groups making decision; (3)The construction of hierarchical structure; (4) questionnaire design and investigation; (5) verification of pairwise comparison judgment; (6) verification of hierarchical consistency; (7) integration of expert preferences; (8) optimal planning or scheme.

We propose a specific quantitative method for evaluating the internationalization development of colleges and universities, and design a questionnaire based on the complex problems of improving the international competitiveness index. With the Analytic Hierarchy Process (AHP) and the Importance Performance Analysis (IPA) model, we can determine the weight of each indicator from the results. This method mainly constructs a judgment matrix in different hierarchical structures by comparing the important strengths of the evaluation indicators between the two factors, so as to obtain the intensity of the quantitative weights of the indicators that influence the decision.

This paper recommends the following steps to measure the international development indicators of universities in China:

(1) Use the Analytic Hierarchy Process (AHP) method. There are three aspects are taken into main considerations: "curriculum program", "administrative management" and "academic research". Through the AHP method, the indicators are decomposed into several levels and various factors. Based on the decomposition of various factors, we establish a pairwise comparison judgment matrix as a reference for comprehensive evaluation, then calculate the importance of these indicators.

(2) Design a questionnaire by Importance Performance Analysis (IPA) model. Surveys and interviews were conducted to investigate the importance and satisfaction of the various factors in the internationalization development of China's universities. Combining with the actual needs of the international talents and various reference factors for the internationalization Development, we find out those factors that need to be improved for priority reinforcement.

This study suggests that the internationalization evaluation index system of China's universities should choose different index systems for different types of institutions such as research universities, comprehensive universities and applied universities according to the mission and development goals of different levels and types of colleges. It highlights the pertinence and adaptability of the assessment work, and also ensures the universal applicability of the index system.

This paper proposes to use data analysis techniques to summarize the evaluation indicators that influence the internationalization of China's higher education. We conduct a questionnaire survey on students and teachers with international views or exchanges of experience between countries in China, in order to provide decision basis for the development of international competitiveness of universities. The statistical questionnaire analysis of this study ranks the weight of evaluation indicators affecting the internationalization development of China's higher education. The important aspects of the development of international competitiveness of universities include “curriculum program”, “administrative management” and “academic research”. The factors under the various facets include “international exchange and expansion of foreign students”, “establishment of international cooperation and exchange centers”, “professional courses taught in English”, “international competition results”, “Establishing a dual academic system with universities abroad officially”, “academic cooperation and exchanges with universities abroad”, “establishing sister-study relations with universities abroad”, “school-wide English learning program”, “Organize international academic seminars”, etc.

Several Suggestions on the implementation of the quality evaluation for university internationalization:

- a) Establishing the data view on international development quality evaluation for China's colleges and universities.
- b) Improve the construction of internationalization development quality evaluation data platform.
- c) Cultivate data analysis talents for quality assessment for the higher education in China.

5. Conclusions

In this study, we find that the higher education internationalization in China is the product of a combination of factors, which include multiple modes of operation, such as economic globalization, competitive pressure in the education market, scientific and technological development, cultural exchanges, economic promotion and the development needs. We also find that the research work of data analysis is still at its very beginning of university internationalization development quality evaluation in China. In order to make decisions more objective and scientific, China's universities must adopt some necessary technology as an aid.

In summary, we suggest that the colleges and universities in China should not only establish a good big data concept of international development quality evaluation, but also need to work hard for building a big data informatization platform. The data analysis method can dig out more valuable results, so that the teaching management department can clearly see the advantages and disadvantages in the evaluation of international development quality, which is conducive to making more reasonable decisions. Meanwhile, we should focus on the relevant technical personnel training programme. Only in this way can fully reveal the potential rules of education and teaching data, effectively track the quality of teaching, and make the evaluation of teaching quality play a greater role in colleges and universities.

Acknowledgement

The authors acknowledge the anonymous referees for their valuable comments. This study was supported in part by the Research Fund from Fujian University of Technology under Grant No. GY-Z18148.

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