Original Paper

Graduate Student Source Analysis Method Based on Annual Report Data of Degree-Granting Information

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Abstract

Based on the annual data of degree-granting information accumulated by degree-granting institutions, this paper analyzes the storage structure of the database, excavates the critical information in the degree-granting information data structure, and puts forward a multi-dimensional graduate source analysis method, such as first-choice admission rate, the admission rate of recommended students, pre-graduation institution type, residential registration origin and types of colleges and universities transferring students. The limitation of using a single index of first choice admission rate to evaluate the quality of student source is improved.

Keywords

Degree-granting information, Quality of student source, Method

1. Introduction

According to "Degree Regulations of the People's Republic of China," China's doctoral and master's degree recipients shall implement the national filing system. In 1991, the National Collaborative Research Group on Computer Management of Graduate Education and Degree Work organized the Graduate School of Tsinghua University and the Graduate School of Peking University to jointly develop the software "National Degree Awarding Information Database Declaration System" (Anon, 1991), and since 1991, the annual report of degree-granting information has been reported on a stand-alone floppy disk. So far, China's degree recipients have begun to conduct the annual report of degree conferring information electronically. In order to adapt to the development of degree and postgraduate education, the National Academic Degrees Committee issued "No. 50 of the Academic Degrees Office [2008]" to significantly adjust the data structure of the annual report of degree awarding information (Academic Degrees Committee Office of The State Council, 2008), which deleted most of

the data items that should be kept by degree-granting institutions and added some data items with important statistical significance. Furthermore, it covers all the content of the new degree certificate. Since 2008, data has been submitted directly via the Internet. In 2018, it was fine-tuned to add contact information fields such as "resolution text number," "email address," "WeChat account," and "QQ number" for the award of degrees. Since the adjustment of the structure in 2008, the primary data content of degree-granting information has remained stable, and degree-granting institutions have accumulated a batch of single annual report data files stored annually, generally DBF database or EXCEL data format. These data have become the "data assets" of the degree program.

In January 2017, the 13th Five-Year Plan for the Development of Degree and Graduate Education formulated by the Ministry of Education and the State Council Academic Degree Committee proposed that "big data analysis of graduate education should be carried out to strengthen quality monitoring and regulation" (Ministry of Education, 2017). In September 2017, the General Office of the CPC Central Committee and The General Office of the State Council pointed out in their Opinions on Deepening the Reform of the Education system and Mechanism that "it is necessary to establish and improve the education evaluation system, establish the education quality monitoring and evaluation institution, and establish the education quality monitoring and evaluation system" (Ministry of Education, 2013). The release of relevant documents has put forward research directions for supporting and promoting the reform and development of graduate education by informatization. In November 2020, the Notice of the State Council Academic Degree Committee and the Ministry of Education on carrying out Periodic Qualification assessments of degree authorization Points from 2020 to 2025 required: "The degree-granting institutions shall compile its annual Report on the Quality of Graduate Education Development and Annual Report on the construction of degree Authorization points according to the overall situation of graduate education development and the construction of degree authorization points in each year" "The degree-granting institutions shall submit to the Office of The State Council Academic Degree Committee and the provincial academic degree committee the basic status information of the degree authorization points as of the end of the previous year (Ministry of Education, 2020). The "annual report" and "Basic status information form submission" system has become a new and regular monitoring system to check the quality of the construction of degree programs, which needs a large number of primary data related to graduate education as support. Among them, the quality of graduate students is an important content. Therefore, it is of great significance to summarize the annual data of degree-granting information, conduct in-depth analysis, dig out the important information behind the annual data of degree-granting information, enable new business applications from the "sleeping hard disk data garbage", realize the reuse of graduate education data, and help graduate student enrollment publicity and periodic qualification assessment of degree programs.

2. Data Preparation and Processing Methods

2.1 Annual Report Data on Degree-Granting Information

Annual report data of academic master's degree-granting information for ten years from January 1, 2013, to December 31, 2022, were collected and sorted out. Through the analysis of the data structure of the annual report of degree-granting information, some valuable fields for analyzing the sources of graduate students are retained, as shown in Table 1.

Table 1. Degree-Granting Information Annual Report Data Retention Fields and Explanations

Field name	Field Analysis	Explanation
ZJHM	The first two places in the ID card are the provinces and cities where the household registration is located	Analyze the regions where the degree recipients household registration is located
YJXKDM	Six first-level discipline code	Analysis of the attribution degree program, and used as a c omparative analysis between degree programs
KSH	The top 5 digits of the candidate number are the national standard code of the first-choice university when the candidate applies for the exam. Considering the need for data confidentiality, only the top 5 digits are taken, such as Henan Polytechnic University, 10460	Compare the top 5 national standard codes of colleges and universities with the national standard codes of our school, and if they are consistent, they will be the first volunteer candidates. Otherwise, they will be a transfer candidate
KSFS	Examination method: 01 National unified examination; 02 Recommendation for admission without an entrance exam;	When the KSFS is 02, candidates are recommended for admission without an entrance exam
RXNY	Year and month of admission, 6 take the top 4	Analyze year of enrollment
HXWRQ	Date of degree received, 8 take the top 4	Analyze year of degree received
QZXWDWM	National standard code of graduated university, 6 digits	Analyze the situation of training institutions before the admission of degree recipients

2.2 Assist in Analyzing Data

2.2.1 Code Database of Colleges and Universities

In order to analyze a candidate's first-choice of a specific university, it is necessary to find the university corresponding to the code according to the first five digits of the KSH field of the

degree-granting annual report as the search keyword. As of June 15, 2023, there are 3,072 institutions of higher learning in China, including 2,820 general institutions of higher learning, 1,275 undergraduate institutions, and 1,545 vocational (junior college) institutions (Ministry of Education, 2023). Download EXCEL data format, convert to database, fields. In order to analyze the quality of graduate students admitted, the field of university type is added, and the types are divided into 985|211| double-world-class, our university, general universities, junior colleges, and research institutes, as shown in Table 2.

Table 2. Code Database of Colleges and Universities

Name of school	School standard code	Competent department	location	Types of colleges and universities
Peking University	10001	Ministry of Education	Beijing	985|211| double world-class
Renmin University of China	10002	Ministry of Education	Beijing	985|211| double world-class
Tsinghua University ellipsis	10003	Ministry of Education	Beijing	985|211| double world-class

2.2.2 Code of Administrative Divisions (Provinces and Cities) of the People's Republic of China

The administrative division of the People's Republic of China is an alternative number for preparing administrative divisions at all levels prepared by means of information technology and generally implements the national standard: the Administrative Division Code of the People's Republic of China (GB/T2260-2007). In order to analyze the candidates' household registration, it is necessary to use the first two digits of the ZJHM field in the annual report as keywords and find the corresponding province (municipality directly under the Central Government, autonomous region) in the administrative division code base. The data structure of administrative area codes is shown in Table 3.

Table 3. Code of Administrative Divisions (Provinces and Cities) of the People's Republic of China

Code	Name of code
11	Beijing
12	Tianjin
65	Xinjiang

80

Code	Name of code
71	Taiwan
81	Hong Kong
82	Macau
ellipsis	

3. Source Analysis of Graduate Students

### 3.1 Statistics on the Number of Degree-Granted over the Years

The number of master's degree students awarded by a certain university in the ten years from 2013 to 2022 is shown in Table 4. The number of academic degrees awarded was stable and declining overall.

Table 4. The Number of Master's Students Awarded Academic Degrees in the Decade 2013-2022

Year of degree	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Number of grants	421	408	381	346	354	373	322	328	345	370

3.2 Analysis of the First Choice Enrolled Situation

The admission situation of the first choice of graduate students directly indicates the enrollment publicity of the school and the influence of the school itself, that is, the attraction of the students. It has a particular reference significance for evaluating the academic influence of the degree program. There are corresponding contents in the elements of qualification evaluation of degree programs and subject-level evaluation indicators. Statistics of the number of students admitted to the first choice and transferred students from 2013 to 2022, as shown in Figure 1; The first voluntary acceptance rate analysis, as shown in Figure 2. As shown in Figure 1, the source of adjustment of students exceeded the first-choice student for the first time in 2019. As shown in Figure 2, the proportion of the first choice enrolled students and adjustment of students is stable at 1:1.
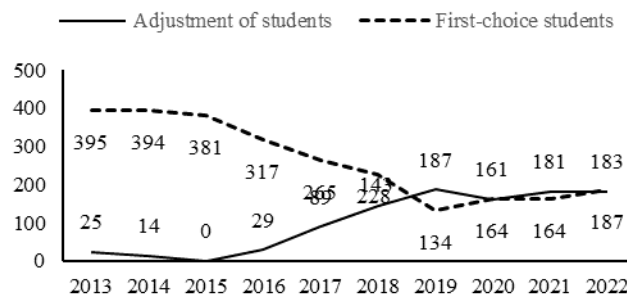

**Figure 1. Statistics of the Number of Graduate Students Admitted from 2013 to 2022**
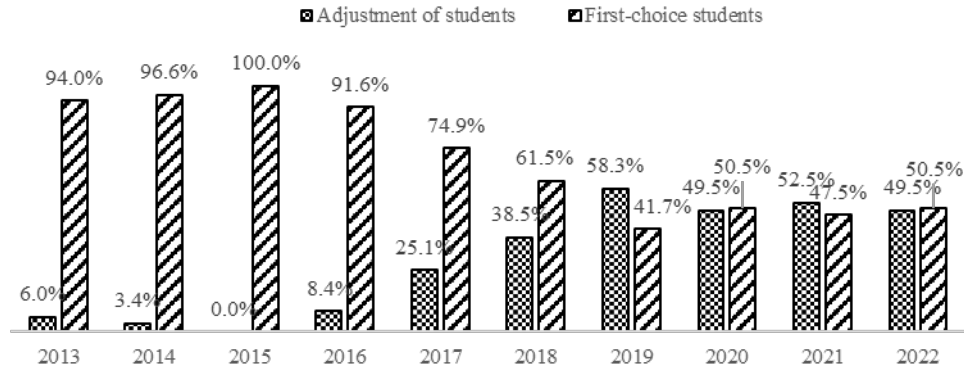
Figure 2. The Proportion of the First Choice Enrolled Students and Adjustment of Students

3.3 The Source Is Analyzed according to the Level of Pre-Graduate Universities

It is of great significance to analyze the colleges and universities that graduate students with pre-graduate are admitted to understand the structure of students and evaluate the quality of students. According to the above-mentioned data, colleges and universities are divided into: 985|211|, double world-class, our university, general university, junior college, and scientific research institute, and the overall quality of students and the quality of transfer students are analyzed, respectively, as shown in Figure 3 and Figure 4. As can be seen from Figure 3, 985|211|, the number of students from double world-class schools ranges from 1.9 to 4.3%, with an average of 3.0%. Our students account for 34.8~63.7%, with an average of 48.1%. As can be seen from Figure 4, the quality of the adjustment of student source showed a downward trend as a whole.
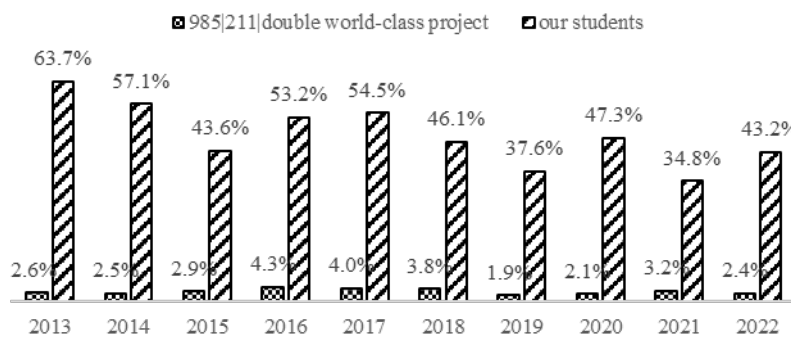

Figure 3. Analysis of the Types of Graduate's Pre-Graduate Universities from 2013 to 2022
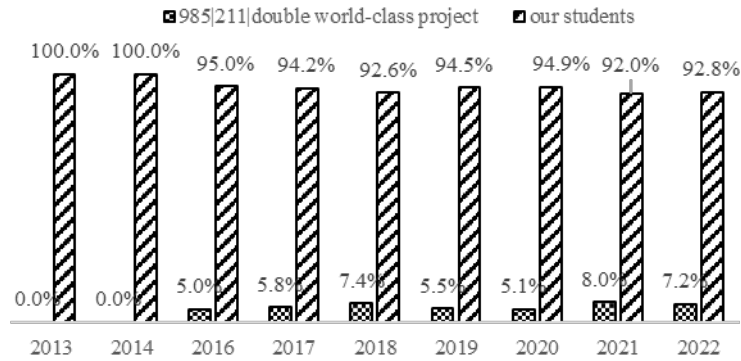
Figure 4. An Analysis of the Types of Adjustment Students' Pre-Graduate Universities from2013 to 2022

3.4 Admission Recommendation Exam-Free Graduate Students

Undergraduate students are admitted as graduate students through the recommended way of exemption from examination, and their comprehensive ability is generally relatively strong, which is an essential part of high-quality students. The enrollment rate for 2013-2022 is 5.3~13.0%, with an average of 9.4%. As shown in Figure 5, from 2018 to 2021, there was a downward trend in the enrollment rate of recommended students.
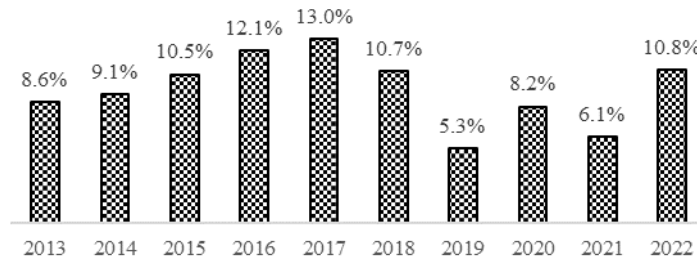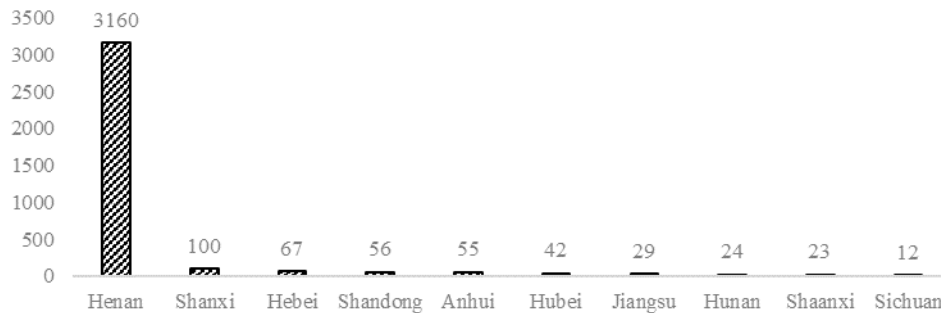

Figure 5. Enrollment Rate of Recommended Exam-Free Graduate Students from 2013 to 2022

3.5 Source Statistics of top 10 Provinces (Municipalities Directly under the Central Government and Autonomous Regions) and Top 10 Universities

It is of certain reference significance to understand the provinces (municipalities municipalities directly under the Central Government and autonomous regions) where graduate students registered before entering the university and the main pre-graduated universities, which are targeted to carry out enrollment publicity. Statistics are made according to the province where the household registration is located (municipalities directly under the central government, autonomous region) and pre-graduated universities, as shown in Figure 6 and Figure 7. As shown in Figure 6, the students of a certain school mainly come from Henan Province, and the second to fourth places are Shanxi, Hebei and Shandong respectively. As shown in Figure 7, the students of a certain university mainly come from Henan

Polytechnic University. Zhengzhou Institute of Business and Industry, Henan Institute of Urban Construction and Henan Institute of Engineering rank second to fourth.

Figure 6. Statistics of the Top 10 Provinces (Municipalities Municipalities Directly under the Central Government and Autonomous Regions) in Terms of Number of Students from 2013 to 2022
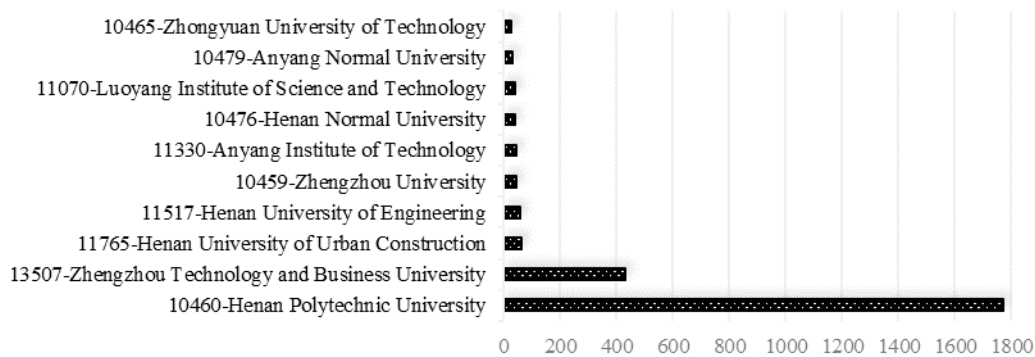
Figure 7. Statistics of the top 10 Universities in the Number of Students from 2013 to 2022

4. Conclusion

By analyzing and mining the contents of the annual data fields of degree-granting information, the multi-dimensional student source quality analysis method proposed can provide accurate data support for degree-granting institutions to comprehensively understand the student source structure and student source quality and enable the management personnel of degree-granting institutions to make good use of various historical data of annual reports, enabling new business applications of "sleeping in hard disk data garbage." It provides a new way of thinking to assist the periodic qualification evaluation and the quality evaluation of the program's construction.

References

Anon. (1991). The first-level training course of "National Degree Awarding Information Database Application System" was held in Tsinghua University. *Academic Degrees & Graduate Education*, (4), 5.

Academic Degrees Committee Office of The State Council. (October 10, 2008). *The Notice on Adjusting the Data Structure of the Annual Report on Degree Awarding Information*. Retrieved October 10, 2008, from http://www.moe.gov.cn/s78/A22/s7065/tnull_40234.html

Ministry of Education, National Development and Reform Commission, Ministry of Finance. (March 29, 2013). *Opinions on Deepening the Reform of Postgraduate Education*. Retrieved March 29, 2013, from http://www.moe.gov.cn/srcsite/A22/s7065/201304/t20130419_154118.html

Ministry of Education, Academic Degrees Committee of The State Council. (January 17, 2017). *On the issuance of the 13th Five-Year Plan for the Development of Degree and Graduate Education*. Retrieved January 17, 2017, from http://www.moe.gov.cn/srcsite/A22/s7065/201701/t20170120_295344.html

Ministry of Education, Academic Degrees Committee of The State Council. (2020). *On Carrying out Periodic Qualification Assessment of Academic Degree Authorization Points in 2020-2025*. Retrieved November 11, 2020, from http://www.moe.gov.cn/srcsite/A22/yjss_xwgl/moe_818/202101/t20210115_509952.html

Ministry of Education. (2023). List of National Higher Education Institutions. Retrieved June 15, 2023, from http://www.moe.gov.cn/jyb_xxgk/s5743/s5744/A03/202306/t20230619_1064976.html