

Reflections on the Construction of "Double First Class" Based on U.S. News World University Rankings

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Abstract: The construction of "double first-class" is a major initiative to strengthen China's science and education, and it is also an opportunity for the rapid development of colleges and universities. Through the comparative analysis of U.S. News world university Ranking index and the ranking of famous universities between of China and abroad, it is concluded that Chinese universities have surpassed most world-famous universities in terms of school-running scale, but need to strengthen in internationalization of faculty and students, faculty-student ratio and full-time researchers. On the scale of high-quality academic achievements, Chinese universities have reached the world-class level, but the proportion of high-quality achievements in total achievements is lower than the world ranking of universities. Therefore, measures should be taken to improve the quality of achievements and control the output of low-quality achievements.

1. Introduction

At present, the main world university ranking systems include ARWU(Academic Ranking of World Universities), QS World University Rankings, THE World University Rankings and U.S. News World University Rankings[1]. Among them, the U.S. News World University Rankings Index pays attention to the overall academic research and reputation of the university, and improves the evaluation index system of QS and THE by better balancing the weight of the soft and hard indicators in the evaluation index system[2]. The evaluation index system has been improved in the basis of the QS and THE evaluation index system, and the weight of the soft and hard indicators in the evaluation index system has been better balanced. China's "double first-class" construction aims to build a number of "first-class universities" and "first-class disciplines" in the world, and to build China into a higher education powerhouse by the middle of the 21st century. The U.S. News' World University Rankings' methodology and index system have been improved and developed over the past 40 years, and have gradually been recognized by the academic community, which has reference and meaning for the construction of China's double first-class universities.

2. U.S. News College Rankings Indicators

U.S. News uses 13 indicators to measure the global research performance from three aspects: academic reputation, literature publishing and international cooperation [3], calculate the university rankings according to different weights.

2.1. Academic Reputation Indicators

Academic reputation indicators include Global Academic Reputation (GRR) and Regional Academic Reputation (RRR), with their weights accounting for 12.5% and 12.5% respectively. The data comes from the academic reputation survey results of Clarivate Analytics. The survey is designed to provide a comprehensive understanding of respondents' perceptions of the world's universities and to evaluate subject areas with which they are familiar. The total number of

respondents exceed 30,000, including 66% of faculty, 15% of researchers, 7% of senior institutional leaders, 5% of graduate students, 4% of others, and 3% of non-education professionals. The total weight of the academic reputation indicator is 25%.

2.2. Literature Publication Indicators

The publication index includes the Number of publications (NoP), the Number of books (NoB) and the Number of conferences (NoC), which reflect the number of documents, with the weights accounting for 10%, 2.5% and 2.5% respectively, the weight of the normalized citation impact (NCI) and the total number of citations (TNC), which reflect the impact of the literature, is 10% and 7.5%, respectively; and the weight of the number of publications that are among the top 10% cited, which reflect the quality of the literature is 10% and 7.5%, respectively. Number of publications that are among the 10 percent most cited (abbreviated: NPT10), the percentage of total publications that are among the 10 percent most cited (abbreviated: TNC), and the number of publications that are among the 10 percent most cited (abbreviated: NPT10), which reflect the quality of the literature. percent most cited, abbreviated as: TPP10), Number of highly cited papers that are among the top 1 percent most cited in their respective field, abbreviated as. NPT1) and Percentage of total publications that are among the top 1 percent most highly cited papers in their respective fields (Percentage of total publications that are among the top 1 percent most highly cited papers, abbreviated as TPP1), with weights of 12.5 percent, 10 percent, 5 percent, and 5%. The total weight of literature publication indicators is 65%.

2.3. International Cooperation Indicators

The international collaboration indicator includes the ratio of the percentage of collaborative publications to the national average (International collaboration, abbreviated: IC) and the percentage of total publications with international collaboration (abbreviated: PIC), with a weight of 5% and 5%, respectively. The number of papers with international collaboration authors in our institution is first counted, and then divided by the number of similar papers in the country where the institution is located and the number of all papers in our institution to calculate the two indicators respectively, and the percentage of total weight of international collaboration is 10%.

2.4. Analysis of Indicator System

From the U.S. News indicator system.

(1) The indicators of academic reputation, literature publication and international cooperation are weighted 25%, 65% and 10%, respectively. The weight of literature publication indicator far exceeds that of academic reputation and international cooperation.

(2) Among the literature publication indicators, the quantity of literature, influence of literature and quality of literature indicators account for 15%, 17.5% and 32.5% of the total weight respectively, reflecting that the weight of quality of literature indicators is equal to the sum of the weight of quantity of literature and influence of literature indicators.

(3) The total weight of the batch markers reflecting the proportion of the number of high-quality results to the total number of results in the institution (such as the percentage of top 10% publications, the percentage of top 1% papers, and the percentage of international copublications to the total number of publications) is 20%.

3. Comparison of Domestic Foreign Famous Universities

3.1. Comparison of School Scale

According to the ranking data of U.S. News in 2021[4], select the top 3 universities in the world and the top 3 universities in China respectively, and compare them in terms of the number of students, staff and freshmen, etc., as shown in Table 1.

Based on the data in Table 1, the average number of students in the top 3 universities in the world is 16,253, the average number of international students is 4,250 (26% of the total), the average number of faculty is 1,941 (the average faculty-student ratio is 1:8.37), the average number

of international faculty is 590 (30% of the total), the average number of full-time research staff is 3,469 (179% of the faculty), and the average number of new undergraduate students, new master's students, and new doctoral students is 1,507, 2,269, and 1,025 (9%, 14%, and 625, respectively). 179% of the total number of faculty), and the average number of new undergraduate, master's, and doctoral students was 1507, 2269, and 1025, respectively (9%, 14%, and 6.3% of the total number of students, respectively). The average total number of students in the top 3 domestic universities was 38,208, the average number of international students was 5,124 (13% of the total), the average total number of faculty was 3,309 (average faculty-student ratio of 1:11.55), the average number of international faculty was 774 (23% of the total), the average number of full-time research staff was 1,497 (45% of the total), and the average number of undergraduate freshmen, master's D. students (11%, 11%, and 6.5% of the total student population, respectively), and an average of 4,057, 4,192, and 2,503 new undergraduate, master's, and doctoral students, respectively.

Table 1 Comparison of Running Scale of Famous Universities at Home and Abroad in 2020.

University Name	World Ranking	Total Number of Students	International Student Number	Total Number of Faculty	Total Number of International Staff	Full-time Research Staff	Number of Undergraduate Students	Number of Master's Students	Number of Doctoral Students
Harvard University	1	21261	5217	2280	456	2075	1700	3516	1446
Massachusetts Institute of Technology	2	11276	3806	1338	525	5046	1118	1564	599
Stanford University	3	16223	3727	2205	788	3285	1703	1726	1030
Tsinghua University	28	37484	4992	3226	579	1969	3742	3356	2741
Peking University	51	38583	6120	3461	950	1491	4321	4222	2391
Shanghai Jiao Tong University	122	38556	4261	3241	794	1030	4107	4997	2376

From the above data, we can see that the scale of our famous universities is larger than that of the world famous universities, which is basically more than twice of the world famous universities; the proportion of international students is low, which is one-half of the world famous universities; the proportion of international teachers among teachers is lower than that of the world famous universities, and the teacher-student ratio also lags behind that of the world famous universities; the proportion of full-time scientific researchers in universities is much lower than that of the world famous universities, which is universities in China.

3.2. Comparison of Academic Indicator Rankings

According to the ranking data of U.S. News in 2021[4], ranking the top 3 universities in the world and the top 3 universities in China according to points and individual indicators, as shown in Table 2.

As can be seen from Table 2, world-renowned universities have good international and regional reputations, and the number of their research results (number of papers, number of monographs, number of conferences) is not necessarily very high, e.g. MIT ranks 29th, 29th, and 8th for the three indicators; but the impact and high quality proportion of their academic results are very high, e.g. MIT ranks 8th, 10th, 9th, and 3rd for standardized citation impact, total citations, total 10% results, and 1% total results ranked 8th, 10th, 9th and 3rd, respectively, and the proportion of 10% results and 1% results ranked 3rd and 1st, respectively; however, the ranking of international cooperation indicators of world-renowned universities is generally much lower than their overall ranking. The international academic reputation of well-known domestic universities is basically attached to the overall ranking, and their total results are generally very high, such as Shanghai Jiao Tong University ranks 10th in the world for the total number of papers, and Tsinghua University and Shanghai Jiao Tong University rank 1st and 4th for the number of conferences, respectively; the number of their high-quality academic results also ranks well, such as the total number of 10% results and the total number of 1% results rank well above the overall ranking, but the high-quality

results as a The ranking of the proportion of high quality results to total results is far behind the overall ranking, which is a negative influence term of the overall ranking; the number of international cooperation results of domestic famous universities is high, but the proportion is still far behind the world famous universities.

Table 2 Total Ranking and Single Index Ranking of Famous Universities in 2020.

University name	Total ranking	Individual index ranking												
		GRR	RRR	NoP	NoB	NoC	NCI	TNC	NPT10	TPP10	NPT1	TPP1	IC	PIC
Harvard University	1	1	1	1	2	101	29	1	1	9	1	20	100	294
Massachusetts Institute of Technology	2	2	3	29	29	8	8	10	9	3	3	1	50	379
Stanford	3	3	2	8	25	34	13	2	2	5	2	11	167	697
Tsinghua University	28	32	4	15	73	1	432	27	19	192	25	285	63	1014
Peking University	51	40	5	19	123	21	570	36	32	413	41	427	53	973
Shanghai Jiao Tong University	122	138	23	10	236	4	787	33	34	727	66	815	157	1181

4. Conclusion

The construction of "double first-class" is a major initiative to strengthen China's science and education, and it is also an opportunity for the rapid development of higher education institutions. By comparing with the world's top universities, we can see that our universities have surpassed most of the world's leading universities in terms of scale of operation, but we need to strengthen the construction in terms of internationalization of faculty and students, faculty-student ratio and full-time research staff. In terms of the scale of high-quality academic results, our universities have also reached the world-class level, but the proportion of high-quality results in the total results is low, which pulls down the world ranking of universities, so we need to increase measures to improve the quality of results and control the output of low-quality results.

References

- [1] Zhang Yong, Zhang Qiang, Du Qizhen. Comparison of world university ranking index system and its enlightenment to China's "double first class" construction [J]. Journal of China Shiyou University (Social Science Edition), 2017, 33(02):93-97.
- [2] Wang Ziyang, Hui Yuanjun. Introduction and analysis of world university rankings [J]. Discovery Science, 2016, (4):388.
- [3] U.S. News & World Report. How U.S. News Calculated the Best Global Universities Rankings [EB/OL]. <https://www.usnews.com/education/best-global-universities/articles/methodology>, 2020.10.19
- [4] U.S. News & World Report. 2021 Best Global Universities Rankings[EB/OL].https://www.usnews.com/education/best-global-universities/rankings?int=top_nav_Global_Universities, 2020.10.19