

# Research on the Discipline Construction of Universities based on ESI Discipline Analysis Report

## -- Through Taking Southwest Petroleum University as an Example

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### Abstract

The proposal of China's "Double First-class" construction scheme has brought new opportunities and challenges to major universities, Taking the advantageous disciplines of Southwest Petroleum University as the research object, and using ESI and incites as research tools, Analyze the number of papers, citations and other indicators of advantageous disciplines in recent ten years, and explore the advantages, opportunities and challenges of ESI discipline construction of Southwest Petroleum University., To help universities optimize discipline construction and scientific research innovation.

### Keywords

University Library; Double First-class; Discipline Construction; ESI; CLC Number: G350.

### 1. Introduction

The construction of "Double First-class" is another major national strategy in China's higher education field following the "211 Project" and "985 Project". It aims to enhance the comprehensive strength and international competitiveness of China's higher education, cultivate First-class talents, produce First-class results, and promote a number of high-level universities and disciplines to become world-class. Southwest Petroleum University is one of the first "Double First-class" universities with world-class disciplines. The strategic planning of "Double First-class" universities makes universities pay more attention to the excavation and construction of their own advantageous disciplines. Each university is in urgent need of a large number of disciplinary information, such as the advantageous disciplines, the position of each advantageous discipline at home and abroad, the development potential of each discipline, the cooperation at home and abroad, and the development status of similar institutions.

Under this background, the library assists in school subject evaluation and provides subject benchmarking analysis for relevant universities at home and abroad. Initiative to provide timely and effective information to management, on the depth of huge data collection and analysis, is committed to tracking the development of the discipline evaluation at home and abroad and the evaluation of dynamic, the performance of the individual, the college scientific research and development situation of key subject carries on the analysis, evaluation, analysis the key discipline of our school of international and domestic development status and strategy layout, Explore the research hotspots, frontiers and emerging trends of key disciplines, insight into the contribution of each school to the discipline and the university's scientific research output, and find high-level papers/researchers and scholars with development potential. Liaise closely with relevant functional departments and colleges to directly provide information services for the "Double First-class" construction of our university.

ESI (Essential Science Indicators) database is a basic analysis and evaluation tool for measuring scientific research performance and tracking scientific development trend launched in 2001 by ISI (Institute for Scientific Information), a world famous academic information publishing institution [1]. The 22 disciplines set by ESI are: Biology and biochemistry, chemistry, computer science, economics and business, engineering, earth science, materials science, mathematics, comprehensive interdisciplinary, general physics, social sciences, space science, agricultural science, clinical medicine, molecular biology and genetics, neuroscience and behavior at, immunology, microbiology, psychiatry and psychology, environmental science and ecology, Botany and zoology, Pharmacology and toxicology. ESI is an important index used to evaluate the international academic level and influence of academic institutions and universities worldwide [2], ESI in all the world universities and research institutions of nearly 11 years of papers in SCI and SSCI database for statistical data, according to the cited frequency of discretion to determine the performance of the threshold, The top 1% of research institutions, scientists and research papers in the world, the top 50% of countries/regions in the world and the top 0.1% of hot papers in the world are respectively included. All statistics are updated every 2 months [3].

Library uses its own advantages to apply bibliometric analysis to discipline construction, makes quantitative analysis of discipline indicators, and provides supporting services through a large number of objective data, which is the research focus of library development in the new era and also the obligatory mission of library. In recent years, ESI has been widely used by domestic universities as a basis for evaluation of scientific research strength, discipline competitiveness and international influence. [4-8]

## 2. ESI Discipline Construction and Analysis

### 2.1. Distribution of ESI Disciplines in Southwest Petroleum University

Southwest Petroleum University is a provincial undergraduate university founded in 1958. According to the annual comparison and analysis with other universities and units in China, all universities have made great efforts in talent introduction and scientific research awards in recent years. As of March 2021, the disciplines of Engineering, chemistry, materials and Earth Science of Southwest Petroleum University have entered the top 1% of ESI.

The academic papers of Southwest Petroleum University involve 21 disciplines of ESI, and the top five disciplines in terms of the number of articles published and the number of citations are engineering, chemistry, Earth science, materials Science and physics. In 2020, engineering, chemistry and materials have made great progress in our school. The engineering discipline has advanced 131 places in the world rankings, and 7 places in China. The discipline of chemistry has advanced 154 places in the world ranking and 6 places in the domestic ranking. After the update of ESI data in September 2020, the discipline of Materials Science of Southwest Petroleum University has officially entered the ESI 1% discipline, advancing 31 places in the world and 1 place in domestic institutions. In 2020, the achievement rate of earth science has also made some progress, from 62.10% in January to 87.29% in November.

### 2.2. Development of Engineering Discipline

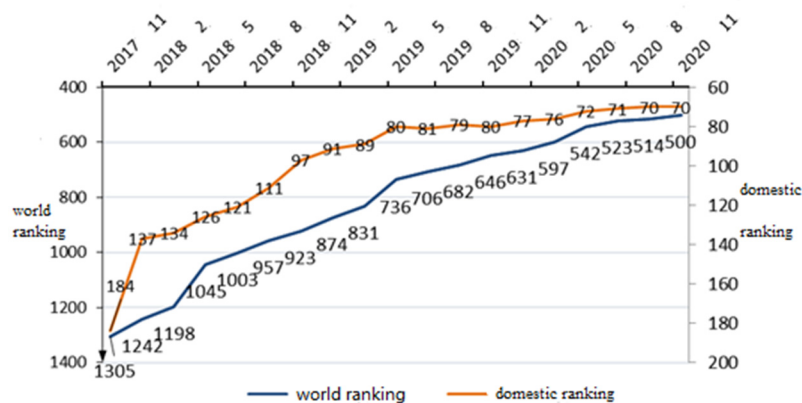
After ESI data update in November 2020, engineering discipline of Southwest Petroleum University has a total number of 2093 papers, with a total citation times of 14467, with an average citation times of 6.91 and a high citation number of 40 papers. According to the ESI data from 2020, the engineering discipline of Southwest Petroleum University has maintained a good momentum of development in the world ESI 1% queue and made great progress, ranking 131 in the world. Domestic institutions moved up seven places. Table 1 shows the ranking changes of engineering discipline of Southwest Petroleum University in ESI 1%

institutions in 2020. There are 6 updates in 2020, and the cited times of engineering in our school have increased by more than 500 times each time, indicating that the research results of engineering discipline in Southwest Petroleum University are gradually attracting attention from researchers around the world.

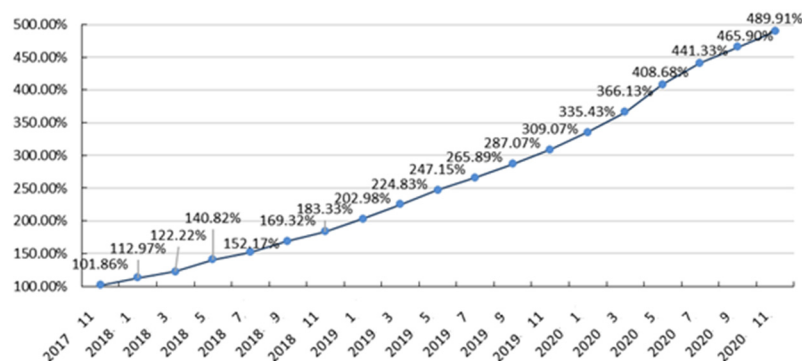
**Table 1.** Ranking changes of engineering disciplines in ESI 1% institutions of SWPU

Update time	Numbers of selected institutions	World ranking	Domestic ranking
2020.01	1535	631	77
2020.03	1576	597	76
2020.05	1541	542	72
2020.07	1585	523	71
2020.09	1624	514	70
2020.11	1661	500	70

Figure 1 shows the changes in the world and domestic rankings of Southwest Petroleum University after it entered ESI engineering discipline 1% in November 2017. Figure 2 shows the changes in the achievement degree of engineering discipline of Southwest Petroleum University. The engineering discipline of Southwest Petroleum University has shown a good upward trend in both the world and domestic rankings. The world ranking has risen from 1305 when it entered ESI 1% to 500. Its domestic ranking rose from 184th to 70th. The achievement degree of engineering discipline in Southwest Petroleum University has also maintained a steady upward trend, rising from 101.86% when it first entered ESI 1% to 489.91% at present.



**Figure 1.** Changes in the ranking of engineering disciplines in SWPU after entering ESI 1%



**Figure 2.** Changes in the achievement degree of engineering discipline of SWPU

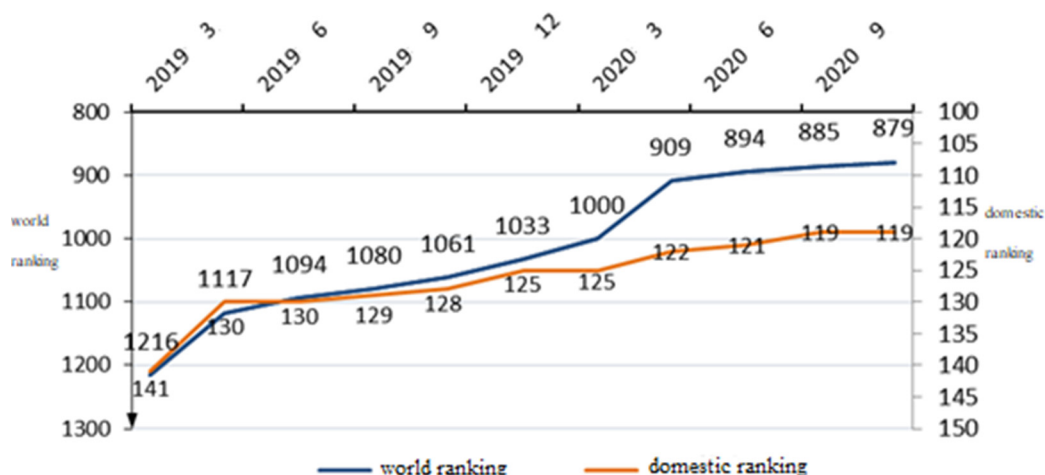
### 2.3. Development of Chemistry Discipline

The discipline of Chemistry in Southwest Petroleum University has been officially entered into the top1% since the update of ESI data in March 2019. After ESI data update in November 2020, the chemistry discipline of Southwest Petroleum University has a total number of 1698 papers, with a total number of cited times of 16926, with an average number of cited times of 9.97 and 17 papers with high cited times. According to the ESI data from 2020, the discipline of chemistry in Southwest Petroleum University has maintained a good momentum of development in the world ESI 1% queue and made great progress, ranking 154th in the world. Domestic institutions moved up six places. Table 2 shows the ranking changes of chemistry discipline in ESI 1% institutions in 2020. There have been six updates in 2020, and the citations of chemistry discipline in Southwest Petroleum University have increased by more than 400 times each time, indicating that the research results of chemistry discipline in Southwest Petroleum University are gradually attracting attention from researchers around the world.

**Table 2.** Ranking changes of chemistry disciplines in ESI 1% institutions of SWPU

Update time	Numbers of selected institutions	World ranking	Domestic ranking
2020.01	1298	1033	125
2020.03	1328	1000	125
2020.05	1299	909	122
2020.07	1327	894	121
2020.09	1356	885	119
2020.11	1383	879	119

Figure 3 and Figure 4 respectively show the changes in ranking and achievement trend of chemistry discipline in Southwest Petroleum University after entering ESI 1%. Since the discipline of Chemistry of Southwest Petroleum University entered ESI 1% in March 2019, its ranking in the world and in China has been rising steadily. Its ranking in the world has risen from 1216 when it entered ESI 1% to 879. Its domestic ranking rose from 141st to 119th. The achievement degree of chemistry in Southwest Petroleum University has also maintained a good upward trend, rising from 104.16% when it first entered ESI 1% to 198.69% at present.



**Figure 3.** Changes in the ranking of chemistry disciplines in SWPU after entering ESI 1%

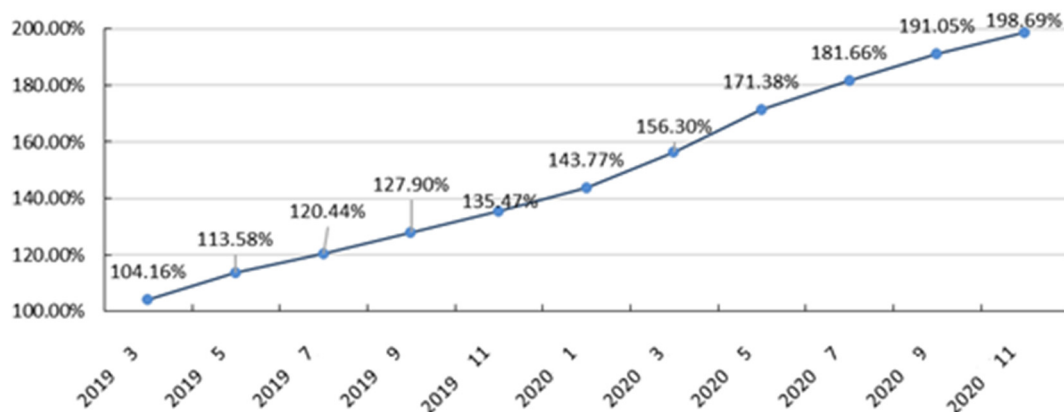


Figure 4. Changes in the achievement degree of chemistry discipline of SWPU

### 2.4. Development of Materials Science Discipline

The discipline of Materials Science in Southwest Petroleum University has been officially entered into the top1% since the update of ESI data in September 2020. After ESI data update in November 2020, there are 819 papers in the discipline of Materials Science in Southwest Petroleum University, with a total number of citations of 7980 times, an average number of citations of 9.74 times, and 8 papers with high citations. The world ranking of materials science has risen from 932 in September 2020 to 901 in November 2020, and the domestic ranking has advanced one place to 143rd. Table 3 shows the ranking changes of materials Science discipline in ESI 1% institutions in 2020.

Table 3. Ranking changes of materials science disciplines in ESI 1% institutions of SWPU

Update time	Numbers of selected institutions	World ranking	Domestic ranking
2020.09	961	932	144
2020.11	979	901	143

### 3. Conclusion

Based on the discipline analysis of ESI, it can be seen that Southwest Petroleum University has achieved certain achievements in discipline construction in recent years, and its academic level has improved significantly. In the process of ESI discipline construction, it is important to promote the construction discipline into the top 1% of ESI ranking. What is more important is to ensure that the disciplines remain in the top 1% of the global ESI ranking and keep improving in the continuous rolling update. The construction of ESI disciplines is not a once for all task. It is necessary to continuously improve the existing ESI disciplines and vigorously support the construction of potential disciplines. Universities can put forward clear planning objectives for ESI discipline construction based on their own discipline construction, adopt strategies and measures that are in line with the actual situation of the university to improve ESI discipline ranking, analyze the international cooperation of the same universities whose ESI discipline is ranked, and analyze hot papers and cutting-edge research in ESI database of the discipline. Tracking the international development of the discipline. It is necessary to encourage appropriate integration of resources from related disciplines to potential disciplines, promote targeted convergence of research output to ESI ranking disciplines and potential disciplines, improve the scientific influence of entering ESI disciplines, and accelerate the speed of potential disciplines entering the top 1% of ESI ranking. Attention should be paid to high-impact papers, and research cards of high-impact scholars should be established to promote their excellent

achievements, so as to improve the scientific influence of individuals in disciplines, so as to drive and enhance the overall influence of ESI construction disciplines and schools.

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