

Web Impact (WI): a bibliometric index based on web usage

Network communication and mobile internet have brought about new formats of scientific research and publishing, such as open science and open access. Citations do not reflect the impact of academic research results in a timely and complete manner due to certain lag and limitations that they must be cited by users in published articles. Therefore, it is necessary to find new indicators for supplement. Through international cooperation, the project team tried to introduce the indexes in Altmetric provided by Digital Science and relevant network indexes of the journal databases of CNKI and Wanfang Data to reflect the comprehensive impact of the academic results of journals in the academic community and society (weight not exceeding 20%). Since the usage of Chinese journals can hardly be illustrated in Altmetric, the CNKI downloads and Wanfang database downloads are introduced as alternative measures to show the function of Chinese journals for Chinese scholars. The international and Chinese weights are 0.8 and 0.2, respectively.

The web usage data vary greatly among journals, and leading journals enjoy a large number of mentions and downloads. For most journals, this index is approximately equal to 0 if the conventional normalization method (divided by the maximum) is used. In this regard, the project team adopted a segment assignment method, with the WI value divided into ten equal segments, and all journals in the same segment have the same WI value.

The specific method is briefly described as follows:

① Algorithm principle

Using the segment assignment method, the WI value of journals in each segment is obtained by backward induction from the World Academic Journal Clout Index (WAJCI). According to the principle that the contribution rate of WI and WAJCI to the World Journal Clout Index (WJCI) is 2:8, the WI value within a certain range can be derived from the WAJCI value. Meanwhile, the contribution rate of Chinese domestic attention (Web impact-B, WIB) and international attention (Web impact-A, WIA) to WI is also maintained at 2:8.

② Calculation process

Journals with “total mentions” in Altmetric or Chinese domestic downloads are divided into ten equal segments in descending order of the WAJCI value, and the W value for each segment is calculated.

$$W = 0.2 * (\text{average WAJCI in each segment}/0.8)$$

International attention: There are 9,694 journals with Altmetric values (“total mentions” in 2019 of published articles in this year). TOP 80% journals (7,808 in total) are selected and divided into ten segments in descending order of “total mentions” and then the values of international attention (WIA) are assigned for each segment.

$$\mathbf{WIA=W*0.8}$$

Chinese domestic attention: There are 1,387 journals with CNKI or Wanfang downloads (downloads in 2019 of published articles in this year). TOP 80% journals (1,109 in total) are selected and divided into ten segments in descending order of downloads, and then the values of Chinese domestic attention (WIB) are assigned for each segment.

$$\mathbf{WIB=W*0.2}$$

WI is the sum of international attention and Chinese domestic attention:

$$\mathbf{WI=WIA+WIB}$$

Table Actual score for each segment

Segment	Average WAJCI	International attention			Chinese domestic attention		
		<i>n</i> of journals	Total mentions	WIA	<i>n</i> of journals	Downloads	WIB
1	8.638	775	[1934,1215603]	1.728	110	[60410,298814]	0.432
2	3.459	776	[829,1931]	0.692	111	[40256,60349]	0.173
3	2.409	775	[426,826]	0.482	111	[30350,40206]	0.12
4	1.831	779	[257,425]	0.366	111	[24434,30331]	0.092
5	1.448	775	[161,256]	0.29	111	[19512,24382]	0.072
6	1.165	781	[99,160]	0.233	111	[15478,19415]	0.058
7	0.959	771	[62,98]	0.192	111	[12348,15464]	0.048
8	0.761	772	[37,61]	0.152	111	[9640,12336]	0.038
9	0.551	806	[22,36]	0.11	111	[7097,9627]	0.028
10	0.273	798	[12,21]	0.055	111	[4107,7089]	0.014