

Distribution and Development Trend of Noun Modifiers

-- A Corpus-based Comparative Study of English Abstracts of Chinese and English Academic Papers

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Abstract

This paper builds a corpus of English abstracts of academic papers written by Chinese scholars and native English scholars, and makes a comparative analysis of the differences and trends between Chinese scholars and native English scholars in the use of noun pre-modifiers and noun post-modifiers in the writing of English abstracts. The results show that the use of noun pre-modifiers by Chinese scholars shows a steady but not significant growth trend, and the use of noun post-modifiers shows a significant growth trend. At the same time, the use of pre-modifiers by native English scholars increases significantly, while the use of post-modifiers does not present significant growth, showing a downward trend from 2013 to 2019.

Keywords

English abstracts, noun modifiers, distribution, development trend.

1. Introduction

Since the 1980s, academic English has been studied for more than thirty years, whose research targets include language teaching, language knowledge, language ability, teacher development, pragmatics and so on. Under the increasingly intense competition for publication of academic papers, English abstracts have attracted much attention from academic paper researchers and writers. Halliday (1979) and Banks (2008) points out that research-based academic papers are different from those of humanities, which need specific text layout, grammatical structure and vocabulary composition to clarify the main content of the paper. [1][2] At present, most studies concerning research-based academic papers' abstracts are carried out from the perspectives of genre analysis, identity construction and language features. As the window of academic papers, English abstracts are required to offer effective and accurate information, highlight the important points and provide readers with some hints.[3] While, due to a limited number of words, the paper should be compressed to achieve the most economical abstract. Therefore, many language researchers have studied the linguistic features of English abstracts from the perspectives of rhetoric, grammar, tense and voice.[4][5][6][7] However, up to now, few researches investigate the relations between language compression and word selection.

Through self-build corpus of English abstracts from native English scholars and Chinese scholars, this study intends to conduct a contrastive study on international research-based articles, which investigates the distribution and developing trend of noun phrases in two sub-corpora, hoping that the conclusions will present some references for Chinese scholars in their writing of academic papers.

2. Research Status at Home and Abroad

As a typical linguistic feature, noun modifiers occupied a crucial position in research-based academic papers, since a large amount of information can be imbedded in a small number of words, greatly improving the accuracy and simplicity of abstracts. At present, English noun modifiers are divided into two categories, named noun pre-modifiers and noun post-modifiers. Noun pre-modifiers are composed of one or more nouns, while post-modifiers are needed to be combined with prepositions to form the preposition-noun post-modifiers.[8] In current studied, the semantic relations between noun modifiers and head nouns have been a heated topic. Yue (1996) points out that when modifying nouns, there exist distinctive differences between adjectives and noun modifiers. Adjectives often used to describe the nature, characteristics or the state of head nouns[9], while there are more specific relations between noun modifiers and head nouns, such as cause and effect, ownership, object, purpose and so on. Meanwhile, the position of modifiers was determined by the semantic relations between modifiers and head nouns.[10] Pre-modifiers embody the “eternity” of the relationship with the characteristic of categorization. Post-modifiers reflect the feature of “temporary”, characterizing by description. Whereas, Jicai believes that this kind of semantic relations cannot be applied to all kinds of modifiers, because modern English presents a complex form of expression with the increasingly obvious trend of “moving forward”, with some “temporary” modifiers can also be prepositioned.[11] Secondly, the meaning of polysemy can be divided into abstract and concrete meanings, whose semantic variants can only be explained in specific contexts. If making concrete semantic variants as the standard for judging syntactic function, it will fall into a tautological model. Hence, constructional licensing is proposed to fill in the gap of the selection for semantic relationships. The appearance of construction grammar also transfers the focus of study to human being’s universal cognition, providing a new perspective for studies on pre-modifiers and post-modifiers. Zhibin states in his study about word order types of noun modifiers in English and Chinese abstracts that the universal cognitive model shared by human beings makes the language have the similarity in form, but the difference in language personality and thinking modes will lead to divergences in language selection.[12]

Above all, most studies on noun modifiers are carried out from a synchronic perspective, trying to reveal the differences and individual characteristics between different languages. However, few studies explore the development trend and variations from a diachronic point of view. Therefore, this paper attempts to investigate the distribution and development trend of noun modifiers in native English scholars and Chinese scholars’ abstracts from a diachronic perspective.

3. Research Design

3.1. Research Questions

This paper focuses on the distribution and development trend of noun modifiers in English abstracts of academic papers written by Chinese scholars and native English scholars. From the perspectives of distribution, development trend and significance of growth, the following three questions will be answered:

- (1) From 2000 to 2019, what is the distribution and status of pre-modifiers and post-modifiers in abstracts from Chinese scholars and native English scholars?
- (2) From 2000 to 2019, what is the characteristics of the development trend of pre-modifiers and post-modifiers in abstracts from Chinese scholars and native English scholars?
- (3) From 2000 to 2019, whether there exists any significant difference in the application of pre-modifiers and post-modifiers in abstracts from Chinese scholars and native English scholars in three certain periods?

3.2. Corpus

Through self-built small sized corpus, author tries to analyze the abstracts from native English scholars and Chinese scholars. The corpus is composed of 228 English abstracts of academic papers, 114 are from Chinese scholars and 114 are from native English scholars, involving 38 majors in Science and Engineering with the time span of publication from 2000 to 2019. All the abstracts from native English scholars are extracted from SCI and SCIE, with the total world count is between 100 and 200. SCI and SCIE are Science Citation Index and Science Citation Index Expanded, including most influential journals in natural science engineering. Making that decision is out of two considerations: 1) SCI and SCIE cover a large number of high-quality papers around the world, from which papers in the same field with the same topic can be easily received. 2) Top journals with a wide range of readers and great impacts require languages to be more universal. Due to the time lag in Chinese and western attention on the same topic, the time span is divided into three periods, 2000 to 2006, 2007 to 2012 and 2013-2019, according to Douglas Biber and Bethany Gray's study on the grammatical change in the noun phrase (2010), Jinqing's research on the development of academic English in China in the past 10 years, and Xi's investigation on the foreign academic English writing.[13][14][15] Among 38 majors, the selected corpus must be highly relevant in themes and key words, in order to avoid the deviation caused by different professional terms and researching methods. In addition, the means to distinguish abstracts from Chinese scholars and native English scholars is also a major concern in this study. For Chinese scholars, names and subordinate units are taken as the criterion for judgments. For native English scholars, names, institutions, and the basic information from official homepages are taken into consideration. In terms of those ambiguous materials, this study chose to exclude them. Specific information about the corpus is as follows:

Table 1. Statistics for Corpus

Corpus for English abstracts	Word count	Total word count	Average word count
English abstract of Chinese scholars	114	15289	134.11
2000-2006	38	5007	131.76
2007-2012	38	5290	139.21
2013-2019	38	5326	140.16
English abstracts from native English scholars	114	17321	151.94
2000-2006	38	5612	147.68
2007-2012	38	5685	149.61
2013-2019	38	6042	159

3.3. Retrieval and Definition of Noun Modifiers

The rapid development of corpus linguistics can be credited to the advanced revolution in the software used to label and analyze corpus. The computation function like retrieval, annotation and other applications render powerful vitality to corpus linguistics.[16] Since some deviations would occur when extracting noun pre-modifiers and post-modifiers, and the process of statistics and screening are complicated, thus in addition to the use of markers, statistical analysis software, the corpus will be further sorted out manually. In order to study the development trend of noun pre-modifiers and post-modifiers in abstracts from Chinese scholars and native English scholars, quantitative and qualitative research methods are adopted to analyze noun pre-modifiers and post-modifiers. After tagging the corpus (treetagger

for windows 2.0), the tagged corpus will be further checked to remove the false tagged and unrecognized corpus. Complex noun phrase refers to a noun phrase with at least one pre-modifier or post-modifier, while simple noun phrase is the phrase with a definite article, such as "the apple". This kind of simple phrase should not be considered in this study, since they often play the role as linking phrases, instead of the elements that can present concise language. The postposition nouns should be further analyzed to distinguish whether they are modifiers or adverbials. Only those post modifiers will be included in this study.

Taking "learn knowledge about language" and "learn knowledge from their own experience" as examples, the former play the function as a post-modifier while the latter an adverbial for the head verb. Douglas Biber and Bethany Gray stated in the *Grammatical Change in the Noun phrases: the Influence of Written Language Use* that before the 18th century, noun post-modifiers were often combined with prepositions like of, but after that period, noun post-modifiers were characterized by diversification, such as of, in, on, with, about.[17] In the course of investigation, there are a small number of prepositions like between and from, which should also be included in this study.

The following examples analyze the noun pre-modifiers and post-modifiers in abstracts from academic papers from Chinese scholars and native English scholars. Example one and Example two are the first sentence in abstracts. In annotation, the noun pre-modifiers are labeled as NN, NNN, or NNS, and noun post-modifiers are tagged as PP.

Example one from native English scholars: In this manuscript, switchable and multi-wavelength erbium-doped fiber laser arrangement NNN, based on Fabry-Perot and Mach-Zehnder interferometers NS is presented. (Physics, 2006)

Example two from Chinese scholars: The proportion of erbium-doped fibre length NN/PP of dual-stage L-band amplifier with NNN/PP cascade structure NN is optimized, which is done by changing pump power NN of the second stage under the condition that the length and pump power NN of the first stage PP is determined. (Physics, 2006)

As shown in the examples, Treetagger (Treetagger for Windows 2.0) includes head nouns in tagging. Therefore, when applying AntConc3.5.8 for retrieving and extracting, only nouns before head nouns will be taken as pre-modifiers. When encountering controversial materials, these materials will be further analyzed or deleted. All the final statistics and analyses are based on the proportion of noun modifiers and prepositions in total word count in abstracts.

3.4. Research Process

First of all, materials in thirty eight different fields and three time periods are preprocessed and saved as txt, named by its major and time of publication. Secondly, we use Treetagger (Treetagger for windows 2.0) to annotate the metadata. This process also needs to manually correct the missing or mislabeled materials. The unrecognized materials are reselected and labeled for analyzing. At the same time, three native English students and Chinese students from English majors are invited to tag the corpus, making sure that the rate of consistency between manually annotated and Treetagger is not less than ninety percent. Then, AntConc 3.5.8 is applied to retrieve the tagged materials and extract noun pre-modifiers. Excel is used to make statistics on the total number of Chinese and English abstracts, the number of noun modifiers and prepositions. The function of automatic summation is employed to show the development trend of the total number of abstracts. The automatic comparison function is used to calculate the proportion of pre-modifiers and post-modifiers in phrases. Finally, the paired sample t-test of SPSS was used to test the data of three groups of samples. The confidence interval is 95%. When the significance level $P < 0.05$, it means that there is a significant difference, otherwise there is no significant difference.

4. Results and Discussion

This part demonstrates the distribution and development trend of noun pre-modifiers and post-modifiers in English abstracts from Chinese scholars and native scholars in thirty eight majors from 2000 to 2019. The differences are presented through the paired sample t-test of two sub-corpora by SPSS. Through comparing the line graph of the development of noun pre-modifiers and post-modifiers, the paper aims to uncover the differences and intersections of two sub-corpora.

4.1. Data Analysis

4.1.1. Distribution of Noun Modifiers in Different Stages

The results of the comparative analysis on two sub-corpora of English abstracts from Chinese scholars and English scholars are as shown in Table 2. The average proportion of noun pre-modifiers in English abstracts from Chinese scholars and native English scholars in three periods are 0.16, 0.18 and 0.20 respectively, while those of native English abstracts are 0.14, 0.18 and 0.20. It can be noticed that there is a stable increase in the proportion of noun pre-modifiers in both sub-corpora. The growth rate of abstracts from native English scholars is 0.04, which is higher than that of Chinese scholars with the proportion of 0.02. The proportions of noun post-modifiers in English abstracts from Chinese scholars are 0.06, 0.07 and 0.08, and those of English native scholars are 0.07, 0.07 and 0.08. The proportion of noun post-modifiers in abstracts from Chinese scholars increases steadily by 0.1, while the proportion in abstracts from native scholars stabilizes at the 0.07 with a little decrease in recent years.

Table 2. Distribution of Pre-noun Modifiers and Post-modifiers in English Abstracts between Chinese and English scholars

	English abstracts from Chinese scholars			English abstracts from native English scholars		
	2000-2006	2007-2012	2013-2019	2000-2006	2007-2012	2013-2019
Average word count in abstracts	131.76	139.21	140.16	147.68	149.61	159.00
Average proportion of pre-modifiers	0.16	0.18	0.20	0.14	0.18	0.22
Average proportion of post-modifiers	0.06	0.07	0.08	0.07	0.07	0.06

4.1.2. The Developmental Trend of Noun Modifiers in Different Stages

The developmental trend and the interaction of the two sub corpora are clearly demonstrated in Table 3 and table 4 through the line graph. Table 5 compares the significant differences in the frequency of noun modifiers in two sub corpora in different time periods respectively. From the frequency of usage, there is a difference in the use of noun pre-modifiers between Chinese scholars and native English scholars in different periods of time, and the difference is more significant in abstracts from native English scholars. When it comes to post-modifiers, the significant difference appears in Chinese scholars rather than native English scholars. The detailed information is as follows:

Table 3. The developmental trend of noun pre-modifiers in abstracts from Chinese scholars and native English scholars

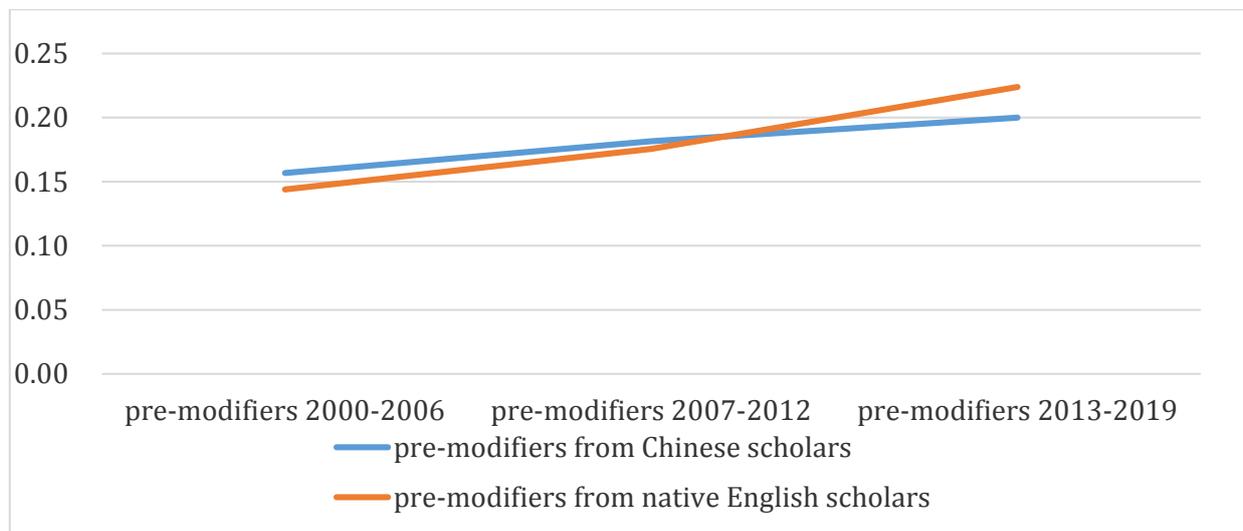
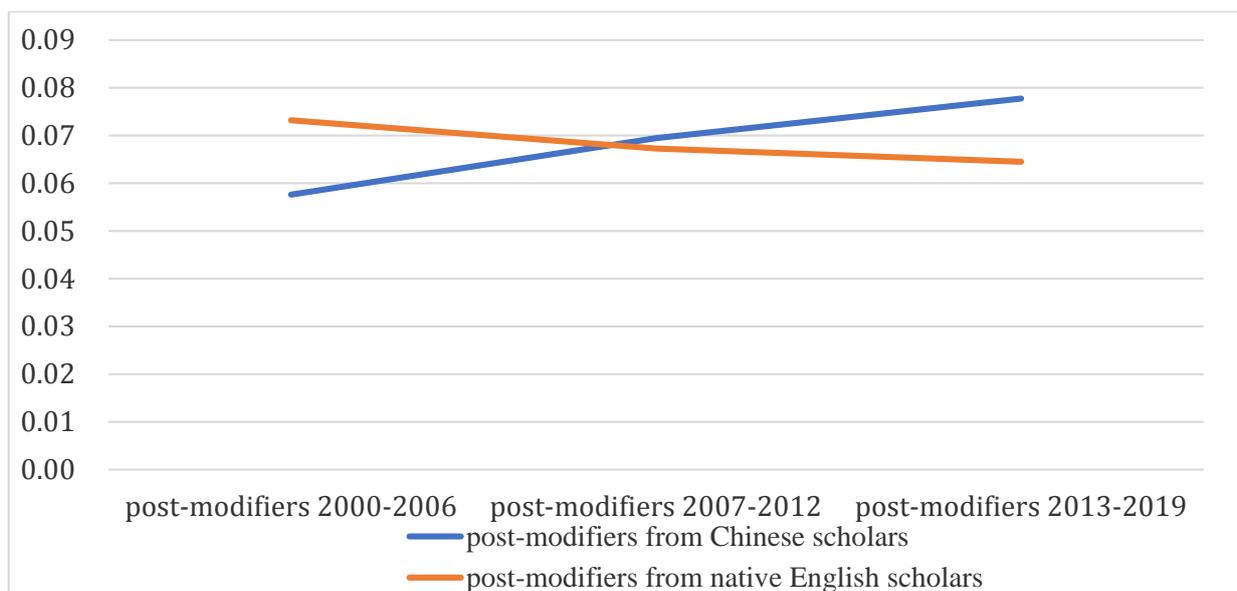


Table 4. The developmental trend of noun post-modifiers in abstracts from Chinese scholars and native English scholars



From table 3, there is an increase of noun pre-modifiers in both sub corpora, with an intersection around 2012. As can be seen in Table 4, the increase of noun post-modifiers shows in abstracts from Chinese scholars, while the decline in abstracts from native English scholars, with the same interaction in 2012.

Table 5. Discrepancies in the distribution of noun modifiers in abstracts from Chinese scholars and native English scholars in different periods.

	Significant value of noun pre-modifiers		Significant value of noun post-modifiers	
	Chinese scholars	Native English scholars	Chinese scholars	Native English scholars
2000-2006 VS 2007-2012	.045	.000	.000	.385
2007-2012 VS 2013-2019	.000	.000	.000	.165
2000-2006 VS 2013-2019	.132	.000	.015	.473

Table 5 illustrates the distribution differences of noun modifiers used by Chinese scholars and native English scholars in abstracts. From the frequency, the noun pre-modifiers in abstracts from Chinese scholars show tendency to ascend, and there is no significant difference between 2000-2006 and 2013-2019 ($P = 0.132 > 0.05$). While, the significant differences occur between periods of 2000-2006 and 2007-2012 ($P=0.045<0.05$), 2000-2006 and 2013-2019 ($P=0.000<0.05$). As presented, the development of noun pre-modifiers in abstracts from Chinese scholars is slow, especially in recent years. However, in native English scholars' abstracts, the growth is significant in paired comparisons of three periods ($P=0.000<0.05$). As it can be seen that since 2000, the noun pre-modifiers gradually increases, in order to reinforce the simplicity and conciseness of academic language.

In the corpus of abstracts from Chinese scholars, the noun post-modifiers increased significantly. The difference between periods 2000-2006 and 2013-2019 ($P=0.015<0.05$) is less insignificant than the comparisons of 2000-2006 and 2007-2012, 2007-2012 and 2013-2019 ($P=0.000<0.05$). However, in abstracts from native English scholars, nothing significant takes place with the significant value $P=0.385>0.05$. Hence, the conclusion could be reached that from 2000 to 2019, the usage of post-modifiers does not transform greatly.

4.2. Discussion

4.2.1. General Features of Noun Pre-Modifiers in Abstracts

Compared with native English scholars, Chinese scholars adopt more noun pre-modifiers in their abstracts, while Chinese scholars use less noun post-modifiers, which is basically consistent with the research results of Ruan[17].The possible reason for the difference between the distribution of noun modifiers is mainly due to the divergences in language habits. Chinese scholars tend to post noun modifiers before head nouns to simplify their language and make implicit expression, offering readers more space to make reflections. Whereas, the noun post-modifiers applied by native English scholars are used to manifest the clarity and logicity of writing. The characteristics in their writing conform to their specific language habits.

4.2.2. The Developmental Features of Noun Modifiers in Different Periods

In abstracts written by Chinese scholars, the frequency of noun pre-modifiers decreases, but proportion of noun post-modifiers increases. Meanwhile, in native English scholars' abstracts, the ratio of noun pre-modifiers improves prominently, and that of noun post-modifiers decline. Another unexpected finding is that there exists an intersection in the development of noun modifiers in around 2012. According the paper published by Jiqing, A 10-year Review of China's EAP Development: Based on a Comparison with Related Studies in, which shows that in the time span from 2009 to 2013, the amount of published papers on academic English increases significantly.

The result is in accordance with Xi's discovery, Foreign Academic English Writing Assessment Studies: a Critical Review, which exhibits that between 2012 and 2013, a large quantity of investigations carried out on academic English. She also studies the research papers on English for Specific Purposes, English for Academic Purposes and Journal of Second Language Writing, when she finds that there is also a summit in 2012. Basing on the coincidence, judgement can be made that around the year of 2012, both home and broad conducted many studies on academic English. Therefore, influenced by these international studies, both Chinese scholars and native English scholars try to transform their writing forms to meet the demands of international development of academic English.

4.2.3. Factors Influencing the Development of Noun Modifiers

The evolution of noun modifiers involves a great number of factors. Firstly, the perceptive thinking from Chinese scholars emphasizes the recognition and comprehension of the unity between subjects and objects, trying to understand things as a whole. Nevertheless, native English scholars hold the rational thinking, insisting to grasp the nature of things through perception and logical reasoning. Thus, when employing noun modifiers, Chinese scholars select to place them before head nouns, ensuring the independence and integrity of head nouns. Yet, native English scholars choose to position them after head nouns to separate specific characteristics from the whole, so as to analyze the inherent nature of things.

Secondly, the transfer of native language allows Chinese scholars to apply language characteristics of Chinese into English writing. Lust states in his Branching Direction Theory that Chinese is the left branching language, whose modifiers appear before head nouns and can be extended infinitely with several modifiers to highlight the center topic.[19] Hence, in English writing, Chinese scholars prefer noun pre-modifiers to make its key points at the prominent position.

Last but not least, the most important factor in the development of noun modifiers turns out to be language contact. In the process of communication, the language habit of using noun post-modifiers is challenged by the "economy" of noun pre-modifiers. At the same time, the perception thinking from Chinese scholars was also influenced by the logical thinking from native English scholars. In order to arrive at the effective mutual communication, scholars with different languages decide to adapt to a different culture. With time goes by, this kind of adaption started to become a part of their writing features. In addition, in order to seize the opportunity in the rapid development of international society, catch up with the times and achieve economic benefits in various fields, Chinese scholars endeavor to make their language meet the demands of international community. Also, the rise of power from China make the international community cannot take the strength of China for granted. Bruce Stokes points out that nowadays, Asian countries like China, Japan, Korea and other countries has unfolded their extreme high knowledge accomplishments in projects concerning advanced engineering mathematics, scientific programs and so on, building great academic value worldwide. Consequently, most western countries step up their efforts in providing international education, broadening the platform for academic communication and providing free developmental space for scholars from all over the world. Under the support of policy, the academic exchange in home and abroad goes deeper and scholars from different countries have been seeking the balance through constant discussions, so as to reach the most effective academic communication.

5. Conclusion

This study reveals the differences and development trends between Chinese scholars and native English scholars in their use of noun modifiers to achieve the structural compression in English abstracts, which can provide a new perspective for abstract writing in international

journals. In the development process of abstracts writing, the distribution frequency of noun pre-modifiers from English abstracts gradually increases and that of noun post-modifiers improves in abstracts from Chinese scholars. This kind of tendency displays that through constant language contact, the abstract writing embraces advantages from both sides, presenting the trait of convergence. This kind of feature enlightened us that in international academic exchange, both native English scholars and non-native English scholars should keep an open mind, respect each other's language, culture characteristics, and establish the concept of lingua franca to promote the international academic communication and development. Certainly, this study also has some limitations. First of all, the samples taken by this study are 228 articles from international journals, with the total word count is 32610, which is still not enough for a more accurate result. Then, the difference is caused by factors from multiple aspects and this study only discusses from the perspectives of thinking modes, native language transfer and language contact. Therefore, future study could collect more language materials to analyze other language features and adopt compound methodologies to explore intricate causes. Academic language is a crucial means for academic communication, and the further investigation in this field could provide scholars with more inspirations and efficiently improve the quality of academic communication.

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