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Classification of scholarly journals based on journal indexes coverage

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Abstract. Scholarly journals can be classified according to many different criteria. Unfortunately, the classification of scientific journals is not a subject on which experts agree. Although some researchers have made suggestions on the subject, it is far from clear how to classify scientific journals. For these reasons, the aim of this study is to propose criteria for the classification of scientific journals and to make the subject more clear and understandable. Undoubtedly, the subject is controversial and open to criticism. We attempt to classify scholarly journals according to the indexes they are covered in. By using various databases and literatures and also by adding my own thoughts and interpretations, so this text has emerged. The scholarly journals were summed under four groups, viz., 1. Journals covered by Clarivate Analytics Web of Science Database such as SCI-Expanded, SSCI, AHCI; 2. Journals covered by ESCI (Part of the Web of Science), SCImago SCOPUS and PubMed Medline; 3. Journals covered in other international or local indexes and 4. Journals that are not covered by any index. The indexes they are covered can give an idea about the performance of the journal. The results of this study have provided clearer, understandable and measurable criteria for the classification of scientific journals.

Keywords: scholarly journals, academic journals, journal classification, scientific journal indexes, development of journals, Web of Science, SCI-Expanded, SSCI, AH&CI, ESCI, Scopus, PubMed Medline

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Introduction

Academic studies begins with an idea and the generation of a hypothesis, followed by funding and approval of research; the conduct and management of research takes place, and finally the dissemination of the scientific results obtained. There is such a cycle in general in scientific studies. The peer-reviewed journals have four important functions: Registration, dissemination, certification and archiving (Ware & Babe, 2015). Although scientific results are also publishing in research and proceedings books, but scientific results are mostly published in academic journals. However, all academic journals are not same quality for various reasons. For example, the number of citations received by the publications in the journals and the recognition of the journals in the world are different. Therefore, academic journals needs to be classified according to some criteria. However, the criteria by which academic journals should be classified is not a subject of consensus among experts.

It is difficult to know the exact number of academic journals available today. Databases index journal using different parameters and therefore no two database lists are identifical or have the number of journals. As of April 5, 2024, there are 22,164 journals in Web of Science Core Collection [SCI-Exp., SSCI, AHCI and ESCI] (https://mjl.clarivate.com/home). However, the actual number is less than this because some journals can be both SCI-Expanded and SSCI (For example, *Asia-Pacific Psychiatry*), which may cause a journal to be counted twice. Mabe (2003) indicated that the number of academic journals increased from 10,000 in 1951 to 71,000 in 1987. Also Suiter & Sarli (2019) stated that as of July 2019, the number of journals published in English is 80,000 and 30,000 of them are in the field of health. In addition, Leydesdorff et al. (2017) stated that the number of academic journals published in English was 28,100 in 2015, but the number of journals in Web of Science (WoS) was 11,365 in the same year. These data indicate that not every journal is included in the WoS database.

Although the first academic journals *(Journal Des Scavans* and *Philosophical Transactions of the Royal Society of London)* began to be published in France and England in 1665, the opinion that scientific journals differ in publishing important scientific results was first introduced in the literature by Bradford in 1934 (Bradford, 1934; Tonta & Al, 2008; Asan &

Asan, 2010). Bradford (1934), analyzed around 1000 journals, noticed that the main journals composed the basis of the literature and only a few of them published important scientific results (Bradford Law) (Tunç, 2004; Asan, 2005). Similarly, Brodman (1944) conducted studies on the covering process of journals in the field of physiology and drew attention to the difference between scientific journals.

One of the old journal index is *Index Medicus* (now PubMed Medline) began in 1879. Eugene Garfield introduced the citation index in 1955, which is today's Web of Science. Over time, the number of journal indexes has increased. For example, currently there are many indexes only belonging to Clarivate Analytics [examples: Web of Science Platform (contains many indexes in itself, such as SCI-Exp., SSCI, AHCI, ESCI), Data Citation Index, Derwent Innovations Index, BIOSIS Previews, Biological Abstracts, BIOSIS Citation Index, Current Contents Connect, Zoological Record, Inspec, CABI-CAB Abstracts, CABI- Global Health, MEDLINE, FSTA-the Food Science Resource, Russian Science Citation Index, Chinese Science Citation Index, KCI-Korean Journal Database, SciELO Citation Index, Arabic Citation Index].

There are also other indexes, for example SCOPUS, EBSCO, EMBASE (Excerpta Medica database), DOAJ (Directory of Open Access Journals), BioOne Abstracts and Indexes, Nature's database list, BioMed Central's list of databases, List compiled by the University of Miami's libraries, List compiled by African Journals Online, JSTOR, Ulrichsweb, PsycInfo, and so on.

Academic journals can be classified based on various criteria, but they all have various limitations:

Journals in the field of science-health-engineering, social or arts;

General and specific journals;

International and local-regional journals;

Journals that publish reviews and original research results;

Journals of developed, developing and less developed countries;

Peer-reviewed and non-peer-reviewed journals;

Journals with low, medium and high article acceptance rates;

Paid or open Access journals;

Journals published by publishers, professional associations or government organizations;

Journals published according to periodicity such as weekly, monthly, quarterly, yearly, etc.

There are various studies on the classification of academic journals. For example, Suiter & Sarli (2019) wrote what criteria are considered in the selection of academic journals and stated that a quality journal is covered by large bibliographic and citation databases such as MEDLINE®, Elsevier Scopus and EMBASE, Clarivate Analytics Web of Science, Cumulative Index for Allied and Health Literature (CINAHL), and others. For these reasons, it is important to consider the criteria by which index the journal is covered for classification of academic journals. Here is an example of how important this situation is: For example, researchers who have not published in journals covered by the SCI-Exp., SSCI or AH&CI indexes in the fields of science, health and engineering (to get sufficient points) cannot advance academically in Turkiye since 2001.

Some researchers classified academic journals such as Asan (2017) gathered academic journals under five groups, Schembri (2007) divided the academic literature into four groups. Leydesdorff et al. (2017) proposed an automated system for hierarchical classification for 11,359 journals covered by Clarivate Analytics Journal Citation Reports (JCR) 2015. Chen et al. (2020) performed a study on the classification of predatory journals, but this study was done to help detect predatory journals more easily, rather than to classify academic journals. In addition, Cicero & Malgarini (2020) focused on journal classification especially in social and human sciences and presented evidence from data obtained from Italy, they mentioned the peer-review system, but did not touch on the issue of academic journal classification in general. Similarly, Filippo et al. (2020) carried out a study to improve the quality of social and human sciences journals especially in Spain, instead of classifying academic journals in general. Researchers stated that values such as citation indexes, h index, quartile scores and visibility can be used in the calculation of indicators for the categorization of Spanish journals by taking them from various databases.

Researchers continue to explore better evaluation systems and different journal evaluation indicators are being developed (Zeng & Shi, 2021). According to Zeng & Shi (2021), various journal evaluation methods have emerged in recent years for different journal ranking and classification purposes. Researchers have made suggestions to measure the performance of journals by considering the output (for example, impact factor, article influence score, immediacy index, etc.) and input (top authors and addresses)

factors, and they have considered the indicators related to citation and authorship. Researchers have developed the framework for a journal classification method by combining output and input factors.

Recommendation for Classification of Academic Journals

There may be many criteria for the classification of academic journals, but in this study, the main criterion used in the classification was the indexes in which the journals were covered. So academic journals can be grouped under four groups in this study (Table).

Classification of Academic Journals according to the indexes they are covered

First Group Journals	Second Group Journals	Third Group Journals	Fourth Group Journals
Covered by SCI-Exp., SSCI, AH&CI	Covered by ESCI, Scopus, PubMed Medline	Covered by the other international or local indexes	Do not covered by any International and/or local-regional journals indexes

First Group Journals: journals covered by SCI-Exp., SSCI and AH&CI (Clarivate Analytics). Although journals covered by SCIE and SSCI are also divided into 4 subgroups according to their Q scores (Q1, Q2, Q3, and Q4), since journals covered by AHCI do not have Q scores because of AHCI journals do not covered by Web of Science Essential Science Indicators, so it is limited to separate the journals into subgroups according to their Q scores. Q scores are formed depending on the impact factor scores of journals, but since the impact factor scores of the journals covered by AHCI are not published, so they do not have Q scores (Except Journal Citation Indicator-JCI) [Note of Web of Science about JCI in mentioned database: *The Journal Citation Indicator is a measure of the average Category Normalized Citation Impact (CNCI) of citable items (articles and reviews) published by a journal over a recent three year period*]. Since the journals covered by SCIE and SSCI are divided into 4 subgroups according to their Q scores, it has become important which Q scores these journals have. Since the journals with the highest impact factor scores and in the first 25% have the Q1 score (Asan & Aslan, 2020), the performances of the journals with the Q1 score are higher. Journals included by Q4 are more likely to

be excluded from SCIE and SSCI coverage than journals included by Q1, Q2 and Q3. The journals in the first group also have other common aspects. Impact factor scores, citation numbers and article rejection rates are high (especially in the Q1 category journals), well-known, important scientific studies are generally published in these journals, and journals generally originated from the USA, England, Netherlands and Germany are in the majority. There are 13,888 journals covered by SCIE, SSCI and AHCI (April 3, 2023), of which 71.81% (9973) belong to these four countries [https://mjl.clarivate.com (access: April 7, 2022)] (There are 13,737 journals covered by SCIE, SSCI and AHCI (July 28, 2023). Some journals in the first group: *Ca-A Cancer Journal for Clinicians*, *New England Journal of Medicine*, *Lancet*, *Nature, Science, Cell, Nature Energy*. The 2020 impact factor score of *Ca-A Cancer Journal for Clinicians* was 508.70, the highest score ever reported (The impact factor score of this journal, which was last published in 2022, is 254.7). This is a high score for the impact factor. The impact factor score of *Nature Reviews Molecular Cell Biology*, which ranked second for the same year, is 94.44 (112.7 in 2022). As can be seen, there is a 5.39-fold difference between the first journal and the second journal in terms of impact factor score in 2020. 2021 impact factor score of *Ca-A Cancer Journal for Clinicians is* 286.13. The second journal titled *Lancet* is 202.73 (Source: Web of Science Database 2022 and 2023).

Second Group Journals: journals covered by ESCI (a component of the Clarivate Analytics Web of Science Core Collection), SCOPUS (a component of Elsevier) and PubMed Medline (a component of the US National Library of Medicine). ESCI index is not specific like SCIE, SSCI and AHCI and journals from all disciplines can be found in this index. Since the impact factor scores of the journals covered by ESCI are not publish, so they do not have Q scores (Except Journal Citation Indicator) based essential science indicators. There are health journals covered by PubMed Medline.

Third Group Journals: journals covered by the other international or local indexes.

Fourth Group Journals: international and/or local-regional journals that are not covered by any index.

Discussion

Classification of academic journals is controversial. For example, Katz and Hicks (1995) classified the journals covered Science Citation

Index depending to the basis of fields and stated that there was no standard classification scheme. In this study, a proposal is presented in order to contribute to the solution of the controversial situation on the subject. However, there are some issues that need to be explained in this proposed academic journal classification. Some journals may be covered by only one index at a time, while some journals may be covered by different indexes at the same time. For example, a journal is not covered by both SCI-Exp., SSCI, AH&CI, and ESCI at the same time; similarly, a journal covered by ESCI is also not covered by SCI-Exp., SSCI, AH&CI indexes at the same time. But for example, a journal covered by SCIE can also be covered by PubMed Medline or Scopus. In this case, the following question may be asked: Is a journal covered by both indexes considered in the first or second group for journal classification? This is a difficult question but there will be situations in the classification of journals based on index criteria. Many journal indexes may cover well-known academic journals that have been published for a long time, with high impact score and high article rejection rate. For example, *Mycologia*, published since 1909, is covered by 6 indexes of Clarivate Analytics (SCIE, Biological Abstracts, BIOSIS Previews, Current Contents Agriculture, Biology & Environmental Sciences, Essential Science Indicators and Zoological Record) and this journal may also be in the covered the other indexes (for example, this journal is also covered by Scopus). Another example: *Turkish Journal of Botany*, which is covered by SCIE, is also covered by many other indexes (https://journals.tubitak.gov.tr/botany/abstracting_indexing.html) (access: April 3, 2023) but since it is cover by SCIE, so it must be accept in the first group. However, the recognition status of all these indexes is not equal. Therefore, if a journal is covered by two different indexes at the same time, its position in a higher group should be taken into account.

Probably academic journal classification criteria can be discussed separately:

Journals in the field of science-health-engineering, social or arts: this criterion is already met when the journals are classified according to journal indexes. Because SCIE index covered journals belonged to disciplines of science-health-engineering, SSCI journals in the social field, AHCI journals in the field of human sciences-arts; and finally, PubMed Medline index specifically covers health journals. Some journals do not comply with the classification of journals according to scientific disci-

plines. For example, important journals such as *Nature*, *Science*, *Plos One* etc. are multidisciplinary.

General and specific journals: journals can be classified according to the various fields of scientific disciplines (for example, Physics, chemistry, biology, mathematics, etc.) and only on specific subjects (for example, only one of the sub-branches of biology such as microbiology). However, this classification does not give an idea about the quality of the journals.

International and local-regional journals: the criteria for whether a journal is an international or a local journal are controversial. Today, it is possible to access journal contents from all over the world via internet. However, when a journal is indexed by important journal indexes, it can be considered as an international journal.

Journals that publish reviews and original research results: this may be possible, but few journals publish only reviews. For example, among the journals covered by SCIE and SSCI, there are 951 journals with "review" in their names, and this number constitutes 6.85% of all journals within the scope of SCIE+SSCI (https://mjl.clarivate.com/home). In addition, this classification does not give an idea about the quality of the journals.

Journals of developed, developing and less developed countries: the distribution of academic journals in developed, developing and underdeveloped countries is not homogeneous. For example, the number of journals originating from the four countries (USA, England, The Netherlands and Germany) with the highest number of journals in the SCIE + SSCI + AHCI indexes is 9973 and this number constitutes 71.81% of all journals in mentioned indexes (https://mjl.clarivate.com/home). If this criterion is taken into account, developing and underdeveloped countries remain very weak. In addition, the status of an academic journal belongs to which country is controversial, and this classification method does not give an idea about the performance of the journal. Clarivate Analytics considers the country of the publisher when deciding which country a journal belongs to. However, sometimes the editor of a journal may be in country A and the publisher may be in country B. Or, a journal may be funded by a professional association in country C, but the publisher may be from country D.

Peer-reviewed and non-peer-reviewed journals: there are few or no journals that do not make peer-reviews for scientific studies submitted to the journal, and it is difficult to determine this situation for each journal

individually. Undoubtedly, the performance of a non-refereed journal will be lower than peer-reviewed journals.

Journals with low, medium and high article acceptance rates: high-impact journals generally have low article acceptance rates, but this rate varies by journal. In addition, it is not easy to obtain article acceptance rates for each journal.

Paid or open Access journals: classifying academic journals as paid or open access does not give an idea about the performance of the journal. While there may be high-performing journals among the paid journals, there may be low-performing journals among the open access journals; vice versa is also true. It is normal for a journal to wants publication fee from the author or reader (Asan & Kiran, 2017) because of publishing a journal has a cost. But it is a negative situation that predatory journals wants publication fee.

Journals published by publishers, professional associations or government organizations: publishing an academic journal has a cost. This cost is financed either by the reader, the author, by donations, or by a professional association or government agency. For example, in Turkey, a government organization named TUBITAK (The Scientific and Technological Research Council of Turkiye) publishes 12 academic journals (https://journals.tubitak.gov.tr/communities.html) (access: April 3, 2023). However, the status of academic journals published by which publisher, professional associations or government organizations does not provide sufficient information about the performance of the journal.

Journals published according to any time period such as weekly, monthly, quarterly, yearly, etc.: since academic journals are periodicals, already they are published periodically. The period in which a journal is published does not give information about the performance of the journal.

As can be seen, it is possible to classify academic journals by taking into account various criteria, but each criterion should be well analyzed. For these reasons, in the classification of academic journals, taking into account the indexes in which the journal is covered, gives an idea about the performance of the journal and provides some measurable data about the journal. Thus, it becomes easier for researchers to choose the journal for submitting articles. The classification of scientific journals according to the indexes they are indexed in is a controversial issue, and it is expected that different opinions will emerge after the article is published.

Anyway, it is normal for scientific research to be controversial. The question is: Are the scientific journals in the first group, for example, in this group because they have a higher impact rating? It is difficult to answer this question and the answer is open to debate. However, author's opinions can be expressed in this study. The SCI-Exp., SSCI and AH&CI indexes within the scope of Clarivate Analytics Web of Science are generally well-known, widely used, generally accepted that important scientific results are published in these journals, generally published for a long time, specific (only journals in the social field are covered in the SSCI index, for example), generally high article rejection rates, and used in academic advancement (e.g. in Turkiye). For this reason, it is important for a scientific journal to be indexed in SCI-Exp., SSCI and AH&CI, it has the potential to bring prestige to the journal, academicians use this database intensively as scientific journals are carefully selected for this database, and therefore the Web of Science database increases the visibility of the journal in the world (Web of Science database is not open access, it requires subscription). In addition, the inclusion of a scientific journal in the SCI-Exp., SSCI and AH&CI indexes does not mean that it will remain there forever; Web of Science Editors periodically analyze the performance of journals and journals with poor performance may be excluded from these indexes. Considering all these reasons, it is valuable and important for a scientific journal to be included in SCI-Exp., SSCI and AH&CI indexes, and it has the potential to give an idea about the effectiveness and quality of the journal. In the second group, ESCI, PubMed Medline and SCOPUS indexes are also very important indexes. ESCI started in November 2015, but it is not as specific as SCI-Exp., SSCI and AH&CI indexes, i.e. a journal from the field of archaeology or engineering can be included in ESCI. Journals in ESCI are mostly selected among local but promising journals and journals with high performance can be included in SCI-Exp., SSCI and AH&CI indexes. None of the journals in the ESCI are included in the Web of Science Essential Science Indicators and therefore impact factor scores are not published regularly every year like the journals in this scope. For this reason, journals in the ESCI index are included in the second group. Also the impact factor scores of journals in AH&CI Database are also not published under Web of Science Essential Science Indicators, but this is because articles published in journals in the field of arts and human sciences cite art books more than journals. This means that articles

published in AHCI journals tend to use non-journal literature (e.g. books, musical compositions, works of art and literature). PubMed Medline is an open access database (https://pubmed.ncbi.nlm.nih.gov/) (accessed July 28, 2023) and covers journals mostly in the field of health and is a database of interest to health professionals. Its use in the field of health is high. Scientific journals in the field of health are decided whether to be included in PubMed Medline by considering various criteria. The impact factor scores and other statistical scores of the journals within the scope of PubMed Medline are not published (at the same time, if a journal covered by SCI-Exp. SSCI or Scopus; Web of Science and Scopus publish statistical scores of it), it is difficult to obtain information about the performance of journals. So, PubMed Medline is included in the second group. However, it should be noted that this is open to debate. The Scopus index (https://www.scopus.com/home.uri) (accessed July 28, 2023) is a general index, i.e. it can covered scientific journals from any field and it is not open access; access to article content requires a subscription. However, the statistical data of the journals covered by Scopus are open access and can be accessed by anyone (https://www.scimagojr.com/) (accessed July 28, 2023). There are two major databases in the world that publish the impact factor scores of scientific journals: Web of Science and Scopus. The impact factor scores of scientific journals in the Scopus database are published every year, so journals also have Q scores. The Q scores of journals in Scopus may not be exactly the same as the Q scores of journals in SCI-Exp. and SSCI. For example, a journal in Scopus may be Q1, while the same journal in SCI-Exp. may be Q2. The possible reason for this may be that the number of scientific journals in Scopus (27,955) (https://www.scimagojr.com/journalrank.php) (accessed July 28, 2023) is higher than the number of journals in SCI-Exp. and SSCI (12,349) (https://mjl.clarivate.com/home) (accessed July 28, 2023). Because if there are 40 journals in SCI-Exp. for a scientific discipline, for example in field X, the 11th ranked journal receives the Q2 score. But in the same field X, there may be, for example, 80 journals within the cover of Scopus, in which case, if the journal is ranked 11th, it will receive Q1 score. For example, *Mycologia*'s 2021 Q score is Q1 in Scopus, while it is Q3 in Web of Science (https://www.scimagojr.com, Web of Science database). A journal in Scopus can also be in SCI-Exp., SSCI, AH&CI or ESCI because Scopus is a general index. The major indexes of the Web of Science data-

base, namely SCI-Exp., SSCI and AH&CI, are specific indexes, meaning that they only cover for journals in certain scientific fields. Scientific journals in the third group are mostly indexed by local-regional indexes. The scientific journals in the fourth group are not indexed by any index. Scientific journals in the third and fourth groups are open to improvement and their performance may improve over time.

In conclusion, a proposal for classifying scientific journals is presented. Because until now, there has not been a study in which clear criteria have been used to classify scientific journals. In order to clarify this unclear situation, these suggestions have been presented. However, as stated in this article, the suggestions presented are open to discussion and there will be academicians who will offer different suggestions on this issue. After the publication of this article, academicians in various countries around the world may offer other suggestions and the classification of scientific journals may be improved, and this article may make an important contribution in this sense.

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