

International Journal of Global Education



INTERNATIONAL JOURNAL OF
GLOBAL EDUCATION

ISSN: 2146-9296

IJGE

International Journal of Global Education

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ISSN: 2146-9296



SCIENTIFIC PUBLICATION PRODUCTIVITY IN THE FIELD OF CHEMISTRY EDUCATION: THE CASE OF FIVE UNIVERSITIES

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ABSTRACT

This study examines the scientific publication productivity of the faculty members working in the Department of Secondary Science and Mathematics Education (SSME), the Division of Chemistry Education of five universities in Turkey between 2007 and 2011. The publication production of the concerning faculty members -working as an assistant professor, associate professor and professor- in science and social sciences was compared and the received citations for the concerning studies were evaluated. The articles produced by the faculty members between 2007 and 2011 were indexed in Social Science Citation Index (SSCI), Science Citation Index-Expanded (SCI-E), Arts & Humanities Citation Index (A&HCI) and Education Resources Information Center (ERIC) databases. In addition, received citations for the concerning articles in SSCI and SCI-E databases between 2007 and 2012 were assessed. As a result, it was observed that the publication profiles of these five universities were different from each other.

Keywords: Chemistry education, publication production, article

1. Introduction

For the recruitment of qualified faculty members for the positions in the universities, the Higher Education Council (CoHE) has developed a criterion for the postdoctoral titles by defining the standards for the appointment of faculty members and assistants and criteria for promotion. According to the Associate Professor Examination Regulation which is prepared based on the Higher Education Law Number 2547, clause 24, the evaluation of the publications and research of the associate professor candidates is carried out by Inter-University Council.

Within the scope of application prerequisite to the position of associate professorship in *The Department of Educational Sciences and Teacher Training*, Inter-University Council Chairmanship presents the following fundamental criterion (IUC, 2012);

“SSCI, SCI- Expanded, AHCI or international field indexes about education (for the department of Educational Sciences and Teacher Training):all indexes that have been entered into the ISI Database, to have published an original single-author-article (except for a letter to the editor, summary, compilation and book review) in refereed journals

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(within Australian Education Index, British Education Index, Journals Indexed in ERIC, Education Index-EI) .

When the *Department of Educational Sciences and Teacher Training* is compared with the *Department of Science and Mathematics*, it appears that the databases –except SCI-E-, which indexes articles within the scope of educational sciences, are also used as criteria for the assignment and promotion in the Department Educational Sciences and Teacher Training.

The Department of SSME is analogous with science considering chemistry; and it is also close to the social sciences considering the educational content. At this point, it is questioned towards which field the publications show inclination most. In addition, the present study employs SSCI, SCI- Expanded, AHCI databases, which are noted in the associate professorship examination, and ERIC.

1.1. Databases: SCI-E, SSCI, AHCI & ERIC

Institute for Scientific Information, ISI has been providing citation index service for more than fifty years (Thomson Corporation, 1992). Web of Science (WoS) is an extensive research platform within the structure of ISI. Thanks to this source, we gain access to the articles in the field of science, social sciences, art and humanities. After its foundation, ISI first published Science Citation Index (SCI), which includes the journals in the field of science. After SCI, it published Social Science Citation Index (SSCI), which includes the citation index for social sciences and lastly it published Art & Humanities Citation Index (A&HCI) whose subject area is art and humanities. Since 1900, SSCI has been indexing more than 4500 journals from over 50 disciplines, and SCI-E more than 8300 journals from over 150 disciplines; and A&HCI has been indexing over 2300 journals since 1975 (Thomson Reuters, 2012).

ERIC is a database that can go back as far as 1966 and it has been collecting the materials related with the field of education. The collection of ERIC journals involves mostly refereed journals and total number of journals in its content is stated to be 1166. While 1063 journals out of 1166 have been indexed comprehensively, for the other 103 selective indexing is applied (ERIC, 2012).

1.2. Overview of Education Faculties in Turkey

It was seen that; five of the education faculties, being included to this study, were founded and started its activities in 1982. Based on the information which was taken from the web pages of these universities; historical background of the universities, being called as A, D, E, was more older than other two (University of B, C) university. According to the 2012 Higher Education Programs and Vacancy Guide published by the Student Selection and Placement Center (ÖSYM), Education Faculty SSME Chemistry Education Department of each five university has a thirty -student- vacancy (ÖSYM,2012).



2. Method

Five university was selected to conduct the study. While the university selection process, the first condition was determined as the Universities which have Faculty of Education Department of Chemistry. First of all universities which have Education Faculty Department of Chemistry were sorted on the basis of "University Entrance Score-2012" for this department. Second, the number of articles which were indexed in the WoS, related with the subject of education were identified for each Education Faculty. Then top five universities for Education Faculty Chemistry Department were selected by evaluating these two sorted lists. Names of the universities were not given in the study. In the whole of the study, universities were called as the letters (A, B,C, D, E), which were given to them randomly. In order to avoid the duplication, the rest of the study, Faculty of Education Department of Chemistry was referred as "selected universities".

Research datas have been compiled by using the web pages of the selected Universities and by receiving query results from the databases (ERIC, SSCI, SCI-E). At First, the web pages of the A, B, C, D, E Universities have been examined to identify the name information of the academic staff who were working in an active state. After determining the names of academic staff for each selected university, query has been configured by using author names in the databases (ERIC, SSCI, SCI-E, AHCI). Filtering methods have been used to not to affected from similar author names in the query results. Query results have been evaluated seperately. In addition, in order to avoid missing query results, all entries of author names have been checked. Query results have been limited between the period of 2007-2011. Articles, which have been received from the SSCI and SCI-E databases query results, have been analysed by citations.

As it is known some of the articles are co-authored. Most of the time authors can collaborate with each other in the same department or with different departments. In this study; when co authored articles have been assessed, articles and number of citations divided in to the author number to identify the personal contribution of the author to the article. In the Co-authored articles, articles and number of citations have been divided into author number.

3. The aim of the study

The aim of the study is to compare the publication profiles Chemistry Education Departments of five selected universities, to examine the inclination of article production whether it is closed to social science field or science field.



4. Practice

The study was carried out considering the SSME, Chemistry Education Departments of five universities, during the five-year period between 2007 and 2011. Firstly, the number of the faculty members conducting scientific studies under the title of assistant professor, associate professor or professor was identified. Table 1 shows the distribution of the faculty members working in the universities

Table 1. The distribution of the faculty members working in the Department of Chemistry Education

Groups	Profesor	Assoc. Prof.	Assistant Prof.
Total	12	9	9

As it can be seen from Table 1, study was conducted with 12 professor, 9 associate professor and 9 assistant professor, being working for these five selected universities.

The present study quantitatively evaluates and compares the articles indexed in ERIC, AHCI, SSCI and SCI-E and written between 2007 and 2011 by aforementioned faculty members. After identifying the number of articles, the received citations of the mentioned articles between 2007 and 2012 (October) were determined. The citation received by each writer for each of his article was evaluated and this evaluation was performed based on the name of the writer. However, as it is known some of the articles are co-authored. For co-authored articles, written articles and received citations were counted once for each author, the number of the received citation was not divided into the number of authors. Table 2 illustrates the number of articles for each author and the number of citations for each article. For the citation information, only SCI-E and SSCI databases were used.

Table 2. The distribution of the number of articles and citations per author

Universities	ERIC	SSCI	SCI-E	SSCI Cited article	SCI-E Cited article
A University	3,12	2,57	0,62	3,39	1,44
B University .	0,88	1,32	0,40	0,82	0,53
C University	0,10	0,12	0,72	0,04	3,32
D University	0,42	0,56	0,33	0,38	0,87
E University	0	0	0,63	0	10,10

Journals within the WoS are indexed with the subject headings determined by the databases. Basically, the scientific content of the journal is primarily considered to determine the subject heading. In addition, the classification of the received citations for the articles and evaluation of the similar groups in the same category are of secondary



importance in the identification of the subject heading under which the journal is supposed to be classified (Moed, 2005, s. 188). However, it is sometimes observed that the same journal occurs under more than one subject heading. Depending on the subject heading in the journal's content, the journal may sometimes be indexed both in SCI-E and SSCI. When Table 2 evaluated in generally; E University does not have any article in ERIC database, which only indexing the articles related with education field, whereas A University has the highest number of article in this database. An other noteworthy point is the publication number of A University in SSCI database. The University of A also has the highest number of article in SSCI database in five universities. It is seen that University C and University E have more publications than other three universities in SCI-E database which being indexing articles in science field. When citations evaluated, It is seen that University E has more citations than other universities in SCI-E database.

It is identified that each of the three universities has a different trend of publication. Therefore, the departments where the academic staff gained their doctoral degree (Ph.D) were determined and presented on Table 3. Table 3 illustrates that, Academic staff of C University and E University, which have more publication and citation in field of science in SCI-E database, have doctoral degree mainly in field of chemistry. An other remarkable point is related with B University. The publication trend of B University is both closer to the science field and social science field. It is observed that 84% of academic staff of B University has doctoral degree in chemistry and other fields. However it is examined that 83% of academic staff of B university have graduate degree in education fields. University of A, which has remarkable effects with publication numbers in social science field, has academic staff with doctoral degree in education field.

Table 3. The departments where the academic staff got their doctoral degree

	Ph D	
	Education Field	Chemistry&Other Fields
A University	100,0	0,0
B University	16,7	83,3
C University	41,7	58,3
D University	50	50
E University	20	80

As in many other countries, it is known that the number of the publications produced in the field of science and social sciences in Turkey is different from each other (Denkel,



Kağıtçıbaşı, Pak & Pamuk, 2002). The publications on social sciences, art, and humanities have regional characteristics as they are shaped by the unique language and culture where they are produced and therefore they generally appear in regional publications (Denkel et. al, 2002). As a result of the fact that the citation indexes do not look at the regional journals flexibly, publications on social sciences, art and humanities appear less in the indexes. Studies on social sciences appear in regional journals with an authentic language which diminishes their appearance of the articles and consequently diminishes the rate of received citations.

Table 2 clearly shows that the academic staff who produces articles on science receives more citations. On the other hand, the rate of received citations in social sciences is much less than compared with the science. It is known that less journals are indexed in social sciences and humanities compared with science. According to Price (1970) science and humanities are two different fields that have different knowledge and information exchange requirements. In the field of science the developments are so rapid that the validity of the data lasts for a short time whereas in humanities temporary hypotheses are generated on permanent principles. In social sciences and humanities books are of due importance. Besides, it is remarkable that “the national publication model” policy is more common in some fields such as sociology, education, political sciences and anthropology and as a result it is observed that the language of literature varies in similar fields. For this reason a core journal has not been produced for the mentioned fields and this effects the citation analysis negatively (Moed, 2005, s. 147-149).

5. Conclusions

It is identified that publication productivity of the academic staff in Department of SSME Chemistry Education in five selected university is not closer to each other quantitatively. Besides it is noteworthy that academic staff who prefers to produce publication in science field can take more citation than others. This situation is due to the fact that the regarding academic staff gained doctoral degree in chemistry and chemistry engineering departments.

As a result, it is identified that publication profile trend is similar to academic staffs' field of study. However it is known that number of publications and number of citations in field of science and social science is different from each other. In this case, academicians who wants to get academic promotion and appointment, has different advantages and disadvantages.

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