

# Stratification of Iranian LIS academics in terms of visibility, effectiveness and scientific and professional performance: Research report Part I

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#### Abstract

This paper aims to identify the stratification of Iranian Library and Information Science academics in terms of visibility, effectiveness and scientific and professional performance. The present study is applied and is implemented through survey and webometrics methods and with a descriptive approach. The research population includes all Iranian academics working in Library and Information Science departments with a PhD with the titles Assistant Professor, Associate Professor and Full Professor. Google Scholar is used to gather web data. A researcher-constructed questionnaire is also used to gather data from the research population in order to stratify them in terms of professional and scientific performance. J Mehrad, MH Dayani and R Fattahi achieved the first to the third ranks respectively in terms of professional and scientific performance. There is also a direct and significant relationship between stratification of the visibility and effectiveness and professional and scientific performance. Graduation from foreign universities, proficiency in English language, writing team papers, scientific collaboration with international scientists, membership of valid national and international research groups, employment in university departments with high experience and also employment in university departments which offer postgraduate qualifications are considered the main factors behind some members' visibility in the research community.

#### **Keywords**

Google Scholar, effectiveness, visibility, Library and Information Science, theory of social stratification in science

# Introduction

The development of free electronic journals has provided a platform and context for scientists not to limit their publications just to the indexed journals in ISI (Institute for Scientific Information) and has facilitated the use of the Web to promote and disseminate their knowledge (Weideman, 2009). With attention to the increasing usage of the Web, particularly its use as a platform for scholarly publications, a range of databases have been launched to monitor the web publications of scientists in which they are ranked according to the numbers of articles and their citations. Google Scholar is arguably the most important (Jacsó, 2005).

Due to the extent and influence of the Web within the scientific community all over the world, and the ease of publishing researchers' scientific works through it, scholarly works are available easily and quickly to other scholars which impacts upon their citation. There is no limitation for citation to web works and thus the number of citations of these kinds of works and the visibility and effectiveness of the authors and their publications will be gradually

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increased. These two topics (author and publications) can be studied through webometrics and one of the research areas in the field of webometrics is to study the rate of visibility and effectiveness of authors.

The rate of visibility indicates the visibility of people and their publications on the Web. It indicates the extent to which information about people and their scientific outputs are available through searching their names with retrieval tools such as search engines (Khan and Park, 2011; Kretschmer and Aguillo, 2004; Vaughan and Shaw, 2003, 2005, 2008). There is no accurate information about the visibility and effectiveness of the Iranian academics in the Library and Information Science (LIS) field and so the present study is focused on this main issue.

In addition, along with visibility and effectiveness, each scientist has scientific and professional performance. However, this kind of performance is not available about Iranian LIS academics. Thus, the relationship between 'scientific and professional performance' and 'visibility and effectiveness of the research community' is another basic issue that is reviewed in the present paper.

# Research objectives and research questions

The main objective of the study is to stratify Iranian LIS academics in terms of their visibility and effectiveness and also their professional and scientific performance. In order to achieve this goal, the following hypothesizes have been formulated:

Q1. How are Iranian academics in the LIS field stratified in Google Scholar in terms of their visibility and effectiveness?

Q2. How are Iranian academics in the LIS field stratified in Google Scholar in terms of their professional and scientific performance?

H1. There is a relationship between the visibility rate of Iranian academics in the LIS field in Google Scholar and their effectiveness in this database.

H2. There is a relationship between the stratification of visibility and effectiveness and the stratification of scientific and professional performance of Iranian academics in the LIS field.

#### Literature review

In this part of the paper, first of all, the theory used in the study – theory of social stratification in science – is briefly discussed. Further, related studies in the area of visibility and effectiveness are proposed and finally the conclusion of the reviewed studies is outlined.

The sociology of science and the Mertonism school has a pivotal role in the creation of the theory of social stratification in science (Cole et al., 1973). Jonathan Cole expressed the theory of social stratification in science based on the theory of Merton's sociology of science. The results of his study showed that the difference in scientists' performances is the main factor in various stratifications of the scientific community, taking advantage of financial and spiritual benefits as well (Jichang, 2006). A review of definitions and concepts in the field of the theory of social stratification in science shows that the scientific community is not a homogenous and uniform community including members with equal circumstances. In fact, there is always dissimilarity and difference between the position, condition and respect of the scientific community members; as a result, the scientific community can be stratified (Jichang, 2006; Mirucki, 2007; Mohseni, 1993). After explaining the theory of social stratification in science, related records to the present paper are reviewed with a critical approach.

With the increasing popularity of the Internet, some researchers in information science have started to study the visibility concept. The concept is explored through two approaches in the study of webometrics. With the first approach, developed by using the link analysis method, the number of received links to each website is considered as its *visibility* (Internet Lab, 2005; Thomas and Willett, 2000). With the second approach, the retrieved results of searching for people's names or other topics through search engines are considered as *web visibility* (Khan and Park, 2011; Kretschmer and Aguillo, 2004; Vaughan and Shaw, 2003, 2005, 2008). The second approach is used in the present study.

In the research undertaken by Aaltojärvi et al. (2008), scientific effectiveness, web visibility and citation patterns in sociology departments in Nordic countries were surveyed. The results of this study indicated that visibility on the Web and numbers of citations have a direct relationship to factors such as gender, type and time of the publication and department; also the visibility capability on the Web, citations and scientific rank of the research population mutually reinforced each other. In another study in line with the above research, the web visibility of political figures in South Korea was studied. The results indicated that figures with high web visibility have a higher political position. Also, there is a significant relationship between their rates of political activities in real environments and the rate of their visibility on the Web (Park and Lim, 2011). The web visibility of scientists in the realm of media and communication in the context of relevant journals was studied by Chung and Park (2012). Their results indicated that scientists' web visibility is related to the number of their indexed publications in SSCI (Social Science Citation Index), their university and the official language they use. The authors suggest that, in the near future, there is a possibility that web visibility measures may replace traditional indicators (Chung and Park, 2012).

Several studies have also been conducted about web effectiveness; some of the most important are reviewed.

Kousha et al. (2010) undertook a study using a new method called Integrated Online Impact, where web citations and traditional citations are evaluated and compared. Their research results showed extensive usage of ISI citations in order to evaluate the impact of the research but they proposed their applied method as a new scientific approach for extracting citation data from web resources. They believe that by using this method, it is possible to determine how papers from journals receive citations from online scientific resources such as conference proceedings, dissertations, open access journals, research reports and other resources which it was not previously possible to track through traditional citation databases. They concluded that weblogs can be considered new valuable web resources for informal scientific communication in the field of Social Sciences and Humanities. Kousha et al. (2011) studied web citations to books and monographs in connection with their previous research in 2010. In this study, two new tools based on Google Scholar and Google Books were used and were compared with data obtained from Scopus Citation Index. The results showed that the citation rate to books in Google Scholar and Google Books is 3.2 and 1.4 times more than the citation rate to books in Scopus.

An analysis of reviewed articles and the results of searches related to web visibility showed that people who have high numbers of publications also have more visibility. In turn, the increased visibility leads to more citations. As a result of higher visibility, citation to works will be facilitated. The review of the literature also showed that in addition to the traditional indicators of ISI, the free citation database of Google Scholar and visibility and effectiveness indicators can be used for monitoring scientists, universities and countries. The use of these new indicators will present a clearer and more accurate picture of the research and scientific status of scientists, universities and countries. In addition to the indexed English papers in ISI, which has been the principal rank and evaluation indicator used to date, the works of all scientists will be evaluated by using these new indicators.

In the present study, the visibility and effectiveness of the research community is surveyed through Google and Google Scholar as well as the relationship between these two variables. Professional and scientific performance and the relationship of these to visibility and effectiveness are also studied. The literature review indicates that no research has been undertaken in these areas to date.

### Methodology

This study is applied and is implemented through a survey and webometrics methods and takes a descriptive approach. The research populations included all Iranian academics working in LIS departments who had a PhD and were Assistant Professor, Associate Professor and Full Professor. The study analysed their scientific productivity and In order to calculate the visibility (scientific productions) and effectiveness (web citations) of each member of the research community, their names were searched in Google Scholar. After eliminating duplicate and irrelevant results, the numbers of retrieved works are considered as the rate of visibility and the total numbers of cited papers to his/her works calculated via Google Scholar is presented as effectiveness.

Google Scholar started its activity in November 2004; the timeline of the present study therefore ranges from November 2004 until the time of data gathering (from 28 September 2013 to 28 October 2013). A researcher-made questionnaire was used to gather data related to professional scientific performance. The validity of the questionnaire items was confirmed by LIS professionals and were weighted.

Each member of the sample, in addition to the visibility and web effectiveness, has experience, scientific and professional performance in the field. Accessing these data was not possible via the Web. Therefore, a questionnaire including 17 items was developed and sent to all research participants. In the questionnaire, indicators such as being an editor, being a member of an editorial board, being a reviewer for prestigious journals, achieving awards and scholarships, being chosen as privileged researcher and professor were surveyed. According to the responses to the questionnaire, the total of all three scores was calculated and the research community was stratified based on scientific and professional performance.

The gathered data is reviewed and analysed through descriptive statistics including frequencies, percentages, averages and Spearman correlation coefficient (due to the non-normal distribution of data (skewed data)).

#### Findings

#### Stratification of the research community in Google Scholar in terms of visibility and effectiveness

In order to stratify the research community in terms of visibility and effectiveness in Google Scholar, the variables of visibility and effectiveness can be used individually or together. On the other hand, stratification can be presented based on the visibility, effectiveness and sum of these two variables. In this paper the third of these is used – the sum of the two variables.

In Figure 1, the research population is classified in three strata and the total frequency of their visibility and effectiveness is between 1 and 1401. In the first stratum 20 people, in the second, 21 people and in the third or central stratum 20 people are present. Overall, of 80 people in the research community, 61 are included in the stratification.



**Figure I.** Stratification of the research community based on the total frequency of the visibility and effectiveness of works in Google Scholar.

The frequency of visibility and effectiveness for 19 people is zero. Among 61 people who were present in the stratification, E Momeni, F Nazari and H Mirjood with frequency 1 for visibility and effectiveness are located in the lowest position and are at the beginning of the first stratum. In the highest position HR Jamali, F Osareh, AR Isfandyari-Moghaddam, Y Mansourian and R Fattahi are located respectively with the frequency of visibility and effectiveness 1401, 343, 239, 229 and 159 (Figure 1). Looking at the experience of people who are located in the highest position, it was evident that studying abroad, scientific collaboration with foreign scientists and also proficiency in English language are influential factors in the publication process of papers and, as a result, assist them in achieving the highest position.

# • Stratification of the research community in terms of their professional and scientific performance

As mentioned in the methodology section, in order to collect data for stratification of the research community in



Figure 2. Stratification of the research community in terms of their professional and scientific performance.

terms of their professional and scientific performance, a questionnaire was developed and distributed. The remainder of the paper reports the results of the questionnaire data analysis. A review of the data and names in Figure 2 indicates that 20 people are visible in the first stratum and the frequency of the range of activities of this stratum is between 35 and 109, based on professional and scientific performance. In

the second stratum, 20 people can be seen with a frequency range of between 110.5 and 185. In the third stratum, 20 people are present with a frequency range between 189 and 299. In the core stratum (the fourth), 20 people are visible too. The frequency range of activities in this stratum is between 301.5 and 1468.5. Therefore, the fourth stratum or the core stratum consists of the most influential people in LIS. In other words, they achieved the highest frequency of professional and scientific performance in LIS in Iran. R Fattahi, MH Dayani and J Mehrad gained the highest frequency rate among all those in the research community. Looking at the profiles of individuals in the fourth stratum (considered as the core stratum), most people in this stratum have the academic rank of Associate Professor and Full Professor and are experienced in the field. Meanwhile, it is worth mentioning that four people in this stratum (AR Norouzi Chakoli, M Hassanzadeh, AR Isfandyari-Moghaddam and M Cheshmeh Sohrabi) have the rank of Assistant Professor, suggesting that the history of their activities is short but their professional and scientific activities are considerable. Also noteworthy is that most of the people in this stratum graduated from foreign universities and just six of them graduated from universities in Iran. Among those who graduated abroad, six graduated from Australia, two from US, two from India, two from UK and one from France. Of those who graduated from Iranian institutions, three graduated from Islamic Azad University and three from Ferdowsi University of Mashhad.

# • There is a relationship between the visibility of the research community and effectiveness rate in Google Scholar

The mentioned hypothesis is expressed according to the study of Aaltojärvi et al. (2008). With this hypothesis, the presence or absence of a relationship between the research community's visibility in Google Scholar and the citation rate of the research community is surveyed. Due to non-normal distribution, Spearman correlation coefficient is used to check the relationship. The presence or absence of a relationship between the visibility and effectiveness of the research community is tested.

Because the significance level is zero and less than 0.05, there is a significant relationship between the visibility rate and the effectiveness of the research community in relation to their works in Google Scholar. The coefficient correlation is 0.853 and positive (Table 1). Therefore, the relationship is direct. In the other words, people who have a higher visibility rate in Google Scholar will have higher effectiveness.

• There is a relationship between the stratification of visibility rate and effectiveness (web stratification) and stratification based on the professional and scientific performance of the research community.

 Table I. The relationship between the visibility of the

 research community and their effectiveness rate in Google

 Scholar.

Variables	Correlation coefficient	Significance rate
Visibility and effectiveness	0.853	0.000

**Table 2.** The relationship between web stratification of the research community and stratification based on their professional and scientific performance.

Variables	Correlation coefficient	Significance rate
Web stratification and stratification based on professional and scientific performance	0.661	0.000

Professional and scientific activities are supposed as features of faculty members in various fields. As expressed previously, it seems that there is a kind of relationship between these activities and stratification so that they are stratified based on the visibility and effectiveness of their works.

As the significance level is zero and less than 0.05, there is a significant relationship between stratification based on the professional and scientific performance and visibility and web effectiveness of the research community. The correlation coefficient is 0.661 and positive, so the relationship is direct. In other words, increasing the rate of the professional and scientific performance of the research community will increase their web visibility and their effectiveness will also be increased (Table 2). Despite the present relationship between mentioned variables, some exceptions are seen among the research community.

### **Discussion and conclusion**

In the present study, the research community was stratified in terms of rate of the visibility and effectiveness and also based on their professional and scientific performance. Moreover, in the two presented hypotheses, the relationship between the visibility rate and the effectiveness rate and also the relationship between stratification in terms of visibility and the effectiveness and stratification based on professional and scientific performance are analysed.

According to the research findings, it can be said that in stratification of the research community in terms of visibility and effectiveness rates, faculty members of Ferdowsi University of Mashhad, Shahid Chamran University of Ahvaz, Shiraz University, Kharazmi University and Islamic Azad University, have the most visibility in the central stratum. Therefore, the results of this part of the research accord with the results of previous research in this area (Jichang, 2006; Miruchi, 2007; Mohseni, 1993) which also concluded that scientists and educational departments with higher citations and higher numbers of papers will be located in the central stratum.

An interpretation that can be made from the analysis of the first question is that graduation from foreign universities, proficiency in English language, writing team papers, scientific collaboration with international scientists, membership of valid national and international research groups, employment in departments with high experience and also employment in departments which provide postgraduate education to Masters and PhD level are the key factors behind some individuals' visibility in the central stratum.

In the next section, stratification based on professional and scientific performance was presented. Results indicate that among the people in the central stratum, 12 are Full Professor, 4 are Associate Professor and 4 are Assistant Professor. Hence, most of the people who are located in the central stratum in terms of professional and scientific performance are considered the most experienced in the field. Among the people in this stratum 14 graduated from foreign countries, three graduated from Ferdowsi University of Mashhad, three graduated from Islamic Azad University.

Finally, the relationship between visibility and effectiveness rate of the research community was surveyed.

The results obtained showed that there is a significant relationship between the visibility rate and the effectiveness of the research community in Google Scholar. The correlation coefficient is positive, meaning that people who have higher visibility will have more effectiveness. The result of this part of the research is in accordance with a study implemented by Aaltojärvi et al. (2008) who concluded that people who have high numbers of publications also have more visibility and the higher visibility will cause more citations to their works (effectiveness).

The second hypothesis was focused on the study of the relationship between stratification based on visibility and effectiveness and stratification based on professional and scientific performance. Results showed that there is a significant relationship between these variables. Further, the correlation coefficient is positive, so the relationship is direct. In the other words, as an individual's visibility and effectiveness increases, their professional and scientific research will increase as well. This result is similar to that obtained by Park and Lim (2011). They believe that there is a significant relationship between the rates of political activities in real environments and the rate of a political figure's visibility on the Web.

According to the above findings and results, it is suggested that faculty members and postgraduate students try to increase their visibility and effectiveness rates by paying attention to a range of factors. These recommended factors are: proficiency in English language, scientific collaboration with national and international well-known scientists, publishing articles in valid journals, regular visibility in national and international professional conferences, employment and studying in influential educational departments, membership in professional and scientific associations in the field nationally and internationally, scientific collaboration with successful and effective people in the field and publishing joint works with them. It is further suggested that the traditional indicators of ISI are increasingly insufficient to monitor research performance and so it is suggested that a new indicator, namely *web visibility and effectiveness*, should be used in order to present a more accurate picture of the ranking of scientists, universities and countries.

#### Author note

The present study is derived from a PhD thesis. Due to the vast and various findings of the thesis, results will be reported in several parts. This paper is as the first part of the research findings.

#### **Declaration of Conflicting Interests**

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