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Analysis of ResearchGate Network based on Suitable Scientific Assessment Tool: A Systematic Review

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Abstract

Purpose: Accurate scientific evaluation of researchers by ResearchGate network is still ambiguous. This systematic study seeks to shed some light on this issue.

Methods: The study was conducted with a systematic review of the previous studies (articles or reports). The analysis of documents was performed with a targeted keyword search in the reputable Google Scholar, Emerald, and PubMed databases (without limit). Titles and abstracts (if necessary, full texts) of the number of 582 documents (Persian, English, and Spanish) were retrieved (1-10 April 2021) and studied. Then, by removing duplicate or irrelevant data, 57 independent studies were selected for meeting the main research problem of this systematic review (using the PRISMA statement). For drawing diagrams, Excel software was used.

Findings: Among 57 previous independent studies retrieved by systematic review, 30 ones, had a negative attitude towards the ResearchGate. 27 studies saw with positive approach from standpoint the concepts of "authentic measuring instrument", " presence of prominent scientists such as Nobel Prize recipients", "valid scientific content", and "having a significant relationship with the academic ranking criteria", and "compliance with the Hirsch

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indicator", that was identified by documentary analysis based on PRISMA statement. Studies with a positive assessment of the ResearchGate dealt with developing countries, and with a small investigated research community. Therefore, it is appropriate to act cautiously when evaluating researchers with the ResearchGate network.

Originality: No similar systematic review to evaluate the ResearchGate network from the standpoint of a scientific suitable evaluation tool, has been done so far.

Keywords: Reputation; RG Indicators; Academic Social Media; Altmetrics; H-Index.

1. Introduction

Nowadays, numerous social media have been created for the use of university students, researchers, and faculty members. Media such as Instagram, Telegram, Facebook, and Twitter are public ones. But ResearchGate, Academia, and Google Scholar are academic social media (Frankie, 2019). The ResearchGate network was established in 2008 (Memon, 2016). Interest in using this international scientific research network has increased since 2015 (Prieto-Gutierrez, 2019). In the scientific ResearchGate network, there are some altmetrics indicators including "RG score", "citation", "research items", "research interest", "reads".

According to Manca (2018), studies published about the ResearchGate network have been double those of the Academia. Also, most researchers from African and Eastern countries, such as Iran, take a truly active part on the ResearchGate network. Researchers in developed societies, on the other hand, are less involved in the network (Tausch, 2015). In addition, the use of online science networks created after 2007 to evaluate research is appropriate in Anglo-Saxon countries but not in developing countries (Campos-Freire *et al.* 2014). Moreover, it is worth creating the profile in social network sites for researchers to be more recognizable and boost the development of scientific career (Wiechetek, 2019a).

Asmi and Margam (2018), considered the two scientific social media of research and academia as the most important networks used by researchers affiliated with Delhi Universities in India. Izeh *et al.* (2019) have stated that university librarians in Nigerian universities make extensive use of the capabilities of the research network. Onyancha (2015) found that librarians at South African universities use free social networking tools such as Google Scholar and ResearchGate because they do not have enough funds to use Web of Science and Scopus websites. Masic and Begic (2016) have stated that developing countries can use free articles on social networks such as ResearchGate due to economic problems, but copyright infringement is a serious challenge on this site (ResearchGate).Moreover,the number of citations that Iranian researchers receive from their articles is less than that of their peers in countries with a per capita income similar to Iran, so sharing the English abstract of Iranian researchers' articles in scientific social networks such as ResearchGate has been suggested (Rezaeian, 2017). Also, ResearchGate, Mendeley, and Academia have

been recommended by researchers in the field of librarianship and information, as well as quantitative studies in the next 10 years (Mansourkiaie, 2019). In addition, nursing researchers should increase their activity on social networks such as ResearchGate, LinkedIn, Wikipedia, and YouTube (Smith and Watson, 2016). Moreover, Ramezani-Pakpour-Langeroudi *et al.* (2018) have considered the increase in the presence of Iranian physicians in the scientific social media of ResearchGate, Academia, and LinkedIn as a factor to increase the citation rate and thus improve their scientometric indicators such as H-Index.

A survey of 455 librarians working at 52 African universities showed that they were widely active on the ResearchGate network and 70% of them, review the intellectual property rights of their desired version, before publishing their research transcripts on the publishers' website (Baro *et al.* 2018). But, Jamali Mahmouei (2018) has found that 40% of the articles that are uploaded in the full-text mood on the ResearchGate network do not comply with the copyright issues, in addition, most people who do not comply with this issue have worked on social science field. Also, the citation data in the Google Scholar Scientific Network has a relatively strong correlation with the altmetric indicators (such as Google Scholar), but, the correlation between the citation data of Web of Science and Scopus websites is weak (Ezema and Ugwu, 2019). According to a study by Delgado López- Cózar *et al*. (2014), bibliographic data in Google Scholar have no scientific validity, because the authors of this mentioned study, easily created a fake researcher in the scientific network and received citations. Furthermore, Masic (2019) argued the Google Scholar social scientific network database and its indicators are not considered suitable for the scientific evaluation of researchers.

ResearchGate, as a social network, can be useful for measuring gray literature using altimetric tools, as traditional bibliometric or scientometric indicators for gray literature, have said in a report from the Hall Open Access Archive Center, however, there are still many challenges (Schöpfel and Prost, 2016). Patthi *et al.* (2017) expressed that traditional scientometric indicators (such as ResearchGate, Google Scholar, and Academia) are consistent with altmetric indicators. But at the same time, more research is needed. In addition, Rousseau (2017) did not consider the altmetric indicators available on social media to be scientifically valid for researchers, and proposed a new indicator

called "metric-wiseness". Moreover, it has been a while since the creation of Web 2, but it still does not recommend the appropriate indicator for researchers 'scientific assessment. In fact, how researchers' academic analysis, with the help of social media such as Facebook, ResearchGate, LinkedIn, and Twitter works, is ambiguous (Christensen and Khalid, 2018). Memisevic *et al.* (2019) stated altimetric indices cannot completely replace scientific measurement, and having a high altmetric rank for an article means that the article is attractive to more readers, but this does not mean that it is of special scientific importance. In addition, according to Bardus *et al.* (2020), there seems to be a positive correlation between traditional scientometric indicators and social network altimetric indices (such as ResearchGate), but more detailed studies are needed to make a definite statement in this regard.

According to Lemke *et al.* (2019), the research field of "social science" has long suffered from quantitative or non-qualitative evaluation of researchers' articles, with the increase in the number of scientific social networks and, consequently, the increase in metric indexes, new issues have been added to the old ones, including the challenges of "privacy", "coping with information overload", "aspects of time consumption", and "Communication methods", are common concerns in the use of altmetric indicators in the social sciences. In addition, Dehghani *et al.* (2019) have found a positive correlation between researchers' traditional citation H-index indices and their altimetric indices in social networks. Moreover, Sedighi (2020), during a study of more than 800 articles and the number of citations to them in the Science Direct database and comparison with the altimetric index of the same articles, stated that the complete replacement of altmetric indicators of researchers' social networks instead of scientometric indices,is not recommended for scientific evaluation. Also, Lora, and Nel-Lo Andreu (2020), while reviewing articles in the field of tourism have stated that scientific social networks reflect the impact of research, but the metric indices of these networks cannot replace the scientific metrics of researchers such as "citations of articles".

2675 articles have been reviewed by Thelwall and Kousha (2017). And it has been observed that the number of citations to articles in ResearchGate media was less than the number of citations to them in Google Scholar but was more than Web of Science and

Scopus. Furthermore, these authors suggested that researchers publish a pre-print version of their article in ResearchGate Network. Moreover, sharing articles in Research Gate media will increase the reading rate and thus increase the citation of the mentioned articles (Lutz (2014); Ale-Ebrahim (2013)). Martín-Martín *et al.* (2018) have stated that the Google Scholar database measures the citation index (scientific evaluation) more comprehensively than the two media outlets Twitter and ResearchGate. Wiechetek (2019b) considers Google Scholar's scientific evaluation criteria to be more accurate than ResearchGate. Moreover, using the ResearchGate network will lead to an increase in citations to the articles of university researchers, but in light of previously published research, there are some contradictions in this area that are noteworthy (Valizadeh-Haghi *et al.* 2021).

Some previous studies argued that there are ambiguities in the field of scientific assessment using scientific social networks and more research is needed in this field (Schöpfel and Prost, 2016; Patthi et al., 2017; Christensen and Khalid, 2018; Bardus et al., 2020). Therefore, the present study was designed to delve into the previous studies, and find out whether the ResearchGate network is suitable or not from the standpoint of the scientific assessment tool.

2. Pre-Study

First study that was published about ResearchGate and argued from the standpoint of scientific evaluation by this mentioned network tool, was seen by Tausch (2015).W. Tausch (2015) argues that the ResearchGate network and its indicators are not suitable tools for scientific assessment because they are too imperfect and in conflict with scientific ranking systems such as Scopus. Tausch has stated that famous and influential people in science, such as Nobel Prize winners in economics, have a very small presence in the ResearchGate network, too. Moreover, according to a study from Kraker and Lex (2015), using the documentary method with technical approaches and mathematical analysis, it is concluded that the research score or score should not be used as a researcher evaluation score because it has three main problems. ResearchGate score is unstable and unproductive, secondly, the RG score does not match the journal's impact factor on researchers' evaluations. And thirdly, ResearchGate network algorithms are designed in such a way that RG scores or scores in general are not reconstructed properly when researchers'

activities change. Jordan (2015) has confirmed the research findings of these two researchers (Kraker and Lex, 2015) and that the ResearchGate network' scoring system has measurement problems. In addition, Ortega (2015) has expressed that the metrics of social networks such as ResearchGate and Academia should not be considered as a substitute for academic assessment of academics. In addition, there is a weak correlation between the bibliographic indicators of a valid scientific database and the indicators of the mentioned social networks.

There was a strong positive correlation between some ResearchGate altmetric indices and the Scopus scientometrics h-index, but there was a correlation between the main RG score of the researchers measured positively and moderately in Scopus on members of the physics department of five Panjab universities in India (Shrivastava and Mahajan, 2015). Also, Onyancha (2015), in a study of researchers at South African universities, concluded that there is a strong positive correlation between the webometric ranking of these universities and the search engine index and the citation rate of articles on the Web of Science.

Rahmani *et al.* (2018) have shown the existence of a strong positive and significant correlation between the h-index extracted from Web of Science (WoS) and the "RG- score" with an amount of 0.844, furthermore, the correlation between the h-index was derived from Scopus and RG score with amount of 0.859. They have said the ResearchGate network score can be considered as a complementary tool for scientific evaluation, too. Moreover, Ramezani-Pakpour-Langeroudi *et al.* (2015) have observed a significant correlation between the number of citations to articles published in the Scopus database and the two indicators of "reading rate" and "citation rate" to the same articles in the research network (in the field of "Quran and health"). Also, Batooli *et al*. (2016), have stated t a significant relationship has been seen between the number of citations to articles in ResearchGate and Web of Science (WoS). Moreover, they have said there is no significant relationship between the number of times articles are read in the ResearchGate network and the number of citations to the same articles in the Web of Science database. In addition, Erfanmanesh *et al.* (2015) have expressed there was a significant but weak correlation between the number of citations to scientific documents on the Web of Science (WoS) and the number of

citations to the same documents in the research network, besides, there is a weak positive correlation between the number of citations to the document on the web of science (WoS) and the number of uploads (shares) of the same document in ResearchGate. Another study from Batooli *et al.* (2016) of one hundred articles published by researchers affiliated with the Kashan University of Medical Science in Iran (field of medicine and biomedicine) on the ResearchGate media has stated there is a positive correlation relationship between Scopus and ResearchGate indicators. In addition, this mentioned network could be considered a suitable tool for the scientific evaluation of researchers. Also, Khalili (2016) has shown that there is a strong positive correlation between the academic rank of Iranian medical universities in the Islamic World Science Citation database and the webometrics ranking of these universities with the ResearchGate scores of researchers affiliated with the mentioned scientific centers. Moreover, Nicholas *et al.* (2016) conducted a heuristic study of four hundred research profiles in a targeted manner (selecting profiles with very high and very low scores) and have concluded that the score of the research media is confusing. In addition, the user's social interaction with others and establishing questions and answers,has identified the most important criterion of RG score (lack of scientific validity). However, the researchers said that the "reads" index (indicator) seems to be more important than the "RG score". Thelwall and Kousha (2016) have stated the number of views of uploaded articles on the ResearchGate has a small to moderate positive correlation with the number of citations by Scopus and Mendeley readers, so, the articles seen in ResearchGate media are probably completely new audiences.

Memon (2016) has expressed the presence of unreliable journals has caused scientific pollution in the research environment so that the articles of these journals can be easily uploaded or shared in RJ media. Therefore, the mentioned social media is not reliable in terms of the scientific nature of the data. Also, Orduna-Malea *et al.* (2016) have expressed that the RG score index in ResearchGate media is not a good tool for researchers in terms of scientific assessment because it is highly influenced by social interactions in this network (up to scientific criteria). In addition, Orduna-Malea *et al.* (2017) using a targeted analytical survey method on the ResearchGate profiles for three groups, 73 Nobel Prize winners, 104 high-profile profiles on the network, and a weekly cross-sectional study of 4 profiles with various

RG scores, have concluded that RG scores can be achieved by simply uploading research items with social interactions such as questioning, answering, and interacting with others, so this fact should be considered in the scientific assessment. Moreover, E.Bandini *et al.* (2017), while studying scientometrics on 845 scientific articles published in the Scopus database of researchers affiliated with Guilan university of medical sciences (1997-2015), found that there was a significant positive relationship between citation rate, viewing rate, and download rate. These articles are available on the ResearchGate social network. Also, Sababi *et al.* (2017) observed a significant positive correlation between the number of citations (H- index) to articles and their number of uploads on the ResearchGate media. In addition, the researchers 'high RG score does not necessarily correspond to the researchers' high Google Scholar scientometric index (Montealegre-Arturo *et al.* 2017). Moreover, the high RG score had no significant relationship with the academic ranking of the centers on the activities of Pakistani higher education institutions (ranking of Asian universities) in the ResearchGate network, however, lower-level institutions have also had lower RG scores scientifically (Ali *et al.* 2017). Also, there is a positive correlation between the number of citations to articles in the ResearchGate media and the citation rate on the Web of Science (WoS) and Scopus have been seen (faculty members of the Sharif University of Technology), therefore the RG score is a suitable tool for scientific assessment, according to Naderbeigi and Isfandyari-Moghaddam(2018). Also, Batooli (2017) has shown that the correlation coefficient between variables of view, download, and citation number of the articles in ResearchGate and citation number of the articles in SCI were positive and significant (Among 909 top papers from Iranian researchers). In this regard, a survey study published by Yan and Zhang (2018) on researchers with organizational affiliation with 61 scientific research centers in the United States, showed that the ResearchGate scores the level of activity of scientific and research institutes in a realistic way. It can be considered a tool of scientific measurement. In addition, the higher the academic level of the institute, the higher the number of research copies and the number of citations, and the reading rate ("reads" indicator) of the ResearchGate media profile, and the number of followers in the profile of the affiliated people, but the indicators of "reads", and "followers" are less and fluctuating.

Orduna-Malea and Delgado López- Cózar (2017), while examining the scientific activity of more than one hundred researchers, found that the indicators of Google Scholar altimetrics, and the ResearchGate network are not compatible with each other. In addition, the "reads" (In RG network) indicator has a different performance than other indicators. In addition, there was a significant difference between the information on Google Scholar and their ResearchGate indicators that had an H-index of 5 or higher in Google Scholar in a study on the activities of the 1390 researchers from Columbia universities (Aguillo *et al.* 2017). Moreover, Copiello and Bonifaci (2018) have expressed that the ResearchGate score is largely dependent on social activity and the scientific evaluation of research items on it is less. Therefore, it is not a suitable tool for scientific assessment. Also, Lepori *et al*. (2018), while studying the presence and activity of more than 2000 European higher education institutions and more than 4000 American scientific centers, in the ResearchGate network, found that the RG score is more correlated with the "research item" index (compared to "Citation" index). Moreover, using the score of the mentioned network to evaluate the quality of research and scientific activities of researchers and educational centers is not correct.

So, there are different approaches to the ResearchGate network and its altimetric quantitative scientific measurement indicators. The current research aims to summarize and analyze these different and seemingly contradictory views. The researchers of this present study, observed contradictory approaches to the ResearchGate network in terms of scientific evaluation in the previous studies. The present research aims to investigate and explain the mentioned contradictions with a systematic review.

Main Research Question

How many previously published studies (research articles or reports) that are indexed in the authoritative scientific databases of Google Scholar, Emerald, and PubMed have recognized the ResearchGate score as a suitable (non-suitable) or valid (not-valid) measurement or scientometrics tool?

3. Methodology

This paper reports on a systematic review that sought to answer the main research question: Is the ResearchGate network a suitable tool for scientific evaluation?

The following search command was applied in three scientific databases of Google Scholar, Emerald, and PubMed (without a time limit), and in order of priority, resulted in retrieving 479, 118, and 11 (608 in total) documents. The date of search and retrieval was from April 1 to 10, 2021.

("ResearchGate" AND ("scientometric" OR "scientometrics")) OR ("ResearchGate" AND "reputation") OR ("ResearchGate" AND "H-Index")

In addition, the phrase “ResearchGate’’ was searched in Persian on Google Scholar (without a time limit) and contained (Retrieved) 32 results (April 1, 2021).

Excel software has been used in the first step of target keyword search and drawing the figures or diagrams.

After deleting documents that were in the form of books or part of the book or their abstracts that had not been published, 582 documents remained (among 640 (608+32)). Duplicate data (studies), which were published both in the journal and by conference, were removed from the remaining articles. Titles and abstracts and, if necessary, all their full texts were carefully studied. Finally, by removing unrelated or duplicate data in both the Persian and English search command approaches, 57 articles or independent studies (in English, Persian, and Spanish) were selected for replying to the main research question using the PRISMA statement presented by Moher *et al.* 2009, that was also explained in the study by Asar *et al*. (2016). Then, in April and May 2021, the title and abstract of articles related to the research question were studied manually by documentary method, and ful if necessary their full-text was studied (if the title or abstract was not sufficient to recognize). In June 2021, the final analysis and summarization, and drawing of charts and tables were done by Excel software.

4. Findings

First, the main research question in this present systematic review,was answered in Table 1, and Figure 1. Then, in order to better analyze and resolve contradictions between previous studies, which was the

main goal of this systematic study, the authors answered the following two questions (not main research problem), in addition to the main research question.

First Supplementary Question On the articles that have a positive approach (suitable tool from the standpoint of scientific assessment) towards ResearchGate network, with which countries(developing or developed ones) has the research community been in communication?

Second Supplementary Question

How many members does the research community have in whose studies the altmetric indicators in the ResearchGate network are thought of as a suitable (non-suitable) tool for scientific measurement (more than 1000 or less)?

Answering the Main Research Question

The analysis of documents was performed with a targeted keyword search in the reputable Google Scholar, Emerald, and PubMed databases (without any limit). Titles and abstracts (if necessary, full texts) of 582 documents (Persian, English, and Spanish) were retrieved (1-10 April 2021) and studied. Then, by removing duplicate or irrelevant data, 57 independent studies were selected for meeting the main research problem of this systematic review by using the PRISMA statement (Table 1, Figure 1).

Table 1. Is ResearchGate a Suitable scientific Assessment or Not (Systematic Review Approach)?

Approach			
Positive	**Member Surveyed**	**Negative**	**Member Surveyed**
Nasibi-Sis *et al.* (2020)	50	Banshal *et al.* (2021)	Countless
Nemati-Anaraki *et al.* (2020)	439	Mason and Sakurai (2021)	500
Janavi *et al.* (2020)	583	Ortiz-Torres and Viamonte-Garrido *et al* (2020) [In Spanish]	None
Doulani *et al.* (2020) [In Persian]	118	Hauer *et al.* (2020)	1052
Doulani *et al.* (2020) [In Persian]	151	Kowalska-Chrzanowska and Krysiński (2020)	113
Biranvand and	158	Masic (2019)	None

Approach			
Positive	**Member Surveyed**	**Negative**	**Member Surveyed**
Shanbedi (2020) [In Persian]			
E.Bandboni *et al.* (2019)	165	O'Brien (2019)	None
Memisevic *et al.* (2019)	303	Copiello (2019)	None
Ansari *et al.* (2019)	1355	Wiechetek (2019b)	364
NK and Mathew K (2019)	42	Joshi *et al.* (2019)	3718
Zhang *et al.* (2019)	450	Teixeira Silva and Dobránszki (2018)	None
Asemi and Heydari (2018)	164	Johnson *et al.* (2018)	None
Yan and Zhang (2018)	61	Costas and Fransen (2018)	None
Naderbeigi and Isfandyari-Moghaddam (2018)	5000	Meier and Dirk (2018)	None
Ramezani-Pakpour-Langeroudi *et al.* (2018) [In Persian]	230	Copiello. and Bonifaci (2018)	None
Rahmani *et al.* (2018) [In Persian]	231	Lepori *et al.* (2018)	600
Ebrahimi *et al* (2018) [In Persian]	200	Aguillo *et al.* (2017)	1390
Ramezani *et al* (2017) [In Persian]	48	Ali *et al.* (2017)	Less than 200
Batooli (2017) [in Persian]	909	Orduna-Malea and Delgado López-Cózar (2017)	A few more than 100
Sababi *et al.* (2017)	1823	Montealegre-Arturo (2017)	16
E.Bandboni e*t al.* (2017) [In Persian]	845	Orduna-Malea *et al.* (2017) [In Spanish]	4,73,103 (Three research community)
Shrivastava and Mahajan (2017)	173	Memon (2016)	None
Batooli *et al.* (2016) [in Persian]	130	Orduna-Malea *et al.* (2016) [In Spanish]	None
Khalili (2016) [In Persian]	23	Thelwall and Kusha (2016)	39406

Approach			
Positive	**Member Surveyed**	**Negative**	**Member Surveyed**
Batooli *et al.* (2016)	130	Nicholas *et al.* (2016)	400
Shrivastava and Mahajan (2015)	100 (approximately)	Ortega (2015)	10000
Onyancha (2015)	6914	Kraker and Lex (2015)	None
		Jordan (2015)	None
		Tausch (2015)	None
		Erfanmanesh *et al.* (2015) [In Persian]	428

For better analysis, the numbers of 57 independent studies (research papers or reports)) that were identified as the relevant documents by PRISMA statement, were divided into two categories.

First division. Articles with a negative approach (30 ones) to the RG Score of ResearchGate network and its other altmetric indicators from the perspective of appropriate tools for scientific assessment of researchers [with at least one code (category) related to this division].

Second division. Articles with a positive approach (27 ones) to RG-Score of ResearchGate network and its other altmetric indicators from the perspective of appropriate tools for scientific assessment of researchers [with at least one category (code) related to this division].

It is to be noted these two categories (positive approach and negative approach) were selected and identified by researchers of this present paper when the previous studies were analyzed with PRISMA statement.

The categories of the first division, i.e negative approach to ResearchGate, were:

1. RG scores or other ResearchGate media indicators are not a good measurement tool in terms of mathematical algorithms.
2. RG score or other indicators of the ResearchGate network are not a suitable tool for the scientific assessment of researchers.
3. The data in Research Gate media is not scientifically reliable.
4. There is no significant relationship between RG indicators and scientometric indicators (such as Hirsch) or bibliometrics related to scientific databases available on the Web of Science (WoS) or Scopus or Google Scholar. If there is a relationship, it is weak or low, or medium (no strong relationship).

5. The world's leading scientists, such as neurosurgeons or Nobel laureates, have no presence at ResearchGate.

6. There is a weak, or moderate correlation (not strong) between the altmetric indices of social networking sites such as ResearchGate, with scientific measurement metrics, such as the number of citations.

7. ResearchGate indicators cannot be used as a substitute for researchers' scientometric indicators.

8. ResearchGate scores do not have a significant relationship with the types of academic rankings (such as academic rankings of Asian universities, webometrics rankings of universities, and rankings of the Islamic world citation database).

9. Google Scholar's scientific evaluation metrics are more accurate than ResearchGate.

10. It is better to pay attention to the ResearchGate media and its metric indicators with an open and cautious view (lack of transparency of the ResearchGate scoring).

11. The high H-index (Hirsch) scientometrics index of researchers does not match the high RG- score.

12. Among the members of the study population (in the mentioned study), more than half of the community had no presence in the international scientific social network ResearchGate.

The categories of the second division, i.e positive approach to ResearchGate, were:

1. ResearchGate Network and its altmetric indices can be used for scientific benchmarking.

2. There is a significant strong relationship (or positive) between ResearchGate indicator(s) and scientometric indicators (such as Hirsch), or bibliometrics related to Web of Science, Scopus, and Google Scholar databases.

3. Research Gate score has a significant relationship with various types of academic rankings (such as scientific rankings of Asian universities, webometrics rankings of universities, rankings of Islamic world citation, or SCI).

According to Table 1, the eleven studies of the study group with a positive approach (27 research paper or reports) to the ResearchGate network were published in the original Persian language (along with the English abstract). Furthermore, three studies of the study group with a negative approach (30 research paper or reports) to the ResearchGate network have been published in the original Spanish

language (along with English abstract). It is worthy to be noted that the number of the research community in Table 1, is provided according to the research question of this present research, and not according to the surveyed member expressed by the authors of previous studies in their study abstract (or full-text).

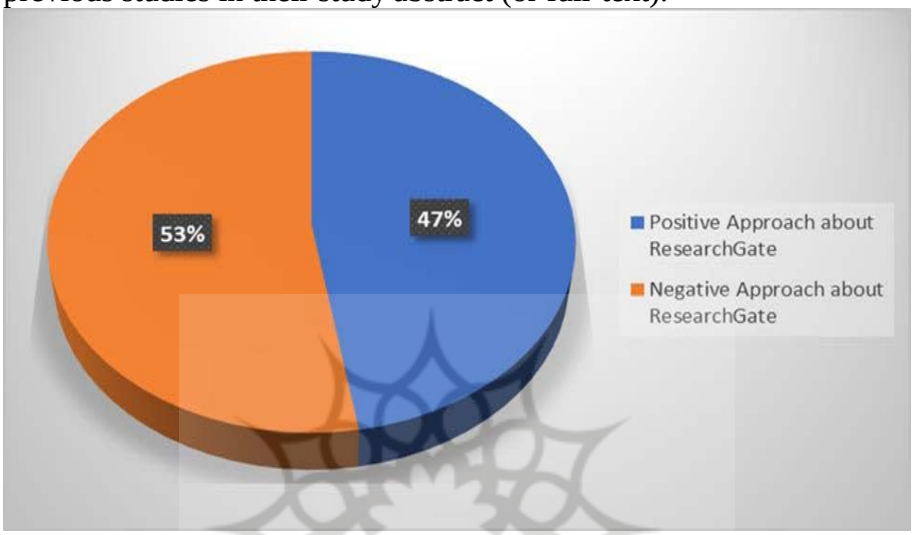

Figure 1. Approaches of previous studies about ResearchGate from standpoint of the suitable scientific assessment tool

According to Figure. 1, 53% of all previous studies, had a negative approach to ResearchGate and its indicators from the standpoint of a reliable scientific evaluation tool. Also, 27 studies (among 57 ones) were identified as having a positive approach to the ResearchGate network from the standpoint, of a scientific assessment tool (47%)

Answering the First Supplementary Question (for better analysis, not main research question)

Figure 2 and Figure 3 were drawn for replying to first supplementary question

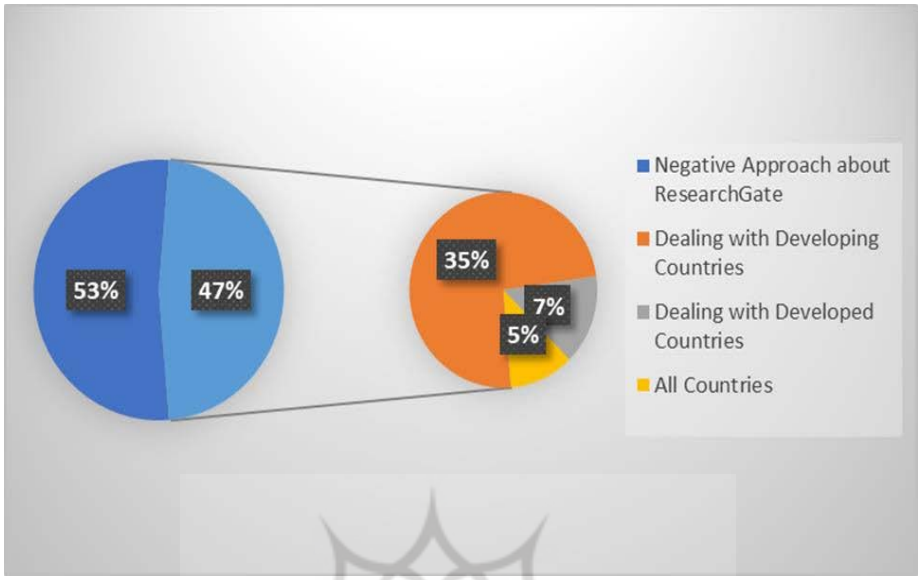

Figure 2. Categorization of articles with a positive approach to ResearchGate from standpoint of region

Figure 2 shows that 35% of all studies that had a positive approach to the ResearchGate network are related to developing countries. Moreover, 7% of those relating to developed countries were seen and 5% related to all countries in the world, too.

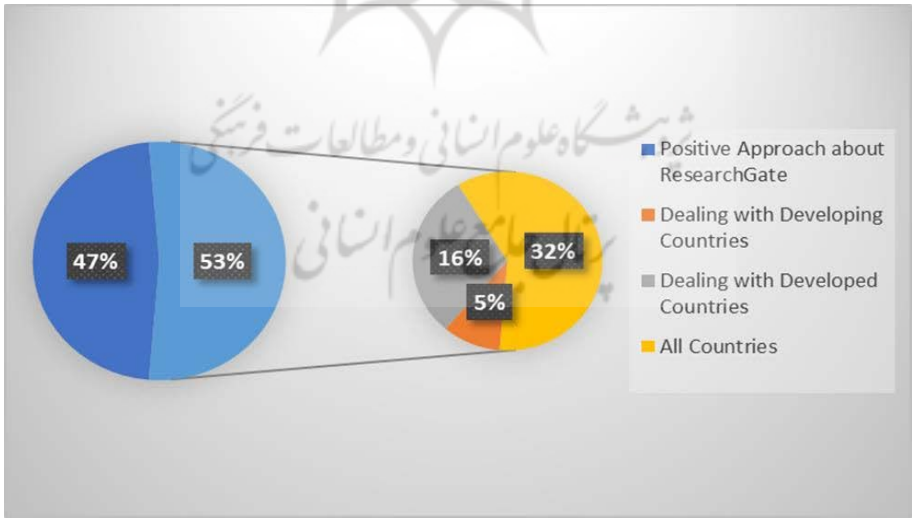

Figure 3. Categorizing articles with a negative approach about ResearchGate from standpoint of region

Figure 3 shows that 5% of all studies that had a negative approach to the ResearchGate network are related to developing countries. Furthermore, 16% of those relating to developed countries were seen and 32% related to all countries in the world, too.

Answering the Second Supplementary Question (for better analysis, not main research question)

Figure 4 and Figure 5 were drawn for replying to the second supplementary question for better analysis.

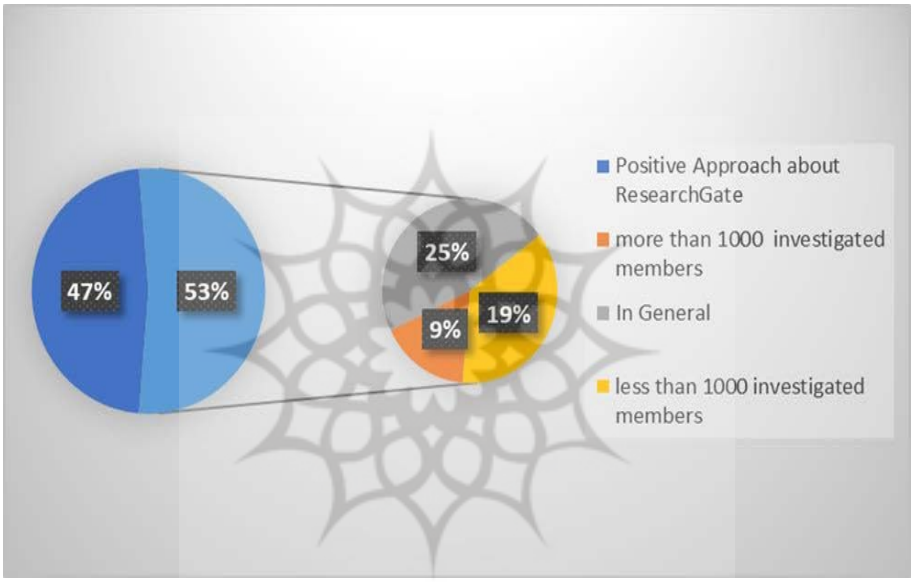

Figure 4. Categorization of Articles with a Positive Approach about ResearchGate from Standpoint of Their Number of Members that Surveyed

According to Figure 4, the number of 19% of all studies that had a negative attitude towards the ResearchGate network are with less than 1000 investigated members. related to developing countries. Moreover, 9% of them are with more than 1000 investigated members and 25% had not researched into the community and discussed it in generality.

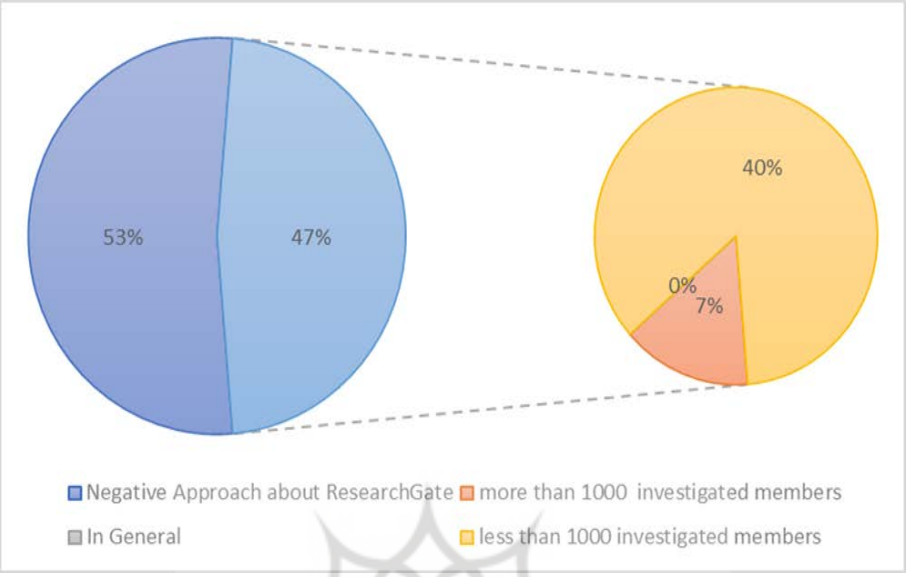

Figure 5. Categorization of Articles with a Positive Approach about ResearchGate from Standpoint of Their Number of Members that Surveyed

According to Figure 5, 40% of all studies that had a positive attitude towards the ResearchGate network are with less than 1000 investigated members. related to developing countries. In addition, 7% of them are with more than 1000 investigated members and 0% (none of them) had no researched community and discussed in generality.

5. Discussion and Conclusion

Meier and Dirk (2018) have stated that social interactions in ResearchGate media have a great impact on increasing the RG score. In addition, the two researchers have experimentally uploaded several articles with a name that does not belong to the author of the article in the media, which has led to an improvement in the score or score of ResearchGate (lack of scientific validity of ResearchGate). Moreover, the ResearchGate Score has an ambiguous measurement. In addition, there is the ability to manipulate data and information in this media, so it is not reliable (Costas and Franssen, 2018). Also, Johnson et al. (2018) have stated that the rating that the ResearchGate network gives to researchers is not desirable in terms of scientific evaluation, and sometimes invalid data is uploaded to the network. In addition, Teixeira da Silva and Dobránszki (2018) have expressed there was a

significant difference between the researchers' H-index in four different scientific databases of ResearchGate and Web of Knowledge, Scopus, and Google Scholar. In this regard, Asemi and Heydari (2018) have said there is a weak correlation between the "reading rate" index on the ResearchGate network and the citation rate of 164 highly cited articles by Iranian scientists who have received more than 200 citations on his web of science. Moreover, Zhang et al. (2019), while studying the activities of 450 supply chain researchers in the ResearchGate network, found that there is a relationship between their scientific impact (Citation) and activity in the network, although this relationship is not strong. Also, Ansari et al. (2019), while studying the researches affiliated with the universities of medical sciences in the western provinces of Iran, have stated that uploading articles in ResearchGate media will increase the citation rate of the same articles in the Scopus database. Moreover, Joshi et al. (2019) studied the activity of 3718 neurosurgeons living in Canada and the United States in ResearchGate media, more than half of them had no presence in the network. Also, Copiello (2019), the "research interest" index in ResearchGate media has measurement problems.

According to a study on the activities of researchers in the field of naval architecture affiliated with six Indian universities in the ResearchGate network, a significant correlation has been seen between the metric indices in the network and the h-index Scopus scientometrics index of researchers. Moreover, 65% (more than half of the population) of the mentioned researchers are present or registered in the mentioned network (NK and Mathew K, 2019). Also, the correlation between RG citations and Google Scholar (GS) citations (also RG h-index and GS h-index) has been seen as moderate on ResearchGate's profiles of one hundred Polish business researchers (Wiechetek, 2019b). In addition, O'Brien (2019) has stated that the data or scientific papers in the ResearchGate network have significant legal challenges and, there is no transparency in awarding RG scores to researchers and participants. However, the platform has an attractive user interface and can be used by scientific communication of researchers, too. Moreover, E.Bandabani et al. (2019), in October 2018, reviewed highly cited articles in the field of chronic diseases published on the Web of Science website (171 articles) and argued that there is a significant relationship between the reading of these articles in ResearchGate and Mendeley.

According to Masic (2019), only less than 50% of researchers' activity is reflected in social networks such as ResearchGate and Google Scholar, and the data shared in these networks can be manipulated (scientific invalidity), too. In addition, Memisevic et al. (2019), have studied the activities of 303 researchers from four state universities in Bosnia and Herzegovina in four databases: Scopus, Web of Science (WoS), Google Scholar, and ResearchGate, and a strong correlation relationship has been seen between all four. Moreover, Kowalska-Chrzanowska and Krysiński (2020) found in a study that although 60% of Polish researchers are present in at least one of the research social media ResearchGate, the academy, or Google Scholar, the other 40% are in none of the media. These are not present, so scientific evaluation based on the three media is not correct. Also, Janavi et al. (2020) in a study of 583 hot (highly cited) articles indexed in the field of clinical medicine on the Web of Science website, concluded that there is a significant relationship between reading and downloading articles with "citation" (in the field of social science). In this regard, Nemati-Anaraki et al. (2020), while studying the activity of 439 Research Gate profiles belonging to the faculty members of Iran University of Medical Sciences (45% of the total faculty members) and comparing "RG score" with his two indexes (Hirsch) of Scopus and Google Scholar, they found that there is a strong significant correlation between the three indicators. In addition, the correlation rate of the ResearchGate network is higher with Google Scholar scientometric indicators (compared to Scopus). Moreover, Hauer et al. (2020) have shown that the altimetric indexes in Scopus, ResearchGate, and Google Scholar are inconsistent with each other. In addition, researchers' H-index scores in media such as ResearchGate should not be considered in scientific evaluations, as people may falsely or erroneously add their names to articles.

A cross-sectional study on the activities of 50 lecturers affiliated with Tehran Paramedical School of Medical Sciences in the ResearchGate network, has shown there was a significant relationship between the altmetric indices of this network, except for two indicators "question" and "answer", with "citation rate" of Scopus (Nasibi-Sis et al. 2020). In addition, one study on the activities of 500 Japanese researchers at ResearchGate, has shown they regularly use the network. But they do not see it as a medium that is scientifically balanced . Because most of its articles in English are useful to them.

Therefore, this network cannot be considered a large scientific community (Mason and Sakurai, 2020). Moreover, there was a significant positive correlation between altmetric indicators of ResearchGate and citation indicators of Google Scholar and Scopus, among faculty members of Al-Zahra University in Iran (Doulani et al. 2020). Also, a study from Biranvand and Shanbedi (2020) on 158 Iranian authors and researchers in the field of nursing has shown that among the indicators of RG score, interest in the activities of others, citations, recommendations, followers and the number of research copies in ResearchGate with the indicators studied, there is a significant relationship between the Scopus database. But there is no significant relationship between the index of followers in the mentioned network with the H- Index received in Scopus. The researchers of this study, in general, considered the index metrics of ResearchGate media to have a significant relationship with the citation indicators of the Scopus database.

A positive correlation has been observed between altmetrics indices in the ResearchGate scientific network and scientometrics indices in Google Scholar and Scopus databases among faculty members of information science of Iranian public universities (Doulani et al. 2020). Ortiz-Torres and Viamonte-Garrido have stated the altmetric indicators on ResearchGate and Google Academic are insufficient to generalize scientific leaders (influential people in science). According to a study of countless Indian articles indexed on Web of Science, there was a positive correlation between "index metrics in research media" and "number of citations to Web of Science articles", but this correlation was weak (Banshal et al. 2021).

The number of studies that had a negative approach to the ResearchGate network in terms of measuring tools, was more than studies with a positive approach (Table 1). Thus, maybe it can be said to be consistent with the studies of Kraker and Lex (2015) as well as Jordan (2015) because they have also stated that the mathematical measurement algorithms in the ResearchGate network were not properly reconstructed.

As Tausch (2015) argued that most of the audience or activists in the ResearchGate media are from developing countries, the present study confirmed that most of the previous studies that contain a positive approach to the ResearchGate network from the standpoint of suitable scientific assessment tool (less than half of all studies) are

related to developing countries, too. Therefore, this current research is in line with the findings of Tausch (2015). In this present study, among 57 previous independent studies, 30 of them had a negative attitude towards the ResearchGate Network. Most of the evidence contained a positive assessment approach to the ResearchGate network (less than half of all studies), dealing with developing countries, and with a small community (less than 1000 investigated members). Thus, the scientific evaluation of researchers is not appropriate considering their ResearchGate scores. Therefore, this present paper is in the same direction as all of the thirty previous studies (with having a negative approach to ResearchGate) that have been identified hereon. Moreover, Memisevic *et al*. (2019), and Sedighi (2020) , because of these two mentioned studies, stated that the altimetric indices cannot completely replace scientific measurement. Also, study by Rousseau (2017), is in the same direction with findings of this present study from the standpoint of arguing that altmetric indicators available on social media are not scientifically valid for researchers.

One of the implicit findings of this study was that the "reads" indicator in the ResearchGate network performs differently from other indices, such as "RG Score", "Citation", and "Research Interest", based on the previous studies from Nicholas *et al.* (2016), Yan and Zhang (2018), Orduna-Malea and Delgado López-Cózar (2017), Batooli *et al.* (2016), Tavosi and Naghshineh (2021). It is to be noted, the studies from Tavosi and Naghshineh (2021) had not retrieved the date of data extraction of this present study (April, 1-10, 2021), hence not mentioned on the Tables and figures.

Researchers' academic evaluation, with the help of social media such as ResearchGate, is ambiguous (Schöpfel and Prost, 2016; Patthi *et al*., 2017; Christensen and Khalid, 2018; Bardus *et al*., 2020). This paper helps to reduce this ambiguity.

It is to be noted, in one research paper by Tavosi and Naghshineh (2020), comparative analysis between Iranian and international researcher from standpoint of presence and activities on the ResearchGate network was done. But not discussed about scientific evaluation on this mentioned network. Moreover, one research by Tavosi (2022) has shown that the best scientific centers of the Times' institute are not active in the ResearchGate network. This finding of Tavosi (2022) is in the same direction of the findings of this present

study from the standpoint that ResearchGate network is not a suitable evaluation tool for scientific assessment of researchers. This mentioned study was not retrieved on the date of data extraction of this present study, therefore not cited on the Figures and Table.

Because this present study has been conducted by quantitative approach (in the main), therefore another research with metasynthesis approach, is recommended.

Although, the data in this study is limited to the international scientific databases of Google-Scholar, Emerald, and PubMed. overall, it provides a broad perspective and can be useful for scientific policymakers. Moreover, this present research could provide a better viewpoint for the future relevant studies.

References

Aguillo, I.F., Uribe-Tirado, A. and Lopez Lopez, W. (2017), "Visibility of Colombian Researchers on Google Scholar and ResearchGate Depending on their Indicators. Differences and Similarities with the Official Classification of the National Science System". *Rev. Interam. Bibliot. Medellín (Colombia)*, Vol. 40 No. 3, pp.221-230. https://inis.iaea.org/search/search.aspx?orig_q=RN:48050903

Ali, M.Y., Wolski, M. and Richardson, J. (2017), "Strategies for using ResearchGate to improve institutional research outcomes".*Library Review*, Vol. 66 No 8/9, pp.726-739. https://doi.org/10.1108/LR-07-2017-0060

Ale Ebrahim, N., Salehi, H., Embi, M.A., Habibi, F., Gholizadeh, H., Motahar, S. M. and Ordi, A. (2013), "Effective Strategies for Increasing Citation Frequency". *International Education Studies*, Vol. 6, No. 11, pp. 93-99. https://ssrn.com/abstract=2344585

Ansari, M., Fallah, M., Noruzi, A. and Rasolabadi, M. (2019), "Comparing the Presence of Researchers of Medical Universities of Western Provinces of Iran on ResearchGate and Scopus". *Webology*, Vol. 16 No. 2, pp.257-274. http://eprints.rclis.org/39681/

Asmi, N.A. and Margam, M. (2018), "Academic social networking sites for researchers in Central Universities of Delhi: A study of ResearchGate and Academia". *Global Knowledge, Memory and Communication*, Vol. 67 No. 1/2, pp. 91-108. https://doi.org/10.1108/GKMC-01- 2017-0004

Asar, S., Jalalpour, S., Ayoubi, F., Rahmani, M., Rezaeian, M. (2016). "PRISMA; Preferred Reporting Items for Systematic Reviews and Meta-Analyses". *JRUMS*, 15 (1) :68-80. URL: http://journal.rums.ac.ir/article-1-3021-en.html

Asemi, A. and Heydari, M. (2018), "Correlation between the Articles Citations in Web of Science (WoS) and the Readership Rate in Mendeley and Research Gate (RG)". *Journal of Scientometric Research*, Vol. 7, No.3, pp.145-152. https://www.jscires.org/article/261

Banshal, S.K., Singh, V.K. and Muhuri, P.K. (2021), "Can altmetric mentions predict later citations? A test of validity on data from ResearchGate and three social media platforms". *Online Information Review, Vol. ahead-of-print No. ahead-of-print.* https://doi.org/10.1108/OIR-11-2019-0364

Baro, E.E., Tralagba, E.C. and Ebiagbe, E.J. (2018), "Knowledge and use of self- archiving options among academic librarians working in universities in Africa". *Information and Learning Sciences*, Vol. 119 No. 3/4, pp. 145-160. https://doi.org/10.1108/ILS-01-2018-0003

Bardus, M., E.l. Rassi, R., Chahrour, M., Akl, E.A., Raslan, A., Meho, L.I. and Akl, E.W. (2020), "The Use of Social Media to Increase the Impact of Health Research: Systematic Review". *Journal of Medical Internet Research*, Vol.22 No.7, e15607. https://www.jmir.org/2020/7/e15607/

Batooli, Z. (2017), "The Relationship between Web of Science and ResearchGate Indicators of Iranian Researchers' Top Papers". *Iranian Journal of Information Processing and Management*, Vol. 33 No.1, pp.161-184. https://jipm.irandoc.ac.ir/article-1-3045-en.html [In Persian]

Batooli, Z., Janavi, E. and NadiRavandi, S. (2016), "The impact of ResearchGate indicators on increasing citation counts of top Clinical Medicine articles in Web of Science: A Comparative study of Iranian and Turkish Researchers". *Journal of Knowledge and Information Management*, Vol.3 No.2, pp.83-93. http://lib.journals.pnu.ac.ir/article_4290.html?lang=en [In Persian]

Batooli, Z., Ravandi, S.N and Bidgoli, M.S. (2016), "Evaluation of Scientific Outputs of Kashan University of Medical Sciences in Scopus Citation Database based on Scopus, ResearchGate, and Mendeley Scientometric Measures". *Electronic Physician*, Vol. 8 No.2, pp.2048-2056. https://europepmc.org/article/med/27054017

Biranvand, A. and Shanbedi, Z. (2020), "Investigation of Altmetrics indices obtained from the activities of Iranian writers and researchers in the field of nursing in scientific social networks". *Journal of Studies in Library and Information Science*, (), pp. https://slis.scu.ac.ir/article_15956.html?lang=en [In Persian]

Bong, Y. and Ale Ebrahim, N. (2017), "Increasing Visibility and Enhancing Impact of Research".Asia Research News, April 24, 2017. Available at: https://papers.ssrn.com/Sol3/papers.cfm?abstract_id=2959952 (Accessed 1 April 2021)

Copiello, S. (2019), "Research Interest: another undisclosed (and redundant) algorithm by ResearchGate". *Scientometrics*, Vol. 120 No.1, pp.351-360. https://dl.acm.org/doi/abs/10.1007/s11192-019-03124-w

Copiello, S. and Bonifaci, P. A. (2017), "few remarks on ResearchGate score and academic reputation". *Scientometrics*, Vol. 114 No. 1, pp. 301-306. https://doi.org/10.1007/s11192-017-
2582-9

Costas, R. and Franssen, T. (2018), "Reflections around 'the cautionary use' of the h-index: response to Teixeira da Silva & Dobránszki". *Scientometrics*, Vol.115, pp.1125–1130. https://doi.org/10.1007/s11192-018-2683-0

Christensen, L.L. and Khalid, Md. S. (2018), "Social media analytics dashboard for academics and the decision-making process: A

systematic literature review". *Proceedings of the 11th International Conference on Networked Learning*, pp. 425-431.

https://vbn.aau.dk/en/publications/social-media-analytics-dashboard-for-academics-and-the- decision-m

Dehghani, S., Hamidi, A. and B.Jahromi, R. (2019). "Representation and Analysis of the Status of Indexed Articles of Researchers in Bushehr University of Medical Sciences at the Scopus Database in Social Networks: An Altmetrics Study". *Iranian South Medical Journal*, Vol. 22 No. 4, pp.222-235. http://ismj.bpums.ac.ir/article-1-1145-en.html [In Persian]

Delgado López- Cózar, E., Robinson- García, N. and Torres- Salinas, D. (2014), "The Google scholar experiment: How to index false papers and manipulate bibliometric indicators". *Jasist*, Vol.65 No.3, pp.446-454. https://doi.org/10.1002/asi.23056

Doulani, A., Shabani, Z. and Baradar, R. (2020), "Information Science Academic Members of Iranian Public Universities Sharing Information Resources in ResearchGate Social Scientific Network: It's Relation on their Scientific Output in Scopus Database and Google Scholar Search Engine". *Journal of Payavard Salamat*, Vol. 14 No.1, pp.53-64. http://payavard.tums.ac.ir/article- 1-6945-en.html [In Persian]

Doulani, A., Zand, S. and Baradar, R. (2020), "Investigating the activities of the faculty members of Alzahra University in the Scientific Social Network of ResearchGate and its impact on the Scopus Citation Database and the Google Scholar Search Engine". *Knowledge Retrieval and Symantic Systems*, Vol.6 No.21, pp.43-69. https://jks.atu.ac.ir/article_10789.html?lang=en [Article in Persian]

Ebrahimi, S., Afifian, F. and Goltaji, M. (2018), "Does Knowledge Sharing in ResearchGate Scientific Network Increase Research-ers' Productivity Indicators? Case Study of Top World Physicists". *Scientometrics Research Journal*, Vol.4 No.8, pp.57-72. http://rsci.shahed.ac.ir/article_614.html [In Persian]

Erfanmanesh, M., Asnafi, A.R. and arshadi, H. (2015), "Iranian universities and research institutions in the ResearchGate: An altmetric study". *Journal of Knowledge Studies*, Vol.8 No.30, pp.59-72. http://qje.iau-tnb.ac.ir/article_522156_111329.html?lang=en [In Persian]

E.Bandboni, M., Batooli, Z., Ramezani, A., Ranjbar-Pirmousa, Z. and Ramezani- Pakpourlangeroudi, F. (2017), "An Assessment of Altmetrics Indicators on Citation Rate of Articles Affiliated by Guilan University of Medical Sciences". *Health Inf Manage*, Vol.13 No.5, pp.367-372. https://www.sid.ir/en/journal/ViewPaper.aspx?id=577194 [In Persian]

E.Bandboni, M., Ramezani-Pakpour-Langeroudi, F., FallahMortezaNejad, S.H.R. and Ramezani, A. (2019), "Investigating the Presence of Highly Cited Articles on Chronic Diseases in Scientific Social Network: Altmetrics Study". Ju*ndishapur Journal Chronic Disease Care, online ahead of Print*, Vol.8 No.3, e90837. https://sites.kowsarpub.com/jjcdc/articles/90837.html

Eze, M.E., Okeji, C.C. and Bosah, G.E. (2019), "Self-archiving options on social networks: a review of options", *Library Hi Tech News*, Vol. 36 No. 1, pp. 9-12. https://doi.org/10.1108/LHTN-12-2017-0091

Hauer, M.P., Hofmann, X.C.R., Krafft, T.D. and Zweig, K.A. (2020). "Quantitative analysis of automatic performance evaluation systems based on the h-index". *Scientometrics*, Vol.123 No.2, pp. 735-751. Available at: https://ideas.repec.org/a/spr/scient/v123y2020i2d10.1007_s11192-020-03407-7.html (Accessed 1

April 2021)

Ezema, I.J. and Ugwu, C.I. (2019), "Correlating research impact of library and information science journals using citation counts and altmetrics attention". *Information Discovery and Delivery*, Vol. 47 No. 3, pp. 143-153. https://doi.org/10.1108/IDD-08-2018-0029

Campos-Freire, F., Rogel, D.R., and Rodríguez, C (2014): "Presence and impact of Andean universities in online social networks". *Revista Latina de Comunicación Social*, Vol.69, pp. 571-592. Available at: http://www.revistalatinacs.org/069/paper/1025_USC/28en.html(Accessed 1 April 2021)

Francke, H. (2019), "The academic web profile as a genre of "self-making"", *Online Information Review*, Vol. 43 No. 5, pp. 760-774. https://doi.org/10.1108/OIR-12-2017-0347

Jamali Mahmouei, H. (2018), "Copyright Infringement in ResearchGate Self-archiving Feature". *National Studies on Librarianship and Information Organization*, Vol.29 No.1. pp.51-

65. http://nastinfo.nlai.ir/article_2119.html?lang=en [In Persian]

Janavi, E., Nadi-Ravandi, S. and Batooli, Z. (2019), "Impact of ResearchGate on increasing citations and usage counts of hot papers in clinical medicine indexed in Web of Science". *Webology*, Vol.17 No.1, Article 212. Available at: http://www.webology.org/2020/v17n1/a212.pdf (Accessed 1 April 2021)

Johnson, R., Watkinson, A. and Mabe, M. (2018*), "An overview of scientific and scholarly publishing"*. The STM Report An overview of scientific and scholarly publishing, Fifth edition. Available at: https://www.stm-

assoc.org/2018_10_04_STM_Report_2018.pdf (accessed 1 April 2021)

Joshi, ND., Lieber, B., Wong, K., Al-Alam, E., Agarwal, N. and Diaz, V. (2019), "Social Media in Neurosurgery: Using ResearchGate". *World Neurosurgery*, Vol.127, e950-e956. https://doi.org/10.1016/j.wneu.2019.04.007

Jordan, K. (2015). "Exploring the ResearchGate score as an academic metric: reflections and implications for practice". *Quantifying and Analyzing Scholarly Communication on the Web (ASCW'15)*, 30 Jun 2015, Oxford. http://oro.open.ac.uk/43538/

Khalili, L. (2016), "Participation of Iranian Medical Universities in ResearchGate". *Health Information Manage*, Vol.13 No.4, pp.273-279. https://www.sid.ir/en/journal/ViewPaper.aspx?ID=529655 [In Persian]

Kowalska-Chrzanowska, M. and Krysiński, P. (2020). "Role of social networking services for scientists in promoting scientific output on example of Polish representatives of social communication and media sciences". *Global Knowledge, Memory and Communication*, Vol. 69 No.8/9, pp.717-736. https://doi.org/10.1108/GKMC-12-2019-0147

Kraker, P.and Lex, E. (2015), "A Critical Look at the ResearchGate Score as a Measure of Scientific Reputation". Available at: http://ascw.know-center.tugraz.at/wp- content/uploads/2016/02/ASCW15_kraker-lex-a-critical-look-at-the-researchgate-score_v1-1.pdf (Accessed 1 April 2021)

Lemke, S., Mehrazar, M., Mazarakis, A. and Peters, I. (2019), "When You Use Social Media You Are Not Working: Barriers for the Use of Metrics in Social Sciences". *Frontiers in Research and Metric Analytics*, Vol.3. Article 39. https://doi.org/10.3389/frma.2018.00039

Lepori, B., Thelwall, M. and HafeezHoorani, B. (2018), "Which US and European Higher Education Institutions are visible in ResearchGate and what affects their RG score?". *Journal of Infometrics*, Vol.12 No.3, pp.806-818. https://doi.org/10.1016/j.joi.2018.07.001

Lora, A. V. and Nel-Lo Andreu, M.G. (2020), "Alternative Metrics for Assessing the Social Impact of Tourism Research". *Sustainability*, Vol.12 No.10, 4299. https://doi.org/10.3390/su12104299

Lutz, C. (2014), "Scientometrics2.0: Scientific Reputation and Networking". Institute for Media and Communication Management. Available at: https://www.alexandria.unisg.ch/236426 (Accessed 1 May 2021)

Manca, S. (2018), "ResearchGate and Academia.edu as Networked Socio-Technical Systems for Scholarly Communication: A Literature

Review". *Research in Learning Technology*, Vol.26, 2008. https://dx.doi.org/10.25304/rlt.v26.2008

Mansourkiaie, R., Babalhavaegi, F., Nooshinfard, F. and Soheili, F. (2019), "Study of the Future of the Dissemination of Scientific Productions of Knowledge and Information Science in Social Networks from the Iranian Experts' Viewpoint". *Library and Information Science*, Vol. 22 No.3 (87), pp.136-163. http://lis.aqr-libjournal.ir/article_82928_en.html [In Persian]

Martín-Martín, A., Orduna-Malea, E. and Delgado López-Cózar, E. (2018), "Author-level metrics in the new academic profile platforms: The online behaviour of the Bibliometrics community". *Journal of Informetrics, Elsevier*, vol.12 No.2, pp.494-509. https://doi.org/10.1016/j.joi.2018.04.001

Masic, I. and Begic, E. (2016). "Biomedical Scientific and Professional Social Networks in the Service of the Development of Modern Scientific Publishing". *Acta Inform Med*, Vol.24 No.6, pp.409–412. https://pubmed.ncbi.nlm.nih.gov/28077905/

Masic, I. (2019). "The most important Google Scholar index disadvantages". 17th International Conference on Informatics, Management and Technology in Health Care, Athens, Greece, 5-7 July, 2019. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6854473/

Mason, S., Sakurai, Y. (2021), "A ResearchGate-way to an international academic community?". *Scientometrics*, Vol.126, pp.1149-1171. https://doi.org/10.1007/s11192-020- 03772-3

Meier, A. and Dirk, T. (2018), "Investigating the transparency and influenceability of altmetrics using the example of the RG score and the ResearchGate platform". *Information Services & use*, Vol.38 No.1-2, pp.99-110. https://content.iospress.com/articles/information-services-and-use/isu180001

Memisevic, H., Pasalic, A., Mujkanovic, E. and Memisevic, M. (2019), "In Search of a Silver Bullet: Evaluating Researchers' Performance in Bosnia and Herzegovina". *Journal of Scientometric Research*, Vol.8 No.3, pp.125-130. https://www.jscires.org/article/321

Memon, A.R. (2016), "ResearchGate is no longer reliable: leniency towards ghost journals may decrease its impact on the scientific community". *National Library of Medicine*, Vol.66 No.12, pp.1643-1647. https://pubmed.ncbi.nlm.nih.gov/27924967/

Moher D, Liberati A, Tetzlaff J, Altman D G. (2009), "Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement". *BMJ*,339,b2535. https://doi.org/10.1136/bmj.b2535

Montealegre-Arturo, S., Linares-Aguirre, IM. and Moreno, F. (2017), "Caracterización de las métricasalternativas de ResearchGate: El caso

de la Pontificia Universidad Javeriana Cali". *Revista Salutem Scientia Spiritus*, Vol.3 No.2, pp.22-31. https://revistas.javerianacali.edu.co/index.php/salutemscientiaspiritus/article/view/1756

Naderbeigi, F. and Isfandyari-Moghaddam, A. (2018), "Researchers' Scientific performance in ResearchGate: The Case of a Technology University". *Library Philosophy and Practice (e-journal)*, 1752. https://digitalcommons.unl.edu/libphilprac/1752/

Nasibi-Sis, H., Valizadeh-Haghi, S. and Shekofteh, M. (2020), "ResearchGate Altmetric scores and Scopus bibliometric indicators among lecturers". *Performance Measurement and Metrics*, Vol.22 No.1, pp.15-24. https://doi.org/10.1108/PMM-04-2020-0020

Nicholas, D., Clark, D. and Herman, E. (2016), "ResearchGate: Reputation uncovered". *Learned Publishing*, Vol.29 No.3, pp.173-182. https://doi.org/10.1002/leap.1035

Nemati-Anaraki, L., Razmgir, M. and Moradzadeh, M. (2020), "Scientific impact of Iran University of Medical Sciences researchers in ResearchGate, Google Scholar, and Scopus: An altmetrics study". *Medical Journal of Islamic Republic of Iran*, Vol.34,142. http://mjiri.iums.ac.ir/article-1-5654-en.html

NK, Sh. and Mathew K, S. (2019), "ResearchGate Profiles of Naval Architecture Scientists in India: An Altmetric Analysis". *Library Philosophy and Practice* (e-journal), 2305. https://digitalcommons.unl.edu/libphilprac/2305/

O'Brien, K. (2019), "ResearchGate". *Journal of Medical Library Association*, Vol.107 No.2, pp.284-285. https://doi.org/10.5195/jmla.2019.643

Onyancha, OB. (2015), "Social media and research: an assessment of the coverage of South African universities in ResearchGate, Web of Science and the Webometrics Ranking of World Universities". *South African Journal of Libraries and Information Science*, Vol.81 No.1, pp.8-20. https://sajlis.journals.ac.za/pub/article/view/1540/0

Orduna-Malea, E. and Delgado López-Cózar, E. (2017), "Performance Behavior Patterns in Author-Level Metrics: A Disciplinary Comparison of Google Scholar Citations, ResearchGate, and Impactstory". *Front. Res. Metr. Anal*, Vol.2, N.14. https://doi.org/10.3389/frma.2017.00014

Orduna-Malea, E., Martín-Martín, A., Thelwall, M. and Delgado López-Cózar, E. (2017). "Do ResearchGate Scores create ghost academic reputations?". *Scientometrics*, Vol.112 No.1, pp.443-460. https://doi.org/10.1007/s11192-017-2396-9

Orduña-Malea, E., Martín-Martín, A. and Delgado López-Cózar, E. (2016), "ResearchGate comofuente de evaluacióncientífica: desvelando sus aplicacionesbibliométricas". *El profesional de la información*, Vol.25 No.2, pp.303-310. https://doi.org/10.3145/epi.2016.mar.18 [In Spanish]

Ortiz-Torres, E. A. Viamonte-Garrido, Y. I. (2020), "Indicadores cienciométricos y altmétricos para la identificación de líderes científicos". *Palabra Clave (La Plata)*, Vol.10 No.1, e105. https://doi.org/10.24215/18539912e105 [In Spanish]

Ortega, J.L. (2015), "Relationship between altmetric and bibliometric indicators across academic social sites: The case of CSIC's members". *Journal of Informetrics*, Vol.9 No.1, pp.39- 49. https://doi.org/10.1016/j.joi.2014.11.004

Patthi, B., Prasad, M., Gupta, R., Singla, A., Kumar, J.K., Dhama, K., Ali, I. and Niraj,

L.K. (2017), "Altmetrics – A Collated Adjunct Beyond Citations for Scholarly Impact: A Systematic Review". *Journal of Clinical and Diagnosis Research,* Vol.11 No.6, ZE16–ZE20. https://pubmed.ncbi.nlm.nih.gov/28764311/

Prieto-Gutierrez, J. (2019), "Ten years of research on ResearchGate: a scoping review using Google Scholar (2008–2017)". *European Science Editing*, Vol.45 No.3, pp.60-64. Available from http://eprints.rclis.org/38920 (Accessed 14 January 2021)

Rahmani, M., Asnafi, A., Rootan, S. and Janmohammadi, M. (2018), "RG Score compared with H-Index: An case study". *Sciences and Techniques of Information Management*, Vol.4 No.2, pp.61-76. http://stim.qom.ac.ir/article_1139.html?lang=en [In Persian]

Ramezani, A., Ghazimirsaeed, S., Papi, A., YektaKooshali, M. and RamezaniPakpourLangroudi, F. (2017), "Evaluation Altmetric Indicators of Iranian Medical Universities in Academic Social Networks: ResearchGate and Academia.edu". *Knowledge and Information Management Jour*nal,Vol.4 No.1,pp.23-30. http://lib.journals.pnu.ac.ir/article_4802.html?lang=en [In Persian]

Ramezani-Pakpour-Langeroudi, F., Okhovati, M., E.Bandboni, M, and Ramezani, A. (2018), "Status of the Scientific Output of Researchers in the Field of "Quran and Health" in ResearchGate". *Quran and Medicine*, Vol.3 No.4, pp.183-188. https://www.sid.ir/en/journal/ViewPaper.aspx?ID=703767 [In Persian]

Rezaeian M. (2017), "How Would it be Possible to Increase the Visibility of a Published Article?". *JRUMS*, Vol.15 No.9, pp.893-898. http://journal.rums.ac.ir/article-1-3638-en.html [Article in Persian].

ResearchGate (nd). Available at: https://explore.researchgate.net/display/support/Signing+up+for+ResearchGate (Accessed 16 January 2021)

Rousseau, S. and Rousseau, R. (2017). "Saber sobremétricas: heterogeneidaden el conocimientobibliométrico". *El Profesional de la Informacion*, Vol.26 No.3, pp.480-487. https://dialnet.unirioja.es/servlet/articulo?codigo=6032614

Sababi, M., Marashi, S.A., Pourmajidian, M., Pourtabatabaei, S.S., Darki, F., Sadrzadeh, M.R.…. and Nejadi, P. (2017), "How accessibility influences citation counts: The case of citations to the full text articles available from ResearchGate". *RT. A Journal on Research Policy and Evaluation*, Vol.5 No.1. https://riviste.unimi.it/index.php/roars/article/view/7997

Schöpfel, J and Prost, H. (2016). "Altmetrics and Grey Literature: Perspectives and Challenges". *GL18 International Conference on Grey Literature*, Nov 2016, New York, United States. ffhal-01405443. https://archivesic.ccsd.cnrs.fr/hal-01405443v1

Sedighi, M. (2020), "Evaluating the impact of research using the altmetrics approach (case study: the field of scientometrics)", *Global Knowledge, Memory and Communication*, Vol. 69 No. 4/5, pp. 241-252. https://doi.org/10.1108/GKMC-02-2019-0013

Shrivastava, R. and Mahajan, P. (2015), "Relationship amongst ResearchGate altmetric indicators and Scopus bibliometric indicators: The case of Panjab University Chandigarh (India) ". *New Library World*, Vol.116 No.9/10, pp.564-577. https://doi.org/10.1108/NLW-03-2015-0017

Shrivastava, R. and Mahajan, P. (2017), "An altmetric analysis of ResearchGate profiles of physics researchers: A study of University of Delhi (India)", *Performance Measurement and Metrics*, Vol. 18 No. 1, pp. 52-66. https://doi.org/10.1108/PMM-07-2016-0033

Smith, D.R. and Watson, R. (2016), "Career development tips for today's nursing academic: bibliometrics, altmetrics and social media". *JAN Leading Global Nursing Research*, Vol.72 No.11, pp.2654-2661. https://doi.org/10.1111/jan.13067

Tavosi, M, Naghshineh, N. (2020). "Participation of researchers affiliated with top Times universities in the ResearchGate network: A comparative study of Iranian and international researchers", *Human Information Interaction*, 7, 3: 66-77

Tavosi, M, Naghshineh, N. (2021). "Correlation Analysis between ResearchGate Indicators and Academic Times Ranking in the Field of Computer Sciences". *Caspian Journal of Scientometrics*. 8 (1): 87-94. DOI: 10.22088/cjs.8.1.87

Tavosi, M. (2022). "Times Ranking versus ResearchGate's Indicators: An Analysis of Presence and Activities of Political Sciences Field". *International Journal of Digital Content Management*, 3(4), 39-56. https://doi.org/10.22054/dcm.2022.14018

Tausch, A. (2015), "ResearchGate, RG-Scores, or a true Research Gate to Global research? On the limits of the RG factor and some scientometric evidence on how the current RG score system discriminates even against Nobel Laureates in economics and against the developing countries". Available at: https://www.researchgate.net/publication/275647731_Researchgate_RG-Scores_or_a_true_Research_Gate_to_Global_Research_On_the_limits_of_the_RG_factor_and_some_scientometric_evidence_on_how_the_current_RG_score_system_discriminates_even_agai nst_Nobel_Lau (Accessed 8 April 2021)

Teixeira da Silva, J. A .and Dobránszki, J. (2018), "Multiple versions of the h-index: cautionary use for formal academic purposes". *Scientometrics*, Vol.115, pp.1107-1113. https://ideas.repec.org/a/spr/scient/v115y2018i2d10.1007_s11192-018-2680-3.html

Thelwall, M. and Kousha, K. (2016), "ResearchGate articles: Age, discipline, audience size, and impact". *Journal of the Association for Information Science and Technology*, Vol.68 No.2, pp.468-479. https://doi.org/10.1002/asi.23675

Thelwall, M. and Kousha, K. (2017), "ResearchGate versus Google Scholar: Which finds more early citations? ". *Scientometrics*, Vol.112, pp.1125–1131. https://doi.org/10.1007/s11192- 017-2400-4

Valizadeh-Haghi, S., Shahbodaghi, A. and Nasibi-Sis, H. (2021), "ResearchGate Social Network: Opportunities and Challenges". *Journal of Medical Library and Information Science*, Vol.2, p.1-6. https://doi.org/10.22037/jmlis.v2i.32545

Wiechetek, L. (2019a), "Educators and Academics in Specialized Social Networks: Comparison of Google Scholar and ResearchGate Usage by Business Researchers of MCSU". 11th International Conference on Education and New Learning Technologies, 8039-8051. https://library.iated.org/view/WIECHETEK2019EDU

Wiechetek, L. (2019b), "The Use of Social Networks by Business Researchers. Comparison of Google Scholar and ResearchGate Usage by Scientists from Polish Economics Universities". *Problemy Zarzadzania-Management*, Vol. 17 No.5 (85), pp.176-197. http://bazekon.icm.edu.pl/bazekon/element/bwmeta1.element.ekon-element-000171583588

Yan, W. and Zhang, Y. (2018), "Research universities on the ResearchGate social networking site: An examination of institutional differences, research activity level, and social networks formed". *Journal of Informetrics*, Vol.12 No.1, pp.385-400. https://ideas.repec.org/a/eee/infome/v12y2018i1p385-400.html

Zhang, Y., Wu, Y.J., Goh, M. and Liu, X. (2019), "Supply chain management scholar's research impact: moderated mediation analysis". *Library Hi Tech*, Vol. 37 No. 1, pp.118-135. https://doi.org/10.1108/LHT-07-2017-0149

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