Summer 8-1-2017

Utilizing ResearchGate social network by Iranian engineering

Amir Reza Asnafi
Shahid Beheshti University, aasnafi@gmail.com

Maryam Rahmani MA in Knowledge and Information Scienc
University of Tehran, marahmani@ut.ac.ir

Utilizing ResearchGate social network by Iranian engineering

Maryam Rahmani, MA in Knowledge and Information Science
;University of Tehran; marahmani@ut.ac.ir

Amir Reza Asnafi, PhD in Knowledge and Information Science;
Assistant Professor; Shahid Beheshti University; a_asnafi@sbu.ac.i

Abstract

This study aimed to assess the role of Researchgate in the development of scientific- scholarly activities among Faculty Members of University of Tehran's Engineering College. This study is Survey and descriptive research and data collection tools, including profiles of researchers at the Researchgate and questionnaire. The study population included faculty members of University of Tehran's Engineering College in 2016 was 242 researcher were earned RG score. The sample 144 subjects who were selected via stratified random sampling method and the questionnaire distributed 144 questionnaires were collected and then Results were analyzed using SPSS software From the perspective of engineering researchers, the goals of "awareness of research activities and researchers pursue their research activities " and "increase the number of citations " as the most important. In addition, among seven groups Researchgate capabilities, "assessment researchers activity" and "Introduce researcher and identify other researchers" are in order from highest usefulness.

Keywords: Academic social network, Researchgate capabilities, Engineering researchers, University of Tehran's Engineering College

Introduction

Research has major role in socio-economic development and it is the main driving force of a society on the path of progress, which is known as one of the important indicators of growth. Science and technology are the products of research activities that their use in political and socio-economic activities contributes to sustainable development. Meanwhile, the university is a center for research and the research is essentially one of the main missions of universities and the most authentic and advanced research and scientific achievements throughout the world are also

originated from the universities. In addition, one of the most important tasks of faculty members in universities and higher education institutes is carrying out basic and applied research to develop the frontiers of knowledge and technology. Since our country will have no underground source of income for the future and there will be no way other than scientific research and innovation in order to survive and governance, this can be realized by faculty members as the main elements of universities (Abbott and Doucouliagos, 2004; Mazloumi et al., 2013; Hodavand, 2003; Hoseeini and Jahed, 2012).

One of the unique features of today's world is widespread human communication. The expansion of electronic communication has distinguished the modern society from earlier societies that the modern age is known as "age of communication" the modern society is referred to as "information society". In such a society, the media and mass media play a crucial role as a key element of communication. Of all new tools and techniques, the mass media has the greatest impact on culture. The media has a tremendous effect on the development of new habits, changes in beliefs, mood, and behavior, the evolution of global culture, and approaching the nations and societies. Of course, the media as well as its public welcoming are not identical in all societies and it is subject to the cultural, socioeconomic, and scientific development of each society. Mass media with its various functions is constantly interacting with the community and its surroundings. Nowadays, an intense competition has emerged in the media to attract audience. The use of audiences' satisfaction and persuasion methods and considering their needs and attitudes is essential and it is such a success tools that if it is disregarded, the opportunity is given to the rival media (Noori Moradabadi, 2012). Virtual social networks are one of the phenomena that have been formed by combining new communication technologies. Given the range of their use, they have grown and developed significantly among different communities in cyberspace. Social networks benefit from features such as without space, atemporality, being industrialized, lack of restrictions on civil law-based states and nations, simultaneous availability, new and free cultural, religious, economic, and political atmospheres (Ameli, 2009). In recent years, a number of social networks have emerged that allow the researchers to cooperate with scientists, share the results, and build professional networks. Through these networks, researchers can come together in different times and places for meeting people, and share their experiences with them. In other words, researchers have used social networks to achieve goals, including establishing their professional network, learning about co-workers, locating experiments to solve problems, and finding potential partners (Almousa, 2011).

ResearchGate is one of the free social networks for scientists and scholars, that it is considered as a Facebook for scholars (Johnson, 2012). The network was launched in 2008 and was extended by two physicists named Ijad Madisch and Sören Hofmayer and a computer expert named Horst Fickenscher. At present, the network has over eight million users. The founders of ResearchGate consider their mission to communicate with researchers, facilitate sharing, and access to the outputs of scholars' scientific, research, knowledge, and experience. They have also considered the possibilities for their network that will help researchers perform the following:

Publication sharing i.e. the network is accessible to the million researches and data dissemination; communication and collaboration with academia, i.e. coworkers, coauthors and experts in the research topic; statistical information on profile visit, obtaining articles and citations to scholars' research; questions and answers: finding solutions to research problems; and finding a good job: focusing on research jobs (ResearchGate, 2008). Bullinger et al (2010) have categorized the ResearchGate among research awareness websites. In another study, Masoud, et al (2012) introduced it as a research-oriented social network site (SNS). In a study, Harmelen (2012) also considered it as a researcher's social network. The results of Madhusudhan's study (2012) indicated that among research social networks, the ResearchGate was most commonly used among researchers for academic activities.

Achieving the first place of science and technology in the Islamic world, establishing an outstanding position in the world, and developing scientific cooperation with the prestigious international scientific centers in the areas of science and technology are the goals and ideals of Islamic Republic of Iran's 1404 vision document on the country's science and technology system. In the general policies of the development of science, technology and innovation, the development of university ranking system and promotion of faculty members have been mentioned. In the fourth chapter, in national strategies and actions for the development of science and technology to support the establishment and development of research and technology networks in order to enhance interactions and facilitate the transfer and dissemination of knowledge, establishing research networks within and outside of the country for the dissemination and exchange of knowledge and technology tailored to national priorities, and taking advantage of global opportunities and the development of researchers and faculty members' research skills and increased access to information resources are emphasized. The establishment of research management in ministries and agencies in order to determine research requirements in cooperation with scholars and specialists and referring it to the universities and academic and research centers and supporting university-industry relations are also mentioned as specific scientific and technological strategies in the field of applied science (Holistic Scientific Map, 2010). According to Batooli study (2013), themed research social network capabilities and their effectiveness on the research from the perspective of medical science scholars, researchers need to investigate the activities of engineering research is visible in the social networks, it is necessary to investigate engineering scholars' activities in research social networks. In Iran, no study has been conducted on the effect of ResearchGate on engineering scholars' research activities and it is unclear what goals are pursued by researchers to use the ResearchGate. Observing the gap in the field, this study examines the effectiveness of the ResearchGate capabilities on the development of engineering scholars' scientific-research activities

Research questions

This study seeks to answer the following questions:

1. For the realization of what goals do the engineering scholars operate in the research social network?
2. What applications do ResearchGate social network have on the development of scientific research activities in the field of engineering scholars?

Research methodology

This study has been conducted using a survey method. To determine the population by searching the names of organizations on ResearchGate, the names of Tehran University's technical campus faculties (electrical and computer engineering, mechanical engineering, civil engineering, chemical engineering, metallurgy and materials engineering, mining engineering, engineering science, surveying engineering, industrial and systems engineering, Fuman technology, and Caspian technology) have been searched. Thus, the names of ResearchGate scholars belonging to these faculties have been extracted. Among network members, 242 faculty member scholars scored RG have been selected. Using Krejcie and Morgan table, the sample size is determined to complete the questionnaire. According to this table, for a population of 242 scholars, 144 scholars are selected as sample. The sample has been determined through stratified random sampling with an equal percentage between the study population in different Technical Campus Faculties of Tehran University. After distributing the questionnaires, 144 questionnaires have been collected, and then statistical analysis has been performed using SPSS software. In this study, a researcher-made questionnaire is used. The questions are designed based on the relevant literature and the ResearchGate capabilities. Therefore, the membership objectives of scholars in ResearchGate are classified into twelve categories and the ResearchGate capabilities are grouped into twenty-seven categories.

Face validity is used to assess the validity and ten knowledge and information science specialists have confirmed the questionnaire. Cronbach's alpha coefficient is used to test reliability, which is obtained 0.96 for 30 questionnaires.

Research findings

In this study, 88.2% of respondents are men and 11.8% of them are women. In terms of age distribution, 36.8 percent are people aged 31-40 have the highest frequency percentage. Regarding education, 85.4 percent have a doctorate degree and 14.6 percent have a postdoctoral degree. In terms of academic rank, 53.5 percent people are associate professors who have the highest frequency percentage. Regarding the specialized field19.44 percent are electrical engineering scholars and 86.4 percent are computer engineering scholars who have the highest and lowest frequencies, respectively.

Table 1 reflects data related to the first question "for the realization of what goals do the engineering scholars operate in the research social network?"

Table 1- Average membership goals of ResearchGate scholars

Membership goals of ResearchGate scholars	Average
Introducing researcher, providing resume and expressing professional capabilities and expertise	3.89
Increasing visibility through search engines	3.78
Enhancing the number of citations to scholar's research works	3.91
Awareness of scholars' research activities and pursuing their research activities	4.06
Disseminating scholar's research results and publications	3.84
Search and free access to information sources (articles, books, etc)	3.58
The importance of the quality and quantity of information sources on the network	3.25
Professional activities (search for research jobs, conferences, etc.)	2.60
Communication with other scholars working in various domain of investigation	3.63
Selecting academic collaborator for research activities	2.74
Debate, discussion and exchange of views on the specialized topics	2.59
Raising the ranks of universities in international ranking systems	3.18

Results show that "awareness of scholars' research activities and pursuing their research activities" with an average of 4.06 has a high priority for engineering scholars, so that 97.2 percent of scholars evaluated the importance of this goal above average. On the other hand, "debate, discussion and exchange of views on the specialized topics" with 2.59 has the least importance, 53.5 percent of scholars evaluated its significance above average. In sum, the membership goals of ResearchGate scholars include awareness of scholars' research activities and pursuing their research activities, enhancing the number of citations to scholar's research works, introducing researcher, providing resume and expressing professional capabilities and expertise, disseminating scholar's research results and publications, increasing visibility through search engines, communication with other scholars working in various domain of investigation, Search and free access to information sources, the importance of the quality and quantity of information sources on the network, raising the ranks of universities in international ranking systems, selecting academic collaborator for research activities, professional activities, and debate, discussion and exchange of views on the specialized topics.

Table 2 reflects data related to the second question "what applications do ResearchGate social network have on the development of scientific research activities in the field of engineering scholars?"

Table 2- The average usefulness of factors associated with the ResearchGate capabilities

Mean	Factor	Mean	Capability
4.08	Identify other researchers working in scholar's investigation domain	3.75	scholar's introduction and recognition of other researchers
3.98	Introduce researcher (name, degree, field of study, academic rank, affiliation)		
3.85	Scholar's experience, research skills and fields of interest		
3.68	Observation of the scholar's associate research fellow network		
3.51	Scholar's contact information (email, workplace address, etc)		
3.40	Find followers and people followed by the scholar		
3.47	Be followed and following the network scholars	2.98	Communication, interaction and collaboration
3.10	Membership in the specialized groups of the research areas of interest		
3.05	Send e-mail and message within the network for the network member scholars		
3.02	Ask questions and answer the questions of other researchers		
2.74	Commenting on information shared by other scholars		
2.49	Create a private group and cooperate on a joint project		
3.49	Scholar's new articles automatically uploaded by the network	3.04	Self-archiving
3.34	manually upload scholar's works on the network		
2.28	Upload videos, images and other training and research files		
3.49	Search by scholar's topics of interest	3.06	Information seeking
3.44	Search by scholar's name, group name and organization name among the network members		
3.28	Search among articles and materials shared on the network		
2.99	Automatically network connection to authentic databases and search capability		
2.68	Access to information on new events (conferences, meetings, workshops, etc)		
2.46	Search by city, country and region		
3.63	Receive email notifications about latest updates	3.46	Keep scholar's up to date
3.28	Find the latest updates in scholar's homepage		
3.90	Network report on visit counts, downloads and citations to scholar works	3.79	Monitor scholars' activities
3.67	Scoring scholar and an indicator to show scholar's activity on the network		
2.65	Set the type of outgoing emails sent by the network to scholar's personal email	2.59	Network settings
	Restrict scholar's information view		

The findings of the survey on the usefulness of ResearchGate capabilities in terms of the study population have showed that "monitor scholars' activities" with an average of 3.79 has the highest usefulness. Thus, scholars assessed the " network report on visit counts, downloads and citations to scholar's works by country and organization" more beneficially than "scoring scholar and an indicator to show scholar's activity on the network". In general, the usefulness of both factors is evaluated above average. On the other hand, "network settings" with 2.59 has the lowest usefulness

and its factors "set the type of outgoing emails sent by the network to scholar's personal email" and "restrict scholar's information view" have been evaluated moderate to low.

Of 27 components of the ResearchGate capabilities, "identify other researchers working in scholar's investigation domain" (4.08) and "scholar introduction" (3.98) are of the highest the usefulness. "Upload videos, images and other training and research files" (2.28) and "search by city, country and region" (2.46) have the least usefulness. Table.2 shows the usefulness ranking of the seven groups of ResearchGate capabilities.

Discussion and conclusion

The results of data analysis show that except for "debate, discussion and exchange of views on the specialized topics, professional activities (search for research jobs, conferences, etc.), and selecting academic collaborator for research activities", other goals are statistically acceptable and are moderate to high. In their study, on the personal use of German users from social networks, Richter and Koch (2008) examined the goals of using social networks through a questionnaire. "Maintaining communication, information sharing, specialists' search, identifying individuals, and introducing them" were considered the most important goals used by German users". In his study, Madhusudhan (2012) showed that "finding materials associated with the field of specialization, finding new scholars, building relationship with familiar scholars, and disseminating materials" were the main goals of Delhi University's faculty members to use social networks. On the reasons for scholars' use of ResearchGate, Chakraborty (2012) demonstrated that 37% used this network to form investigation groups, 31% for upgrading, 24% to familiarize with other areas of research, and finally, 6% to share research activity. In Batooli's study (2013), the membership goals of social networks among medical science scholars were examined and these goals were classified into seven categories. From the viewpoint of medical science scholars, in terms of the degree of importance, the goals included introducing and sharing research works, identifying and communicating with other researchers, being informed of the research activities of other researchers, increased visibility and accessibility by search engines, communicating with familiar friends and researchers, tools for keeping an updated resume, and search and access to articles and materials in the research area of interest. Yaqhubi (2014) categorized the motivations and goals of researchers for joining the ResearchGate social network. The goals include the possibility of more and better dissemination and representation of academic activities, better communication and interaction with other researchers, easy access to articles and scientific resources, keeping up to date the scientific work of other researchers, getting feedback about the personal scientific works, raising the level of knowledge of scientific networks, curious about what is happening in these networks, overcoming the isolation of the academic settings, and personal interest in networks. The literature review in comparison with the present study shows that scholars operate in various fields with similar objectives in research social networks, and from the viewpoint of researchers, the prioritization of this goals are relatively the same.

As the scholars stated, the main objective of using ResearchGate is "awareness of scholars' research activities and pursuing their research activities"; being informed of effective and decisive

scientific activities in the specialized field of research helps the scholar identify research fronts, theories, and new research ideas. As a result, the main reason for selecting this goal is to keep up to date the researcher about the scientific-research works of other researchers (especially those who are experts and scholars in their scientific and technical fields).

In their study, Thelwall and Kousha (2015) examined the correlation scores of the effect of articles in ResearchGate and other systems, and the results indicated that there was the highest correlation between the scores of articles in ResearchGate and other systems, and the use of ResearchGate was very influential on increasing the effectiveness of articles. According to the study scholars, "enhancing the number of citations to scholar's research works" is of great importance for membership and activity in ResearchGate since the researcher allows to disseminate and represent scholars' scientific-research activities and the accessibility and visibility of their works is increased. The results of the effectiveness of ResearchGate capabilities and applications in developing and facilitating researchers' activities showed that from engineering scholars, capabilities included scholar's introduction and recognition of other researchers, communication, interaction and collaboration, self-archiving, information seeking, keeping scholars' up to date, monitoring scholars' activities, and network settings, respectively. In their study, emphasizing the research collaborations, by interviews with the founders of social networks, Bullinger et al (2010) classified the social network functions in four groups of "information management, network management and identification, communication, and cooperation". In another study, Rouhani and Ow (2011) divided the essential requirements for social networks in academic settings into four groups of "management, cooperation, reporting and integration." Almousa (2011) pointed out social network capabilities in seven categories, including "academic profiles, identifying research interests, communication, searching articles, questions, latest updates, and participation in question and answer". In Batooli's study (2013), the social-research network capabilities were categorized into eight groups. According to medical science scholars, the usefulness of capabilities included evaluation of scholar's activity, scholar's introduction and recognition of other researchers, keeping scholars' up to date, information seeking self-archiving, communication, interaction and collaboration, resource and citation management, and network settings, respectively. In Yaqhubi study (2014), the ResearchGate social networking features that are more important in view of researchers include "communication and interaction in a national and international level, the rapid dissemination of scientific activities without having to arbitration, the removal of constraints of time and place for academic works, sharing articles and experiences, fast and easy updating, the possibility of asking questions of leading researchers, quick and easy access to scientific resources, automated profile updates by the network, high user community, the ease of network use, searching scholars by disciplines and institutions, and receiving remarkable feedbacks". The usefulness of Research-Gate capabilities, which were extracted using literature review and Research-Gate website, indicated that these capabilities affected on achieving scholars' research goals.

As mentioned, of seven ResearchGate capabilities, the usefulness of "the assessment of scholars' activities" was in the first place in view of researchers. This capability is handled automatically by

ResearchGate. Therefore, the statistic provided by ResearchGate through viewing, citing, and downloading scholar' works as well as a RG score that network assigns the researchers is considered as a stimulating factor of more activity and presence of researcher in the network. One of the most important capabilities of ResearchGate as a profile-based social network was "scholar's introduction and recognition of other researchers", which was in the second place from the viewpoint of engineering scholars. Since the recognition of right people for academic interaction and cooperation is very important for most researchers, the ResearchGate allows the researcher to recognize scholars with common interests and areas of expertise. Most ResearchGate activities are managed by user profile information. The nature of profile in this network is research-driven. Thus, with a research profile in ResearchGate and keeping the profile up to date, the scholars can use it as a means of introducing their research skills and experience to the academic community. Meanwhile, the ResearchGate network has high visibility in search engines and it serves as one of the best tools to introduce researchers. If the profile information of network members is complete, the information can be used to identify researchers with a common field of activity and expertise. Thus, the main use of this capability is to detect other researchers and scholars can develop their communication and academic cooperation through it. While scholar's profile information conforms to other researchers' profile information, the ResearchGate identifies people working in scholar's research area and introduces him. In addition, the ResearchGate provides users with researcher interaction with other researchers, including co-investigator network, researcher's followers, and people followed by the researcher so that user is aware of research areas shared between them and consequently identifies other people working in that field.

"Keeping researchers' up to date" was in third place in scholars' view. This capability is also done automatically by the ResearchGate. If the introduction of researcher's skills, experiences, and interests is more complete and the researcher uploads more research works and establishes more communication with other researchers, the ResearchGate will also provide more comprehensive update. With an increase in uploaded works, asking questions, answering questions, and number of followed researchers, the scholar's RG score is also increased. Bullinger et al (2010) categorized the ResearchGate among research awareness websites and they proposed this capability as keeping researcher's up to date regarding network news and his research area. Due to the numerous concerns of academic and research affairs, scholars welcome information about the latest updates and news about researchers' activities and topics in ResearchGate because they are aware of news and information related to research activities without having to log onto the network. In view of researchers, "information seeking" was in the fourth place. Rouhani and Ow (2011) introduced the semantic search as one of critical capabilities of ResearchGate. Thus, ResearchGate has made it possible to simultaneously search in major databases, including Pubmed, Arxiv, Pubmed Central, IEEE, RePEc, Citeseer, NASA Library, and Directory of Open Access Journals. In addition, the subject search between articles and publications shared on the network has also accelerated the easy access to information resources required by researchers. Therefore, it is likely that limitations and problems facing researchers to access database and information resources within the country is the reason for the emphasis of using ResearchGate network for access to information resources.

The role of ResearchGate has been highlighted in providing information resources needed for researchers. The self-archiving provided by the ResearchGate was in the fifth ranking. Through this capability, the researchers are able to enter the bibliographic information of their scientific-research works, including books, articles, theses, videos, speeches, training documents, resumes, websites, blogs, research files, etc. into their profiles. As already noted, due to the lack of opportunity, scholars often welcome "scholar's new articles automatically uploaded by the network."

In sum, in view of engineering scholars, the average usefulness of seven social-research network capabilities of ResearchGate in the development of research activities were evaluated above average. Therefore, it could be concluded that ResearchGate had a significant role in the support of engineering scholars' scientific-research activities.

References

Ameli, Saeedreza (2009). *Virtual scientific networks*, Tehran: Center for Social and Cultural Studies. [In Persian]

Batooli, Zahra (2013). I*dentification and evaluation of the usefulness of the research social networking capabilities from the viewpoint of medical science scholars*, MA thesis, Tehran University, Tehran. [In Persian]

Hadavand, Saeed. (2003). Obstacles to Iranian scientific development, *Journal of Science Policy and Research*, 1 (1), 61-74

Holistic Scientific Map (2010), Retrieved September 14 2015, http://www.iranculture.org/UserFiles/1.pdf

Hosseini Shavon, Amin; Jahed, Hosseinali (2012). Identifying barriers to research activities from the viewpoint of faculty members of Tabriz University, *Science and Technology Policy*, 4 (4), 49-64

Mazloumi Mahmudabad, Saeed; Hosseini, Poria, Abbasi Shavazi, Masoumeh; Mirzaee Alavijeh, Mahdi (2013). The viewpoints of Yazd Shahid Sadoughi University of Medical Science's students on barriers to research activities during training in university., *Journal of Education Development in Medical Science*, 6 (10), 63-70.

Noori Moradabadi, Younes (2012). *The attitude of the students of Tehran University towards the Facebook social network and its related factors (comparative analysis of the views of media experts and Facebook users)*, Master's thesis, Tehran University, Tehran. [In Persian]

Yaqhubi Malal, Nima (2014). *Scholars' information incentives and interactions on professional ResearchGate*, Master's thesis, University of Al-Khwarizmi, Tehran. [In Persian]

Thelwall, M., Kousha, K. (2015). Researchgate: Desseminating, communicating and measurinig scholars?. *Journal of the American Society for Information Science and Technology*, 66 (5), 876–889.