Revista Latina de Comunicación Social # 069 – Pages 571 to 592
Funded Research | DOI: 10.4185/RLCS-2014-1025en | ISSN 1138-5820 | Year 2014

How to cite this article in bibliographies / References

F Campos Freire, D Rivera Rogel, C Rodríguez (2014): "Presence and impact of Andean universities in online social networks". *Revista Latina de Comunicación Social*, 69, pp. 571 to 592.
http://www.revistalatinacs.org/069/paper/1025_USC/28en.html
DOI: 10.4185/RLCS-2014-1025en

Presence and impact of Andean universities in online social networks

Francisco Campos Freire [CV] [] [] Professor of Journalism. Universidad de Santiago (Spain) / francisco.campos@usc.es

Diana Rivera Rogel [CV] [] [] Director of the Communication Department of the Universidad Técnica Particular de Loja (Ecuador) / derivera@utpl.edu.ec

Claudia Rodríguez [CV] [] [] Universidad Técnica Particular de Loja (Ecuador) / cvrodriguezx@utpl.edu.ec

Abstract
Introduction. This research study examines the presence and impact of the 165 universities that are part of the four Andean countries (Colombia, Peru, Ecuador and Bolivia) on the most important online research networks (Researchgate.net and Academia.edu), in order to establish the degree of use and penetration of these new tools that enable scientific communication, collaboration and interaction, and incorporate alternative scientific reputation evaluation systems that expand the traditional the visible and invisible colleges of science. **Method.** The study is based on quantitative and qualitative research techniques and social networks analysis (SNA). **Results.** The presence and impact of the Andean universities in the online research networks is heterogeneous, but generally emerging and growing, and still divergent in terms of reputation in comparison to the results achieved in other international university rankings of long-standing tradition. **Discussion and conclusions.** The online research networks and their techno-social tools (Web 2.0 and 3.0) are convergent digital ecosystems of software services, repositories and open and networked communication platforms that allow researchers: to share their academic and professional profile within a specific area of knowledge dissemination and exchange; to create lists of users related within one or more scientific disciplines in order to be able to monitor them, and share information contacts, projects, documents, notes, collaborations and research studies with them; to create scientific networks; to access and download references and scientific works available online; and to

calculate and monitor the qualitative and quantitative value (scientific social capital), popularity and impact of their own and others' citations, interactions and publications. The results of the metrics used by these new research networks are moderately similar to those provided by the major university and scientific evaluation systems, but are still inadequate to measure research institutions in developing non-Anglo-Saxon countries. The challenge of the universities from developing countries and the new online research networks –launched after 2007-- is to manage the efficiency and recognition of their scientific reputation.

Keywords
Online research networks; social capital; rankings; reputation; scientific collaboration; invisible colleges.

Contents
1. Introduction. 2. Object of study. 3. Hypotheses. 4. Method. 4.1 Methodological strategies and procedures. 4.2. Population and sample. 5. Results. 6. The opinion of experts. 7. Verification of hypotheses and conclusions. 8. List of references.

Translation by **CA Martínez Arcos**, Ph.D. (Universidad Autónoma de Tamaulipas).

1. Introduction

Throughout history, the dissemination of scientific knowledge has gone through different phases and has incorporated the uses and new technologies of each era, from the peripatetic school of Aristotle to the invention of printing press and the digital revolution, characterised by the search engines and the semantic intelligence of our contemporary world, just to mention a few well-known landmarks.

Around these and other important knowledge-transmission trends, formal and informal networks are also articulated, in the form of schools, colleges, universities, publications, books, journals, publishers, societies, conferences and congresses. As shown by Derek J. de Solla Price (1986), the emergence of the printing press and books paved the way for the emergence of scientific societies and journals, represented by the Royal Society of London (1660) with its *Philosophical Transactions* (1665), and the French *Journal des Savans* (1666).

Scientific journals acquired equal and even greater strength and prestige than books, from the 17th to the 20th century, as visible communication and reputation vehicles for science, and were articulated and reinforced with the prestige of the collaborating authors and the networks of citations consolidated by the research of Eugene Garfield, founder of the Institute of Scientific Information (ISI) in Philadelphia.

The law of Bradford (which estimates exponentially diminishing returns of extending a search for references in scientific literature) and the law of Garfield (on the dissemination of scientific knowledge) were used to articulate large databases of scientific literature (WOK and Scopus, among others) and reference and citations indexes that serve as indicators of scientific reputation and intellectual capital, of both researchers and the institutions they belong to.

Internet multiplied the rules of competition and Google changed the paradigm of the scientific metrics (De Pablos, Mateos and Túñez, 2013) by introducing on the field of play the impact and productivity index (H-index), proposed by Hirsch in 2005 (Túñez, 2013). After this sequel of scientific production metrics, classifications and rankings were formulated, including the rankings of the scientific production and reputation of journals, publishers and universities.

Global rankings of universities (ARWU, Times Higher Education, QS Top University, World's Best Universities, Global Universities, Leiden Ranking, Webometrics Ranking of World Universities, the Financial Times' rankings) emerged in 2003 and 2004 causing major challenges for higher education institutions (Goméz and Puente, 2013), which used them as self-promotion when they turned out to be positive and hide them when they were negative. These rankings are based on various criteria: scientific production in the highest-rated journals, Nobel Prize-winning professors and students, highly-cited researchers, the possession of at least 500 publications in the last five years, surveys of reputation on limited numbers of universities, teacher-students ratios, etc.

There are also many other local rankings, including *The Guardian*'s in the United Kingdom, *El Mundo's* and the BBVA Foundation's in Spain, the QS in Latin America, the RUF of Folha in Brazil, the National Accreditation Commission of Chile, the ICFES's in Colombia, the CEAACES's in Ecuador, the América Economía's in Perú, the Ranking Iberoamericano SIR, etc. In 2011 the European University Association (www.eua.be) analysed the main university rankings and updated them in 2013. Meanwhile, in 2004 UNESCO created the International Ranking Expert Group (IREG) for the consecutive assessment of the quality of these indicators.

All those systems of knowledge and research dissemination, transmission and evaluation represent the so-called visible colleges of science but there are also other more informal or less institutional forms that are known as the invisible colleges, a concept that emerged within the scientific and secret societies of the 17th century and was rescued in 1963 by De Solla Price (1973).

Sociologist Diane Crane (1969 and 1972) has characterised the invisible colleges as non-institutionalised informal networks of knowledge exchange between scientists, related -but not exactly synchronised- with the epistemic or practice communities (Haas, 1992; and Wenger, 1998, respectively). Caroline S. Wagner (2009) applied the concept of invisible college to the global network of communications between scientists.

Digital networks are part of the essence of the visible and invisible colleges because they are a communication channel and a system of articulation of relations and interactions among scientists. The conceptualisation, theorisation and contextualisation of social networks requires us to go back to the origins of the structural organisation of society, through sociology, anthropology, social psychology, history and other experimental, traditional or new sciences, such as mathematics, physics, computer science, communication and neurology. The study, research and analysis of networks, be they face-to-face or virtual, requires of scientific interdisciplinarity in order to understand the size and breadth of the social and communication relations established through them.

Social networks and relations are as old as mankind but have acquired a new organisational, social, cultural and political dimension in the techno-social environment of the digital age (Rheingold, 2004). Networks are structures of social relations that connect the elements or agents of society (individuals or organisations) through links or ties that can be represented by lines and nodes,

respectively. Emmanuel Lazega (1998) has defined the social network as a set of specific relationships between certain actors who share a culture and rules.

For Castells (2009: 45-47), a network is a set of interconnected nodes that are articulated to form the backbone of societies. They are sets of social actors linked together through social relationships, which can be represented –based on graph theory- through points or nodes, which are the actors, and lines that reflect the links that connect them (García-Valdecasas, 2011). Each relation is equal to a different network (Tello and De la Peña, 2013).

British anthropologist John Barnes (1954) is known to be the first to use the concept of social network, but the scientific origins of sociology, of the systems of social relationships, interactions and structures date back to the transition from the late 19th century and early 20th century, with Saint Simon, Comte, Durkheim, Spencer, Cooley and Simmel (Requena, 2003; Mattelart, 2007; Freeman, 2012).

Linton C. Freeman (2012) has identified four historical stages in the development of the study of social networks: a) the prehistory, from the 19th century to late 1929 (the forefathers of sociology); b) the 1930s (Jacob Moreno and social psychology); c) the 1940-1960s period (anthropology, mathematics and interconnections with Milgram's psychology); and d) the period after 1970s. Freeman places the focus of the theory and analysis of networks on four aspects: a) the intuitive notion that the sociability relationships of persons and/or organisations have important social consequences; b) the foundation on the basis of systematic empirical information; c) the use of graphic images for a better representation; and d) the use of mathematical or computer models.

Since the end of the 1970s, the theory and analysis of social networks were consolidated with the contribution and support of several social and experimental sciences, on one side, and the exchange of research among different universities from around the world. In 1977, Barry Welman promoted the creation of the International Network for Social Network Analysis (INSNA). Also in 1977, Freeman and Welman implemented an Electronic Information Exchange System (EIES), the first project to create a virtual community and a scientific digital network.

Jorn Barger, the creator of the first web-blog (*Robot Wisdom*), and Dave Winer, who pioneered the syndication of contents (Nafría, 2007), opened the door of the social media through the revolution of blogs and social networks. The first version of MySpace was created in 1999 and it survived until 2001 as a file exchange system, and was recovered later as a social network by Tim Anderson and Chris DeWolfe in 2003.

In 2001, the project to create the free encyclopaedia that anyone can edit, Wikipedia, was launched and, as Patrice Flichy (2010) points out, the amateur rised as an expert, not as intrusive or substitute, but as a new actor who tries to make knowledge more open, participatory and democratic, even though this may involve continuous and subsequent online corrections. The English term "Social Media" began to become popular and translated as "medios sociales" and "productos de software social" in the Spanish-speaking world.

This new creative, innovative, collaborative and participative culture emerged from the Web 2.0 with Creative Commons, social computing, free software, open access, open source, wikisource, online communities, wikinomics, microblogging, prosumer, crowdsourcing, crowdfunding, networking,

collective intelligence, membership economy, and new consumption, production and business models (Tapscott and Williams, 2007; Gutiérrez-Rubí and Freire, 2013). These labels of the industrial ideology sneaked into the common language to encourage the social practice or to seek new economic dynamics and business reorganising models (Benghozzi, 2011: 32).

Although the first online information-exchange networks emerged almost at the same time the Internet emerged (*Bulletin Board Systems* in 1978 and *The Well* in 1985, according to Balagué and Fayon, 2012), it was in 2003 when the so-called social networks began to be developed (Friendster, Tribe.net, Meetup, Facebook and Flickr in 2004, YouTube in 2005 and Twitter in 2006), ranging from small online communities to mass, popular, general-interest or thematic, global or local, communication structures.

Online virtual communities emerged before the social media and the social network sites (Rheingold, 1993, 2000) and are, in fact, somewhat different to the later due to the identity of their ties, the sense of belonging, feelings, values, common practices, memberships and objectives (Proulx, 2009).

The name of social media and networks, whose popularity grew faster than the research about them, continues to raise epistemological reservations (Stenger and Coutant, 2011). This type of communication structures, connected and powered by the Internet (Castells, 2009: 45), are social networks that need to be described as digital or online because their connections are established through information technologies. They are also called virtual networks (in order to be differentiated from the face-to-face networks and by association the online communities), socio-digital networks, communication platforms and social media, social networks and social networking sites.

Other authors (Surowiecki, 2005) highlight the importance of this new interaction between computational systems and social behaviour, between collective intelligence and the engineering of social ties (Levy, 2004). In response to those who see the use of these new technologies as the paradise or de-socialisation of a new reality, Antonio Casilli (2010: 327-330) reminds us that when analysing the relation between the real and the virtual it is a mistake to separate the social practices and computer use or to think that the Internet is a space (cyberspace) that transcends our reality.

The most-cited definition since 2007 is the one formulated by Danah Boyd and Nicole Ellison. This first definition of Boyd and Ellison (2007) describes the Social Network Sites as web services that allow users: (1) to build a public or semi-public profile in the heart of the computer system; (2) to generate a list of users with whom a link can be shared; and (3) to see and browse the list of the links established in the system by the user and by others. Boyd and Ellison later expanded and contextualised more this definition.

According to these researchers (Ellison and Boyd, 2013), a social network site is a networked communication platform that allow participants: (1) to have profiles that are associated with a unique identity and are created by a combination of contents produced by the user, its friends and the systemic data; (2) to publicly expose the relations that can be viewed and consulted by others; and (3) to access the flows of content (combinations of texts, photos, videos, data, and new links) generated by users and their contacts through the web sites. It should be noted that both definitions clarify the concept of network and for that they use the terms “web services sites” and then communication platforms.

Based on the ideas of Ellison and Boyd, Thomas Stenger (2009), of the University of Poitiers, has described the social networks as web-based services that allow people to: (1) build a public or semi-public profile within a limited system; (2) articulate a list of other users to share a connection with; (3) view and navigate through their list of links, and the link set by others within the system; (4) taking into account that the nature and nomenclature of these connections may vary from one place to another; and focusing the attention mainly on the first three points and not on any other particular activity. Thus, Stenger differentiates the digital networks of the traditional media and the online communities.

Alain Degenne (2011: 39) points out that the social networks are tools of mediation, relation and interaction, via the Internet and the telephone, between people and organisations. For Duncan J. Watts (2011: 15), the science of networks is part of the current "age of connectivity" in "simple representations of extremely complex phenomena". According to Rheingold (2004), "this is a new form of social, cultural and political organisation in the making".

This is what Castells (2009: 20) defines as "a networked society whose social structure is composed of networks powered by digital information and communication microelectronics-based technologies". For Pierre-Jean Benghozi (2011: 32), networks are a laboratory of various forms of organisation, of a new hybrid economy, of an innovative architecture of relations, of different business models, which in several cases also disrupt the traditional industries.

Social networks research and analysis focus in various objects of study. Two of them, related to the social capital and knowledge, are extremely important to understand the value of social, economic and civic relations. They provide variables that measure social collaboration, strengthen reputation, back up the theory of the cost-benefit exchange (Requena, 2012) and generate the intangible added value that is indispensable for a new organisational architecture and the hybridisation of the innovative models of the economy of attention, partnership, affiliation and social intelligence.

Substantially, social capital is the representation of the relational dimension of sociability, which is currently developed –to varying degrees– in both face-to-face relationships and digital interactions. This has been widely studied by Bourdieu (1986, 1993), Coleman (1990), Putnam (1993), Burt (1992), Granowetter (1974), Lin (2001), Benghozi (2011) and others. Granowetter introduced the idea of the weak relationships as a source of social capital while Burt introduced the paradigm of structural holes, or non-redundant contacts which give more power and influence to the nodes needed to establish network connections.

Social networks can be classified as direct and indirect. The first are those (of general-interest) in which there is a collaboration between the groups of people who share some common interests and interact bi-directionally, in apparent equality of conditions, through profiles (with certain degrees of privacy) which manage their personal information and the relationship with other users.

Indirect networks (virtual forums and communities), the precursors of the direct networks, are more hierarchical and less bi-directional, although they tend to have an identity profile that is recognisable by the rest of the community, and a person or group that moderates and directs the discussions on specific topics or information.

Direct networks can be horizontal or general (Facebook, YouTube, Hi5, Sonico, MySpace, Tuenti) and vertical or specialised according to themes (professional, cultural identity, business, hobbies, travel and other subjects), activities (microblogging, games, geolocation or geo-referencing, social bookmarking and objects-sharing) or shared content (pictures, videos, documents, slides, news, readings or science). They can also be classified according to the characteristics of their relationships: directed (bi-directional) and non-directed (mutual relations and interactivity); explicit (the relationship is defines) and implicit (the type of relationship is inferred from behaviour).

General-interest social networks are also useful for the dissemination and communication of science, as transmitters from many to many, for little focused and specialised public masses. However, these networks also enable high portability and virality of the direct communication of science in real time with mainstream audiences, as documented by Gago, Toural and López García (2014). Nonetheless, according to some experts, although Facebook-like general-interest networks are mainly self-projecting. They allow people to connect, share, entertain, relax, organise, express themselves, create a brand, monitor and learn (Aldawani, 2014). They also allow the creation of thematic groups (in Facebook and LinkedIn) and academic communities (in Google+).

These thematic groups include the communication researchers' group created in LinkedIn (http://www.linkedin.com/groups?gid=7483586), whose members are part of the network initiative Investicom.recinet.org, promoted from Colombia by Raymond Colle, who by 21 March, 2014, had registered 25 and addressed the areas of online journalism, knowledge and learning technologies, corporate and business communication, crisis communication in the society 2.0, cultural policy and global networks.

2. Object of study

The objective of this research study, which is part of a broader study on social networks, funded by the Prometheus Project of the Ministry of Higher Education, Science, Technology and Innovation (SENESCYT) [1] of Ecuador, is to analyse the penetration, use and impact of digital scientific networks in Andean universities. Direct and indirect networks (open thematic networks and closed groups and communities, respectively) also coexist in the field of science and research, feeding the visible and invisible colleges of knowledge dissemination. The work presented in this article is primarily based on Researchgate.net but also takes into account it relations with Academia.edu and Mendeley.com, its two main competitors.

The new scientific networks -which are direct, vertical and specialised- are broader, more reciprocal and interactive than the indirect networks, and can be classified by theme, activity and the content that motivates the participation, the collaboration and the open dissemination of research and knowledge. Its social capital is much broader due to the dissemination potential of its external link, as emphasised by the paradigm of Granowetter (1974).

While the 1990s offered specialised exchanging data networks and closed virtual communities (related groups with common identities, affiliations, and interests), the first decade of the 21st century has provided open digital network sites, which involve more than computer-mediated networking activities and communication because they articulate virtual social relationships (Web 2.0) over a system that recognizes and interconnects (public or semi-public) profiles, friends, comments, links, searches for knowledge, citations, reputation, popularity and content of all kinds.

The online metadata processing and networking activities allow the computer system and its search engines to increase the possibilities of these networks. These new online reticulated structures and social media allow the articulation of collaboration ecosystems with ambitious capacities, skills and ways of thinking (Tapscott, 2007: 401).

The scientific, innovative and business excitement that has taken place in the last two years around the concept Big Data anticipates the technological and social leap that is occurring from the management of communication (Web 2.0) to the use of the semantic information (Web 3.0, metadata interpretation) through artificial-intelligence tools and applications. This is a technological leap with a whole range of possibilities and risks. Debate on open and citizen science (Charvolin, 2007, and Flichy, 2010), the collaboration between experts and "amateurs", and the relations between artificial intelligence and science 2.0 and 3.0, are also the focus of the scientific research.

The confrontation and controversy on blind peer review and the slow publication rate of scientific journals in comparison to digital networks is red hot. In 2012, the founder of Academia.edu, Richard Price, questioned the efficiency of scientific journals –their corporate spirit and slowness to dissemination scientific advances- and proposed new more open and transparent models to evaluate online scientific reputation through "crowdreview" and "socialreview". In 2013, Prize Nobel winner Randy Schekman joined the critics of the journals Cell, Science and Nature. In 2014, Researchgate highlighted the online arguments of a Chinese scientist who disproved the validity of a Japanese discovery on stem cells published in Nature.

The prestigious journals counterattacked by publishing the study of another Professor, Cyril Labbé, of the Joseph Fourier University (France), who discovered that between 2008 and 2013 another German magazine had published 120 supposedly scientific articles, which were in fact fake articles generated by computer robots. These articles were allegedly generated with a software tool called SCIgen, which was created as a kind of joke in 2005 by a group of researchers from Cambridge-MIT (United States). If verification of sources is essential in journalism, it should be twice as important in science.

There are already many specialised networks dedicated to science and research that compete for the affiliation of researchers and the collection of their scientific production. These include Mendeley (2007), Academia.edu (2008), ResearchGate (2008), Frontiers (2012), Cosis.net, Methodspace (part of Sage Publications), Quandl (2011, scientific search engine), Scivee (dedicated to share scientific videos), ScienceStage (multimedia social network), Biomedex (medical software and information management tools), Doc2Doc (forums and medical communities), CiteUlike (dedicated to manage and share academic references and citations), Scilogs (Nature's blogs), Google+, SSRN, My Science Work, ArXiv and Quarzy. Some of these specialised networks emerged as repositories of documents and articles drafts and class notes (ArXiv is managed by Cornell University) and gradually became digital networking sites.

The main scientific social networks (Researchgate, Academy and Mendeley) have over one hundred million online documents and ten million visitors per month. Mendeley is one of the oldest and most powerful networks in terms of its document management software, but is not the fastest growing. It allows document sharing, online collaboration, references management, automatic document

archival, the management of personal libraries, the creation of thematic discussion groups, and viewing the number of times documents have been read.

In 2014, Academia.edu reached seven million affiliated researchers, many more millions of regular visits as well as millions of documents available for free access. It allows users to create their own tracking profile based on the academic and research curriculum, and to follow other researchers; to upload their own publications and to daily monitor the publications of their peers and colleagues from related areas; and to view a geo-located ranking of monthly visits to their publications and the publication of other users.

The Academia.edu profile is more general and less specialised in terms of the areas of affiliation of researchers, but attracts more scholars from the social sciences and the Ibero-American area than other networks. It is very simple in its management and popular due to its *page Rank* in Google searches, of which constant geo-located information is constantly sent to the email of each researcher.

Researchgate (RG) also has more than three million researchers and 15 millions of documents, predominantly from the fields of medicine and biology, with more than 600,000 and 500,000 researchers, respectively, and 17 and 12 million documents, respectively. In 2013, RG had 83,220 social sciences researchers and 19,684 followers in its social networks. These data were obtained from its official website in November 2013.

RG has added an online collaborative tool based on open-ended questions, by way of chat, so that the scientific community can instantly collaborate on a topic under study, which is based on the dynamics of the forums and discussion groups. It also produces a ranking for each of its affiliated researchers, by linking the scientific reputation of its publications with the online interaction of its research works and profile with the social scientific community as well as the influence of its members. Based on the individual reputation of researchers, Researchgate calculates the RG Score of each of the universities, their impact and position in the world, continental and national rankings.

Mendeley, based in London, was created by German PhD students, but was quickly supported by active innovation entrepreneurs such as the former Chairman of Last.fm, Skype engineers, the former head of strategy at Warner Music and academics from Johns Hopkins University. In 2013, Mendeley was acquired by the Elsevier Group, the Dutch academic publishing company which publishes medical and scientific journals and owns Scopus, the largest database of peer-reviewed literature. Academia.edu was founded in 2008 by Richard Price and backed by venture capital firms such as Venture, Spart and the creator of Lastminute, Brent Hoberman, among others. Researchgate was also launched in 2008 from Boston (although it was later moved to its current location in Berlin), by Doctor Ijad Madisch and the computer scientists Sören Hofmayer and Horst Fickenscher, with the financial backing of Bill Gates, among others.

3. Hypotheses

The presence of researchers from leading Andean universities in digital scientific networks is growing but its impact on reputation is still low due to the deficiencies, in general, of the research policies; the geostrategic weakness with respect to the Anglo Saxon systems of scientific publication,

recognition and reputation-evaluation; and the lack of institutionalised strategies to promote and stimulate participation.

The nature of the interaction between Andean researchers and academics in the digital networks is more individual and informal rather than institutional and, therefore, is more of an invisible rather than visible college initiative. Universities, as institutions, currently pay more attention to the general-interest social networks (Facebook, Twitter and YouTube) and give priority to the management of the communication with its main interest group and major clients (students) to the detriment of the valuation of the scientific and intellectual capital of research.

In summary, the two hypotheses that guide the study are:
H1: The presence of Andean universities on social networks is growing but this is not increasing their research/scientific reputation.
H2: Andean universities prioritise their management of general-interest social networks over the use of scientific networks

4. Method

4.1. Methodological strategies and procedures

This case study of Researchgate.net examines the penetration, incorporation and affiliation of researchers from each of the universities that exist in the four Andean countries to this scientific digital network as well as the Andean universities' reputation index, impact, and their ranking in the world and South America, depending on the activity generated and registered by their faculty in this social technology platform.

This research is based on quantitative and qualitative methods, and guided by the theory and system of social network analysis. We reviewed the catalogues of public and private universities of the four Andean countries as well as their respective systems of categorisation, which are not homogeneous but we have tried to integrate into a single analysis sheet model, which included the name of the university, its category (if it corresponds to a country with such a classification), its public or private character, foundation year, number of faculty and students, members in Researchgate, scientific reputation RG Score, total impact, position in the ranking of the world's and South American universities based on their RG indicators.

In order to verify the global management strategy of the Andean universities in relation to the social networks -mainly general networks, because the scientific networks are the direct result of the individual initiative of researchers- we analysed a sample of 20 university institutions in each country, particularly those with the highest rankings in Researchgate. The research study analysed 165 universities, but due to space limitations only 80 universities were included in the tables presented in this article. The objective was to measure the penetration of the general social networks in Andean universities.

We also reviewed the main global, continental and local university rankings and the institutional evaluation and categorisation systems. To balance this case study, based on Researchgate, we also took into account other recent research studies (Thelwall and Kousha, 2013 and 2014) on these universities' metrics and their researchers' use of Academia.edu and other new scientific digital networks. And finally, we consulted the opinion of experts to compare the results.

It is important to note that the total impact indicator of Researchgate sums up the points gained by all the publications attributed to the researchers of each university. The RG Score is the impact and popularity index, based on the impact of the publications and their reception (popularity of interaction) by the network's scientific community.

4.2. Population and sample

The observation of the presence and impact of the universities of the four Andean countries on the digital social network Researchgate.net is based on a universe of 165 university institutions. The analysis of the presence in the general social networks is based on the 20 universities with the highest RG score in each Andean country, which gives us a total sample of 80 university institutions. The observation was carried out in two stages: the analysis of the presence in scientific networks was conducted in the first half of 2014 (from February to May), and the quantification of the presence in the general networks was carried out in the beginning of July 2014.

In the last week of February 2014 (when the observation and analysis were carried out), the digital social network Researchgate.net had as members a total of 20,250 professors and researchers from the universities of the four Andean countries under study. Of these academics affiliated to RG, 13,682 were employed by the universities of Colombia; 3,967 by the universities of Peru; 2,142 by the universities of Ecuador; and 459 by the universities of Bolivia. Together, the four Andean countries had a total faculty of more than 107,100 academics and a student body of almost two million.

5. Results

The socio-demographic and economic-development differences of the Andean countries are also reflected in the penetration of both general and scientific, social networks in the universities of Colombia, Peru, Ecuador and Bolivia. In the Andean countries the scientific network Researchgate has more penetration in the areas of natural sciences and medicine than in the social sciences and humanities, which reflects the global trend of affiliation.

Academia.edu is more visible and present in the social sciences, also in these Latin American countries. The penetration of Researchgate in the national university faculty of the Andean countries reaches 50% in Colombia; only 10% in Peru and Ecuador; and under 5% in Bolivia. So with the exception of Colombia, the penetration of Researchgate in the Andean countries remains low.

Table 1. Networks of the universities of Colombia and Peru

University	RG Impact points	RG Score	RG members	Facebook followers	Twitter followers	Google+ followers	Videos on YouTube		N. of networks
							Videos	Views	
COLOMBIA									
Antioquía	2,796.16	2,698.16	732	121,540	102,000	78	2,849	1,810,180	6
U Nacional	1,863.91	4,863.91	4,077	28,390	134,000	37	733	381,673	6
U Andes	1,493.10	1,561.34	942	29,010	43,100	799	708	708,913	6
U Valle	969.16	1,247.39	673	42,637	3,931	7	15	2,953	5
Javeriana	663.89	1,331.48	865	16,264	43,800	32	309	347,184	5
Cartagena	642.02	468.26	149	12,843	7,936	149	256	38,973	6
U Industrial Santander	498.89	998.83	497	27,800	30,600	43	717	607,823	5
Del Rosario	489.22	664.87	322	19,475	25,300	30	310	170,922	5
Pamplona	462.82	89.29	53	22,198	16,000	59	316	260,939	4

El Bosque	151.61	263.86	246	10,359	5,847	11	59	27,706	4
Del Cauca	162.97	283.26	278	7,191	10,300	52	17	30,211	4
U CES	143.23	154.74	67	11,951	7,090	182	291	320,601	5
Pontificia Bolivariana	141.29	361.92	261	3,761	27,800	183	821	174,385	5
Militar Nueva Granada	129.28	214.41	217	6,205	5,050	7	101	10,820	4
Autónoma de Bucaramanga	108.88	124.28	205	12,050	8,255	14	18	26,795	5
La Sabana	108.02	326.65	258	22,741	24,000	15	171	181,137	4
Tecnológica Pereira	97.75	323.52	259	23,313	17,600	884	566	246,250	5
Del Quindio	93.89	163.58	125	6,785	123				2
U ICESI	70.90	138.23	118	16,650	14,200	347	438	2,341	8
U Norte	69.26	402.12	521	70,229	28,100	179	866	212,361	4
EAFIT	66.50	266.93	265	18,860	50,800		644	219,850	5
De Tolima	59.98	208.91	124	11,796	924		30	8,216	4
Medellín	52.40	43.39	42	8,375	1,329				3
Córdoba	45.94	153.50	84	4,958	468	702			
PERU									
Cayetano Heredia	2,817.27	2,232.14	637	89,371	3,765	29	5	1,904	6
Nacional Mayor San Marcos	520.85	553	626	185,316	18,100	370	1,091	248,134	6
Pontificia	169.01	668	786	281,482	157,000	1,091	780	2,102,708	5
Nacional Agraria La Molina	130.68	196.08	300	8,604	2,700	9	65	318,849	6
San Antonio Abad Cusco	46.75	11.53	26	10,500	282		2	1,267	4
U Científica del Sur	42.30	52.37	19	45,689	1,076	26	120	66,937	7
U N Trujillo	36.64	48.01	71	34,293	2,102				3
Nacional de Ingeniería	32.81	83.80	162	50,479	991	60	81	206,528	5
Ciencias Aplicadas	32.04	175.36	217	91,505	18,000	59	323	6,785,913	6
Nacional de San Agustín	21.34	75.52	111	27,995			131	89,810	3
San Martín de Porres	20.07	139.09	118	61,389	7,383	29	119	2,072,501	6
U Ricardo Palma	14.32	14.29	34	6,196	349		28	7,136	5
Nacional del Altiplano	10.54	8.03	12	4,729	663				3
San Ignacio de Loyola	9.72	0.61	10	66,316	19,000		37	37372	5
Nacional Piura	9.58	3.55	10	17,963					3
Nacional de Cajamarca	8.79	36.57	27	17,684	473	113			4
Católica de Santa María	7.03	34.89	30	19,059		172	35	48,031	4
Nacional Federico Villareal	6.26	29.77	32	33,409					2
Peruana C. Informática	5.68	0.36	1	8,093		10	35	48,031	4
U de Lima	4.82	13.59	111,947	11,400	1,130		44	71,247	6

Source: Authors' own creation based on the analysis of the general and scientific social network sties

Colombian universities show a fairly homogeneous strategy on the use of the general networks, mainly Facebook, Twitter and YouTube. These three networks have the largest number of followers or viewed videos among Colombian universities. This is not the case in the universities of Peru,

Ecuador and Bolivia where Facebook beats the microblogging social network, Twitter, as the preferred network.

Table 2. Networks of the universities of Ecuador and Bolivia

University	RG Impact points	RG Score	RG members	Facebook followers	Twitter followers	Google+ followers	Videos and views on YouTube		N. of networks
ECUADOR									
Pontificia	263.41	390.36	189	38,178	8,020	139			5
U Central	141.98	275.77	82	19,884	170	213			3
San Francisco	141.76	385.65	181	500,793	50,700	77	117	108,326	7
U de Cuenca	95.34	254.09	111	28,116	6,069	120	6	4,444	6
Católica de Guayaquil	49.29	49.72	38	63,941	20,700	2			4
Equinoccial	45.62	3.94	38	45,481	1,206	52			3
Politécnica Nacional	40.30	329.71	136	5,712	2,590	33	3,989	511,974	5
UTPL	34.47	258.88	241	46,686	17,200	82	2,014	3,159,376	6
Universidad de Guayaquil	28.53	34.11	29	42,310	1,615	45	199	32,684	5
Politécnica del Litoral	12.57	259.47	327	874			679	348,000	2
Andina	9.27	8.62	14	5,619	1,358	30	157	116,158	4
Indoamérica	4.71	73.97	8	17,891	44	25	11	259	4
Politécnica Salesiana	3.33	29.98	158	47,205		127	17	24,817	4
Técnica de Ambato	2.74	29.10	9	5,958	666	125	27	12,239	4
T E Quevedo	2.61	7.56	9	1,769					1
FLACSO	2.43	43.86	32	4,870	14,200	32	56	5,055	5
P Ejército	1.67	161.60	154			97	193	5,170	5
Politécnica Chimborazo	1.62	45.91	25	3,491	1,840	73	4	3,295	4
Técnica de Machala	1.11	10.56	11	8,601	665	125	27	12,239	4
Técnica de Cotopaxi	1.10	8.92	3	6,489	494		128	19,223	4
BOLIVIA									
Mayor San Andrés	126.77	332.44	132	10,719	298	8			3
San Simón	101.19	188.19	68	26,976					1
René Moreno	15.66	46.03	36	25,964	211	11	44	44	3
Técnica de Oruro	7.85	0.01	3	3,273					1
Tomás Frías	4.35	4.05	1	2,535		27			2
Del Valle	3.30	22.46	80	57,083	688	58	95	380,731	4
Mayor Real y San F Javier	2.26	1.94	4	2,370					1
Misael Saracho	1.96	5.19	11	6,036	274	43	11	33,504	4
U Aquino		7.31	6	28,544	338	5			3
Privada Boliviana		2.68	13	13,929	529	5	30	3,740	4
Nur Univty		1.79	11	13,846	26				2
Ingeniería Militar		1.44	3554						1
Franz Tamayo		0.01	2	52,083	55	10	14	15,231	4
Amazónica de Pando		0.01	1	659					1
Tecnológica de Santa Cruz		0.01	3	33,302	459	1	60	12,283	5

Source: Authors' own creation based on the analysis of the general and scientific social network sties.

Colombian and Peruvian universities were present in an average of five to six different networks while the Ecuadorian and Bolivian universities were present in a lower number: between three and four. The strategy of the Andean universities regarding the general networks is more about presence than interaction, is more passive than proactive in the management of the social conversation, in

view of their *page rank* and contents. In general -except in few cases- their communication strategy is conventional and similar to the strategy they could develop in the traditional media.

The results regarding the scientific networks also reflect a passive attitude, a lack of an institutional proactive strategy, although in this case the situation is a little more complex because the initiative of the affiliation and interaction corresponds to the academics and is the result of their research work and the results of their dissemination. It is difficult to establish comparisons and trends because the impact of the publications and the result of their interactions is completely different from one university to another. The Researchgate ranking does not correspond in many cases with the categorisations established by the public evaluation systems –in the case of Ecuador-- nor with other recognised rankings of the universities of Colombia and Peru.

In the RG Score, the National University of Colombia occupies the first position among the Andean countries, the 27th position among the South America countries; and the 820th in the world. Among the South American universities Antioquia occupies the 48th position, the University of Los Andes the 75th position; the Pontifical Xavierian University the 84th and the University of Valle the 88th position. With regards to the position of the Peruvian universities in the South American ranking, the Cayetano Heredia University occupies the 58th position; the Pontifical University of Peru the 132nd position; the National University of San Marcos the 135th; and the Peruvian University of Applied Sciences the 340th. In terms of the RG Scores of the universities of Ecuador in South America, the Pontifical University of Ecuador, the first university in this country, occupies the 195th position; the San Francisco University of Quito the 196th; the National Polytechnic School of Ecuador the 216; the Central University of Ecuador the 249th; the Polytechnic School of El Litoral (ESPOL) the 260th; and the Technical University of Loja (UTPL) the 263rd. Finally, in relation to the positions of the Bolivian universities in the ranking of the South American universities, Higher University of San Andrés occupies 283rd position, followed by the University of San Simon in the 323rd position; the Bolivian San Pablo Catholic University in 525th; the Gabriel René Moreno Autonomous University in 672nd; and the Private University of El Valle the 956th.

6. The opinion of experts

Mercedes Caridad Sebastián, Professor of Information and documentation sciences at the Carlos III University of Madrid, considers that general networks (like Facebook, LinkedIn, Twitter, etc.) are "a good channel for the dissemination of knowledge, without getting into scientific depths, and an extraordinary marketing weapon". Her opinion is similar to that of Xosé López García, Professor of Journalism and coordinator of the new media research group of the School of Communication Sciences of the University of Santiago de Compostela. Both professors agree that these networks can be useful to scientists as "very fast exchange of information vehicles". In addition, Mercedes Caridad highlights that scientists have always been known for their tendency to establish networks and invisible colleges.

With regards to scientific social networks, the experts precisely highlight their specialisation: Caridad Sebastián, who specialises in research on the changes of the information society and search engines, highlights "the transition from the general to the specific in the field of science" and López García highlights "the degree of specialisation". Among the positive aspects of the social networks, Caridad Sebastián highlights "their fast access to knowledge and connections among researchers" while López García highlights their capacity to provide "better understanding and segmented

information". On the negative side, Caridad Sebastián points out the risk of exclusion of the information that is not present in the network while López García notes "the absence of verification systems and the numerous ways that exist to alter the results in a biased way".

Caridad Sebastián sees complementarity between Researchgate and Academy, while Xosé López considers that the model of the former network is more complete "but both of them have similar verification systems". Both experts believe it is necessary to strengthen the reputation systems. Xosé López considers that it is very difficult to have a unique measurement system in today's society" while Caridad Sebastián remarks that the evaluation systems are "being investigated a lot…and more effective and new meters will appear soon".

Regarding scientific communication, Lyudmyla Yeres'ka, lecturer and researcher at the University of Piura (Peru), believes that "if it has something of interesting to the public, in general, it must be published it on all platforms, but with the right message for each of them, using the specific language", adapted to the target audience.

Other two academics and professional experts in the management of social media, Manuel Gago Mariño and Pablo Escandón, of Spain and Ecuador, respectively, highlight the importance of the general networks (Facebook, Twitter, and YouTube) as "platforms in which all kinds of scientific dissemination activities are very suggestive and effective". Manuel Gago, blogger and Professor at the University of Santiago, see general networks "as a starting point for the horizontal progression of science. Scientists tend to have their own channels of communication, which are very effective in the vertical communication and within the same sector. And in order for scientists to get in contact with scientists from related fields they often need to use these general social networks".

Pablo Escandón defined the general social networks as "new expanded spaces for conversation about popular knowledge" but warns of the risks of "too much circulation of "scientific" information that non-corroborated by the authorities in the field". This expert sees the scientific networks more as "repositories of literature and scientific communications" than as spaces for conversation and debate. Among the positive aspects of the scientific networks, this expert highlights their documentation possibilities and among the negative aspects points out that they are too closed. Fir Gago Mariño the scientific networks are positive because of their "ability to disseminate research results and expand the vertical networks among scientists (new countries enter the social network)". And among the negative aspects, Manuel Gago criticises the general management of metadata, in the sense that they do not allow "the cross-referencing of information and new perspectives".

7. Verification of hypotheses and conclusions

The hypothesis about the penetration of scientific networks was verified in the case of Colombia, but this penetration is emerging, but not growing, in Peru, Ecuador and Bolivia. The penetration is greater than the impact and reputation achieved due to the weakness of the research policies and the preferential specialization of Researchgate in the areas of medicine and biology in comparison to the social sciences.

The classification methodology of Researchgate also has disadvantages for the Andean countries because it discriminates against less developed scientific systems and privileges the Anglo-Saxon systems, as highlighted in the case study carried out by Innsbruck University Professor Arno Tausch

(2014). Researchgate's RG Score is similar to other rankings of the world's best universities differs from the rankings of universities from the least developed countries due to the hegemonic effect of the Anglo-Saxon reputation evaluation system.

The second hypothesis was not completely proven because the analysis of the use of the general networks by the Andean universities shows that, although their management strategies focus on the main publics and customers, they fail to achieve good results in terms of interaction, especially among young people. In other words, the most common social networks management strategy of the Andean universities remains similar to the one applied in traditional and media, and that is why the most active and youngest audiences are more disconnected from the institutions in which they are studying or have studied.

Scientific and general social networks are a new tool for scientific collaboration and communication, as highlighted by the consulted experts. However, they must improve their verification and indexing systems, their search engines, the semantic technologies, their reputation assessment models, and to bridge the gap between digital and analogue knowledge. These networks are are new tools and technological resources that researchers and universities must take into account in their management strategies. While Google Scholar's H-Index is an indicator of impact and productivity, Researchgate's RG Score, which assess the reputation of researchers and universities, is an indicator of impact and popularity. Its algorithm calculates the impact of the publications and the popularity of the interactions among researchers.

Digital scientific social networks are ecosystems of software services, repositories and open networked communication platforms that enable researchers (1) to create an academic and professional profile within a specific system of knowledge the dissemination and exchange; (2) to establish a list of users related within one or more scientific specialisations to share contacts, networks, projects, documents, notes, collaborations and research works; (3) to access and download references and scientific works available online; (4) to apply metadata and semantic intelligence tools; and (5) to manage the quantitative and qualitative (scientific social capital) value of citations, impact factors and the tracking information of researchers' publications and, as a result, of the universities to which they belong.

* This research study is part of a Prometheus Project approved by the Ministry of Higher Education, Science, Technology and Innovation (SENESCYT) of the Republic of the Ecuador to Dr. Francisco Campos Freire on 29 November 2013 (PROMETHEUS-CEB-010-2013). This project, whose funding was awarded from 23 May 2014, is being developed in three stages: June-October, 2014; June-October, 2015; and June-October, 2016. The name of this wider study is "Use, impact, and results of the management of social and research networks by Ecuador's media, organisations and communication institutes and the promotion of good quality practices and Corporate Social responsibility". This research study is being carried out by several teams of researchers at two Ecuadorian universities: the Technical University of Loja (UTPL) and the Pontifical Catholic University of Ibarra (PUCESI). This article was produced with the collaboration of Dr. Diana Rivera Rogel and Professor Claudia Rodríguez.

8. List of references

AM Aladwani (2014): "Gravitating towards Facebook (GoToFB): What it is? And How can it be measured?". *Computers in Human Behavior* (33:4), pp. 270-278.

Ch Balagué, D Fayon (2012): *Facebook, Twitter et les réseaux sociaux dans une stratégie d'entrepresse.* Paris: Pearson

A Bardon (2011): "Top 20 des réseaux sociaux scientifiques". Available at: http://www.knowtex.com/blog/le-top-20-des-reseaux-sociaux-scientifiques/

J Barnes (1954): "Class and committees in a Norwegian Island parish". In *Human Relations,* 7, pp. 39-58.

P J Benghozi (2006): "Communaute virtuelle: structuration sociale ou outil de gestion?". In *Entreprises et Histoires,* 43, pp. 67-81.

P J Benghozi (2011): "Économie numérique et industries de contenu: un nouveau paradigme pour les résaux". In *Hermès,* 59. Paris: CNRS.

J D Bolter, R Grusin (2000): *Remediation. Understanding New Media.* Cambridge: Mit Press.

P Bordieu (1993): *Sociology in Question.* London: Sage.

P Bourdieu (1986): "The Forms of Capital", in Richards J.G. (ed), *Handbook o Theory and Research for the Sociology of Education.* Nueva York: Greenwood Press, pp. 241-258.

P Bouquillion, J T Matthews (2010): *Le Web collaborative: Mutations des industries de la culture et de la communication.* Grenoble: PUG.

DM Boyd, NB Ellison (2007): "Social Network Sites: Definition, History, and Scholarship". In *Journal of Computer-Mediated Communication,* vol. 13, 1, p. 210-230.

RS Burt (1992): *Structural Holes: The Social Structure of Competition.* Cambridge, MA: Harvard University Press.

CT Butts, T Carter and CB Remy (2009): "Change and External Events in Computer-Mediated Citation Networks: English Language Weblogs and the 2004 US Electoral Cycle". In *Journal of Social Structure (JOSS),* vol. 10, 3. http://www.cmu.edu/joss/content/

D Crane (1969): "Social Structure in a Group of Scientists: A Test of the "Invisible College" Hypothesis". In *American Sociological Review,* v. 34, 3, American Sociological Society.

D Crane (1972): *Invisible Colleges: Diffusion of Knowledge in Scientific Communities.* Chicago: University of Chicago Press.

N Carr (2011): *¿Qué está haciendo Internet con nuestras mentes? Superficiales.* Madrid: Taurus.

A Casilli (2010): *Les liaisons numériques. Vers une nouvelle sociabilité?* Paris: Seuil.

M Castells (2009): *Comunicación y poder.* Madrid: Alianza Editorial.

F Charvolin, A Micoud, L Nyhart, dir. (2007): *Des sciencies citoyennes?* La Tour d'Aigues, Éditions de l'Aube

Mt Chéreau (2010): *Community management. Comment faire des communautés web les meilleures alliées des marques.* Paris: Dunod.

NA Christakis and J H Fowler (2010): *Conectados. El sorprendente poder de las redes sociales y cómo nos afectan.* Madrid: Taurus.

JS Coleman (1990): "Social Capital in the Creation of Human Capital". In *American Journal of Sociology,* 94, pp. 95-120.

A Degenne (2011): "Retour à l'analyse des réseaux sociaux (entretien)". In *Hermès,* 59, pp. 39-40. Paris: CNRS.

A Dekker (2005): "Conceptual Distance in Social Network Analysis". In *Journal of Social Structure (JOSS),* 6, 3. http://www.cmu.edu/joss/content/

A Dekker (2008): "The Eurovision Song Contest as a Friendship Network". In *Connections,* vol. 28,1, pp. 59-72. www.insna.org/connections

JM de Pablos Coello, C Mateos Martín, M Túñez López (2013): "Google cambia el paradigma de la métrica científica". In *Historia y Comunicación Social,* 18, special issue. December, 225-235. ISSN: 1137-0734.http://dx.doi.org/10.5209/rev_HICS.2013.v18.44327

N B Ellison (2011): "Réseaux Sociaux, numérique et capital social (entretien)". By Thomas Stenger y Alexandre Coutant. En *Hermès,* 59, pp. 21-24.

N B Ellison, Ch Steinfield and C Lampe (2011): "Connection strategies: Social capital implications of Facebook-enabled communication practices". In *New Media&Society,* vol. 13, 6, Sage Pub.

N Ellison and D Boyd (2013): "Sociality through Social Network Sites." In *The Oxford Handbook of Internet Studies* (ed. William H. Dutton). Oxford: Oxford University Press.

Fayon, David (2010). *Web 2.0 et au-delà : Nouveaux internautes : du surfeur à l'acteur*. Paris: Económica

E Fillias, A Villeneuve (2011): *E-Réputation. Stratégies d'influence sur Internet.* Paris: Ellipses

P Flichy (2010): *Le sacre de l'amateur. Sociologie des passions ordinaires à l'ère numérique.* Paris: Seuil

LC Freeman (2012): *El desarrollo del análisis de redes sociales. Un estudio de sociología de la ciencia.* Bloomington: Palibro

J I García-Valdecasas Medina (2011): "Una definición estructural del capital social". In *Redes,* vol. 20, 6, Barcelona. http://revista-redes.rediris.es

T Gómez and X Puente (2013): "Rankings y reputación universitaria". Universidad de La Rioja (España): XXIV Jornadas Formativas de la Asociación de Profesionales de Gabinetes de Comunicación de las Universidades Españolas y Centros de Investigación (AUGAC), held on 17 and 18 October, includes the paper: "El valor de los rankings universitarios". Available at: http://asus.usal.es/tomas-Goméz-y-xavier-puente/22317-alias (retrieved on 10/2/2014).

A Gutiérrez-Rubí, J Freire (2013): *Manifiesto Crowd. La empresa y la inteligencia de las multitudes*. Madrid: Laboratorio de Tendencias

M S Granovetter (1974): *Getting a Job: a study of contacts and careers.* Cambridge: Harvard University Press

J Hallam (2012): *The Social Media Manifesto*. Palgrave Macmillan

P M Haas (1992): "Introduction: Epistemic communities and international policy coordination". *International Organization*, 46(1), 1-35.

H Jenkins (2009): *Fans, blogueros y videojuegos: la cultura de la colaboración.* Barcelona: Paidós

H Jenkins (2010): *Piratas de textos: fans, cultura participativa y televisión.* Barcelona: Paidós

J Lanier (2011): *Contra el rebaño digital.* Barcelona: Madrid

E Lazega (1998): *Réseaux sociaux et structures relationnelles.* Paris: PUF.

P Lèvy (2004): *La inteligencia colectiva. Por una organización del ciberespacio.*
Washington: Organización Panamericana de la Salud (ed. PDF)
N Lin (2001): *Social Capital: a theory of social structure and action.* Cambridge: University Press.

X López García, M Gago and C Toural (2014): "La encrucijada de la divulgación científica: tiempo real y portabilidad de conceptos". Available at: www.academia.edu [retrieved on 25/06/2014].

A Mattelart (1998): *La mundialización de la comunicación.* Barcelona: Paidós.

A Mattelart (2007): *Historia de la sociedad de la información.* Barcelona: Paidós.

P Mercklé (2011): *Sociologie des réseaux sociaux.* Paris: La Découverte.

JL Molina (2004): "La ciencia de las redes". In *Apuntes de Ciencia y Tecnología"*, número 11

JL Moreno, H H Jennings (1934): *Who Shall Survive: A new approach to the problem of human.* Washington: Nervous and Mental Disease Publishing

E Morín (1994): *Introducción al pensamiento complejo.* Barcelona: Gedisa

I Nafría (2007): *Web 2.0. El usuario, el nuevo rey de Internet.* Barcelona: Gestión 2000

MA Nicolás Ojeda, MM Grandío Pérez, coord. (2012): *Estrategias de comunicación en redes sociales. Usuarios, aplicaciones y contenidos.* Barcelona: Gedisa

JM Noguera Vivo, J Martínez Polo, MM Grandío Pérez (2011): *Redes Sociales para estudiantes de Comunicación*. Barcelona: UOC.

JM Noguera (2012): *Redes y Periodismo*. Barcelona: UOC

JL Orihuela (2011): *Mundo Twitter.* Barcelona*:* Alienta

T O'Reilly (2005): "Web 2.0. Design Patterns and Business Models for the Next Generation of Software". In: http://oreilly.com/web2/archive/what-is-web-20.html.

P Parra, AJ Gordo, SA D'Antonio (2014): "La investigación social aplicada en redes sociales. Una innovación metodológica para el análisis de los «Me gusta» en Facebook". *Revista Latina de Comunicación Social*, 69, pp. 195 a 212.
http://www.revistalatinacs.org/069/paper/1008_UCM3/11p.html
DOI: 10.4185/RLCS-2014-1008

A Poncier (2011): *Les réseaux sociaux d'entreprise.* Paris: Diateino

T Proulx and S J Heine (2009): "Connections from Kafka. Exposure to meaning threats improves implicit learning of an artificial grammar". In *Personality and Social Psychology Review,* 10, 2, p. 88-110.

R Putnam (1993): "The prosperous community: social capital and public life". In *The American Prospect,* 13.

F Requena Santos (2003, 2012): *Análisis de redes sociales. Orígenes, teorías y aplicaciones.* Madrid: CIS

F Requena Santos (2011): *Las redes de apoyo social*. Madrid: Thomson Reuters

Researchgate (2014): The RG Score is a metric that measures scientific reputation based on how all of your research is received by your peers. https://www.researchgate.net/RGScore/FAQ/

H Rheingold (1993, 2000): *The virtual community: Homesteading on the electronic frontier. Reading*, MA: Addison-Wesley**.**

H Rheingold (2004): *Multitudes inteligentes. La próxima revolución social.* Barcelona: Gedisa

J Rifkin (2013): *La era del acceso. La revolución de la comunicación*

T Stenger, y A Coutant (2011): "Introduction. Ces réseaux numériques dits sociaux". In *Hermès,* 59, pp. 9-20.

T Stenger (2009): "Social Network Sites (SNS): do they match? Definitions and methods for social sciences and marketing research". In *XXIX Conferencia INSNA* (San Diego, USA). Available at: http://www.academia.edu/2521387/Social_Network_Sites_SNS_do_they_match_Definitions_and_methods_for_social_sciences_and_marketing_research

DJ Solla Price (1986): *Little science, big science and beyond*. Nueva York: Columbia University Press.

J Surowiecki (2004). *The Wisdom of Crowds.* N. York: Random House.

D Tapscott y AD Williams (2007): *Wikinomics. La nueva economía de las multitudes inteligentes.* Barcelona: Paidós.

N Tello and JA de la Peña (2013): "Modelos matemáticos de la sociedad y aplicaciones. Crecimiento de las redes sociales". In *Redes*, 24, 1, Barcelona. http://revista-redes.rediris.es

M Thelwall y K Kousha (2014): "ResearchGate: Disseminating, communicating, and measuring Scholarship". Retrieved from https://www.academia.edu/5946225/ResearchGate_Disseminating_communicating_and_measuring_scholarship. DOI: 10.1002/asi.23236. Preprint of the article published in *Journal of the American Society for Information Science and Technology*, John Wiley &
Sons, 2013.

M Thelwall and K Kousha (2013): "Academia.edu: Social network or Academic Network?". In *Journal of the Association for Information Science and Technology*, vol 65, 4, pp. 721-731.DOI: 10.1002/asi.23038.

A Tausch (2014): "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 against economic and social sciences and against the developing countries". www.academia.edu. Retrieved on 10/07/2014 from: https://www.academia.edu/2460163/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_against_economic_and_social_sciences_and_against_the_developing_countries#1

M Túñez López (2013): "El índice h de la investigación en Comunicación en España, Portugal y Latinoamérica: Web of Knowledge (Wok), Scopus y Google Scholar". In *Coomunication&Society/Comunicación y Sociedad,* n. 4, pp. 53-75.

D J Watts (2006): *Seis grados de separación. La ciencia de las redes en la era del acceso.* Barcelona: Paidós.

CS Wagner (2009): *The new invisible college: Science for development.* Washington: Brookings Institution Press.

E Wenger (1998): *Communities of practice: learning, meaning, and identity*. Cambridge University Press.

D Wolton (2006): *Salvemos la comunicación. Aldea global y cultura. Una defensa de los ideales democráticos y la cohabitación mundial.* Barcelona: Gedisa.

D Wolton (2011): "Ces réseaux numériques dits sociaux", In *Hermès*, 59. Paris: CNRS

How to cite this article in bibliographies / References

Francisco Campos Freire, Diana Rivera Rogel, Claudia Rodríguez (2014): "Presence and impact of Andean universities in online social networks". *Revista Latina de Comunicación Social*, 69, pp. 571 to 592.
http://www.revistalatinacs.org/069/paper/1025_USC/28en.html
DOI: 10.4185/RLCS-2014-1025en

Article received on 19 July 2014. Accepted on 30 August. Published on 15 September 2014.