

Commentary

From insularity to connectivity: trends in scientific and humanistic research

In recent decades the world has experienced a number of changes that have affected the way society undertakes activities, ranging from everyday household chores to cutting-edge scientific research. Much is due to advances in information and communication technologies (ICTs), and in particular to the current ease with which we communicate and interact with institutions, using tools such as online banks, or in our worldwide professional or social relationships using computer programs that allow text, voice and video communications by Internet, in real or deferred time.

In technological terms, connectivity refers to the capacity of a device to connect to the Internet or other devices autonomously. However, it also refers to connectivity in terms of inclusion or social interaction and in this sense, refers to the connection between social organizations, whether governmental or any other. Connectivity recently emerged as a study of the theory of development, forming part of the analysis of globalization and ways that national economies become integrated into this process.

The Internet, the first web browser, known as WorldWideWeb (WWW), and the first web server were devised in the context of higher education institutions and research; this fact illustrates the importance of connectivity for academic life. In other words, today it is inconceivable to envisage scientific research without considering the complex communication networks and interaction between scientists, and in particular concerning collaboration as a vital component in the advancement of knowledge.

As a generator of social welfare, this research intends to transform scientific and technological knowledge into benefits for society. Current multidisciplinary studies, which are essential for solving major problems linked to globalization, such as public health, environmental pollution and renewable energy sources among others, lead to cooperation between specialists in different fields and even between formal and natural scientists and their social and humanistic counterparts. Research in the social sciences and humanities is a key element for improving society and an essential cog in the engine that drives the society of knowledge. Therefore, when addressing particular questions in these disciplines one cannot ignore changes in the way science is now undertaken because of technological developments. Proof of this lies in increased collaboration in these areas of knowledge and the emergence of an area of research, teaching and creativity where humanities and computer science converge: digital humanities.

In the world of interconnectivity, the researcher is conceived as an integral element in a network of scientists/collaborators. Their connectivity is associated with the density and intensity of the links they have, particularly in terms of co-authorship of publications. The size of the network to which a scientist belongs is an important indicator of their social and professional ties, because larger networks typically result in greater diversity, provide access to a variety of resources and opportunities and facilitate access to specialized information. The networks are displayed through different computer programs that facilitate social network analysis and identification of latent substructures in the network. Social network analysis is a research tool characteristic of social and behavioral sciences, whose application has been extended to other disciplines. In the field of bibliometrics for example, it is used to conceive of relationships between the different components associated with research and scientific communication, for example authors, journals, institutions and countries.

As science becomes increasingly globalized, collaboration between scientists and institutions will increasingly depend on connectivity and particularly access to fast and reliable communication links and data. However, at the periphery of this

“Brave New World”, a fundamental question about scientific collaboration persists, reflecting on factors that motivate scientists to collaborate. Besides this, due to the emergence of interconnectivity, another no less important question emerges: to what extent does the increase in scientific collaboration relate to ICTs?

Clearly the answer to the second question requires considering factors related to the first, especially given that ICTs are facilitators, rather than promoters of scientific collaboration. No researcher decides to collaborate with another on the basis of the availability of a high speed Internet connection between two institutions. Possibly, lack of efficient communication channels may reduce the chances of achieving collaboration or delay an undergoing investigation and be a cause of frustration, but if the reasons and basis for collaboration are strong, it is more likely they will outweigh any digital hindrance to collaboration.

In contrast to the above, the decision to collaborate is related to considerations on profit and advantage in the world of scientific research, which is increasingly competitive and interdisciplinary. Scientists seek access to funding, to high-tech gadgets, to complementary skills, to increases in scientific production, to making an impact in terms of citations and exchange of students, among other benefits. Collaboration between scientists from developing countries with their counterparts in industrialized countries in particular helps fill any deficits they experience in their national institutions. For scientists in these countries, social relationships with colleagues from other nations represent significant social capital, which also influences prospects for collaboration and ultimately productivity.

Despite the ubiquitous nature of collaboration there is little research on its benefits; so this remains an element of conjecture. In short, there still is no consensus among the divided opinion on how to evaluate a co-authored work.

One view is that it is easier to publish in collaboration because that way more people participate in the same task. Another perspective is that integration of a research group involves a unique role and high level of expertise on the part of each of its members, who often achieve results in combination

that would be impossible to achieve without joint efforts and combined individual talents.

What is certain is that any new physical or social phenomena require analysis and interpretation in order to understand what is occurring and where this will lead us. If we want to exert certain control over the process and define the outcome, different approaches and specific viewpoints related to the various branches of scientific and humanistic knowledge must be included for their study. Research is both an epistemological and social process based on the standards of these two systems. Connectivity as an auxiliary tool in the research process is related to the particular techniques involved in the search for new knowledge. The study of connectivity and its relationship with scientific collaboration needs to use research methods that comply with the stated objectives, which means finding new ways to analyze and understand the impact of connectivity in different fields of scientific endeavor, as well as developing new quantitative and qualitative tools to highlight the different elements involved.

While conceptualizing and measuring scientific collaboration presents difficulties, bibliometrics takes co-authorship in peer-reviewed publications as an indicator of collaboration in scientific research. You can operate on either a small or a large scale, the latter involving millions of records retrieved from national and international data bases, with the help of powerful computer programs devoted to data and text mining.

However, co-authorship is only one product of scientific cooperation (undoubtedly the most tangible), and as such omits to mention other inputs such as training and development of human resources for research, or participation in networks through which scientists become professionally and socially integrated. Studies that emphasize understanding of connectivity and actors interaction rather than their attributes, while aiming to analyze academic and social connectivity of research groups, are required.

Particularly in the case of scientists from developing countries, it is necessary to construct and validate indicators to measure not only the products of scientific research, but also the way these are organized and their degree of connectivity. Only then, the relationship between collaboration and connectivity,

as much as the effect they have on productivity in our environment, can be clearly established. In the absence of adequate, reliable and useful indicators, the formulation of scientific policies to promote scientific research through initiatives for collaboration and connectivity is doomed to failure.

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