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Gold or Green: The debate on open access policies

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Introduction

The earliest public demonstrations in favor of Open Access go back some 15 years, with the letter of the Public Library of Science (2001) and the Budapest Open Access Initiative (2002). Both advocated a change in the model of science communication and essentially proposed unrestricted, free access to academic content. Now, more than 10 years later, the Open Access movement has matured, in the sense that it is widely known by all agents of science communication—whether they be authors, publishers or librarians. Moreover, it has acquired remarkable institutional support from universities, research funding agencies, and the European Union, among others.

This maturity is also confirmed by the many studies on Open Access published in the intervening years and focusing on scientific journals, repositories, authors, legal aspects, etc. These have been partially compiled by Bailey in two bibliographies [2,3]. In addition, this topic has been dealt with in texts of wider dissemination. For example, *STM Reports* [15,16]—published by the International Association of Scientific, Technical & Medical Publishers (STM), the leading global trade association for academic and professional publishers whose members are responsible for the publication of 66 % of all journal articles—analyzes the current state of science editing and devotes a good part of its content to Open Access. Prestigious journals such as *Nature* have also published several monographs on Open Access, including the recent “The Future of Publishing” [12].

Open Access advocates are convinced that science communication would be improved if all academic content was accessible on the Internet, unrestricted and free of charge. But, when will this vision become reality? How long will it take for all or most scientific publications to be openly accessible? Until recently, the growth of

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Open Access had to be assessed qualitatively and indirectly. But today there are estimates on the quantitative impact of Open Access in the science communication system. These estimates have been made with respect to either the total number of journals or the total number of articles, which serve as two different kinds of indicators.

As for the number of journals, in 2013, Ulrich's directory, which included scientific journals from all over the world, listed 8,000 Open Access titles, corresponding to 13.5 % of all peer-reviewed journals (some 60,000 worldwide). If we focus exclusively on the elite journals, those listed by the Web of Science (WoS) or by Scopus, the percentages are a bit lower but in no case are they negligible. In 2013, out of the 10,763 titles in the WoS database, 1,111 (10.3 %) were Open Access journals (figures taken from the Ulrich directory), while according to Scopus among the 18,500 indexed journals some 1,800 (9.7 %) were Open Access titles (figures taken directly from Scopus). These similar, substantial percentages provide proof that the quality of Open Access journals has been acknowledged.

The distribution of Open Access titles across countries is not homogeneous; rather two extremes are evident. At the lower end are countries with an important tradition in commercial publishing, especially the USA, the UK, the Netherlands, and Germany; on the opposite extreme are emerging economies, for example, Brazil, where over 90 % of the journals published are Open Access [11].

As for the number of articles with Open Access, several studies have provided data-based estimates, in both cases derived from samples. Laakso-Bjork [10] focused on articles indexed in Scopus, reporting in 2012 that 17 % were Open Access (12 % immediately after publication, and 5 % after an embargo period). A study conducted two years earlier and referring to the total number of articles published [4] estimated that 20 % were Open Access (8.5 % in portals from publishers and 11.9 % in repositories). Thus it has taken some fifteen years to have approximately 20 % of all scientific content unrestrictedly and freely accessible from the Web. This is remarkable progress, even if it is still insufficient to totally transform the science communication system.

For Open Access to become widely adopted and cover all manner of scientific content, political measures that prioritize this means of publication and dissemination should be instituted. Two mechanisms were advocated by the Budapest Initiative (2002). The aim of what was later referred to as the "gold road" was to ensure that most journals are Open Access; this is in contrast to what was later called the "green road," in which the focus is on archiving articles in

repositories, as a transitional stage until full implementation of the Open Access model. These two mechanisms have been equally defended by the Open Access movement, as, by necessity, they are considered as being complementary.

The UK's Finch Report [7,8], published in 2012, advocated the exclusive adoption of the gold road in order to reach Open Access. Its conclusions have generated heated debate as to whether either of the two options should be given priority. The document has had a remarkable impact not only within the academic world but also among the general public, thanks to its dissemination through the media. In the following, we describe and assess the proposals included in the Finch Report and analyze their possible application to other countries, and particularly to Spain.

The Finch Report

The British government charged Janet Finch, Professor of Sociology at the University of Manchester, to conduct a study aimed at determining how all publicly funded research could be made accessible without restrictions and at no cost. The determining factors that had to be respected from the start were: (i) to maintain the high level of quality of the scientific publications (by means of peer review) and (2) to not harm the important British publishing industry.

In the report, access to scientific information in the UK is analyzed, including a quantification of research and of journal subscriptions costs. Both the communication and dissemination of results as an integral part of research itself and the need for research budgets to include publication fees are recognized [8]. After establishing that Open Access is the horizon for science communication, the Finch Report suggests that the gold road provides a strategy for all science communications in the UK. Specifically, it recommends that the costs of science communication and dissemination be included in research budgets and the launch of a system in which Open Access journals are funded through author payments. This proposal respects the mandate of the Government while counting on the support of British science publishers.

The report was released on 18 June 2012. A month later, the British Government announced that it had accepted its recommendations, a move accompanied by changes in the Open Access policies of the Research Councils, which are the institutions that fund research in the UK. However, the report generated intense controversy among academicians specialized in Open Access, because its recommendations did

not take into account the function of repositories (thereby distancing itself from that segment of the Open Access movement that advocates the adoption of both roads) and it laid the burden of article processing charges exclusively on authors.

Underestimation of repositories

The Finch Report focused primarily on journal articles, leaving aside monographs and “gray literature,” despite referring to both in several parts of the document. In addition, when it deals with repositories the report points out several already-known weaknesses, including the small volume of documents they contain, the lack of indexing of their contents in databases, and the often insufficient quality of the access services offered. The role of repositories is, in the end, to facilitate access to research, theses, and gray literature.

Strengthening of the role of repositories to ensure a change in the model of science communication has been encouraged from many quarters. For institutions, the latest recommendations of the Budapest Open Access Initiative [5] maintain the validity of the two roads (gold and green) and insist on the need for repository infrastructures:

“3.1 Every institution of higher education should have an OA repository, participate in a consortium with a consortial OA repository, or arrange to outsource OA repository services.”

From the academic sphere, John Houghton and Alma Swan [9] agree that in a fully Open Access system the net benefits of the gold road are higher than those of the green one. However, taking into account that we are in a transitional phase, those authors concluded that repositories are still the most economical and flexible way to make progress towards Open Access, based on two advantages. Firstly, the green road makes it possible to include any research work, even those that are not strictly journal articles (i.e., doctoral theses, books, working papers, reports, and congresses), which is especially relevant in the humanities and the social sciences, in which research is not disseminated exclusively by means of scientific journals. Secondly, the obligation of depositing scientific production is a political decision that can be adopted unilaterally (which therefore makes it faster than the gold road, in which a more complex global agreement is required) by any funder or institution as well as at the state level, and at relatively low cost. Peter Suber [14] added a

further, economic argument in favor of repositories: they entail no costs for the depositor.

Article Processing Costs

The Finch model is based on author payment of publication fees. This decision has been welcomed by publishers, as their businesses will be maintained even if the collection of fees is shifted from users to authors. Among academicians, however, the concept of author payment has led to heated discussion as well as to doubts about the viability of the model since it is not entirely clear how authors without funds for their research will manage to pay publication fees.

It is worth noting that publication in Open Access journals can be funded not only by the authors themselves but also by the publisher or, even, by libraries (as would be the case in the SCOAP3 project). In this regard, the Budapest Initiative is very clear; its recommendation 3.5 proposes a model of reasonable article processing costs and, importantly, favors institutional funding of Open Access journals.

“3.5. Universities and funding agencies should help authors pay reasonable publication fees at fee-based OA journals, and find comparable ways to support or subsidize no-fee OA journals.” [5]

The proposal of the Finch Report can be understood and appreciated in countries with a powerful and consolidated publishing market (as is the case in the UK, the USA, the Netherlands, and Germany), with strong national funding agencies, both public and private, that sustain R+D. In those countries, it is not difficult for authors to obtain financial resources for publishing. What happens, however, in countries and in disciplines where financial aid for research is in short supply? In such cases, the proposals of the Finch Report are not feasible and other ways, tailored to the particular conditions and circumstances, must be found. This is the case of Brazil, where Open Access is near 90 % (as stated above), and of other emerging countries but also of Spain and other countries in southern Europe.

As mentioned above, the same problems confront the humanities and social sciences, since research in either field is only modestly funded. Scientists in these disciplines typically support Open Access but are quick to point out that the ‘author pays’ system is a serious disadvantage. According to the SOAP study [13], this problem was mentioned by 39% of researchers who would like to publish in Open Access journals but have difficulties in finding the financial resources

to cover the necessary publication fees.

Open Access in Spain

Spanish support of Open Access has given rise to state legislation and university regulations that deal with this issue. Article 37 of the Science, Technology and Innovation Act [6] cites the obligation of depositing the results of research funded by the state's budget in Open Access repositories, taking into account limitations based on author's copyrights. In addition, the latest Royal Decree on Doctoral Studies (2011) includes the obligation of depositing all theses in Open Access repositories.

University mandates regarding Open Access require that the scientific output of academic staff be published in Open Access journals or placed in Open Access repositories. These regulations apply broadly and not only to publications resulting from funded projects, as indicated in the Spanish law. One of the first Spanish universities to approve the mandate policies was the Technical University of Catalonia, in 2009. Since then, twelve other centers have joined in [1]. Both legislation and mandates give priority to the green road, i.e., the archiving of scientific production in repositories. While publication in Open Access journals is also valued, there are neither incentives nor state funding proposals, in contrast to the Finch Report.

In Spain, the 'author pays' model is rarely used, although some journals offer the option of freeing articles. Spanish Open Access journals account for 35 % of the total—quite a bit higher than the above-mentioned worldwide average of 14 %. Most of these journals are funded by institutions linked to the public sector, such as universities and public research centers, or learned societies and academies, e.g., the Institute for Catalan Studies. In the sphere of the humanities and social sciences, no part of the scant funds devoted to research is allocated to the payment of publication fees.

Currently, there are 112 repositories, according to the *BuscaRepositorios* directory. Most universities and research centers have this type of infrastructure, which is well known among the scientific community. According to Webometrics, seven of these Spanish repositories rank among the top 100 in the world. They are those of the Autonomous University of Barcelona, the Technical University of Catalonia, The National Science Research Council (CSIC), The Complutense University of Madrid, the University of Alicante, the University of Salamanca, and the Technical University of Madrid [<http://repositorios.webometrics.info/en/Europe/Spain>].

Thus, current legislation and regulations in Spain clearly advocate the green road, as it is consistent with the country's science communication system, in which many journals have little commercial presence (only 28 %), a very low implementation rate of the 'author pays' system, but a good repository infrastructure.

Conclusions

Open Access has grown moderately yet steadily over the last 15 years such that it is currently estimated to comprise 20 % of the total of the science communication system (journals and articles). To date, policies favoring Open Access have been based on two strategies, fostering publication in OA journals (the gold road) and the archiving of publications in repositories (the green road). The recommendations of the Finch Report, which exclusively supported the gold road, have ignited controversy.

The merit of the Finch Report is its defense of a clear, global, and overwhelming policy supporting Open Access by the public administration. However, it has been criticized because it exclusively advocates the gold road and the payment of publication fees by authors, thus overlooking the role of repositories and access to materials that are not articles.

In the case of Spain, state legislation and existing university mandates generally favor the green road. This model fits well with the characteristics of Spanish science communication, i.e., a significant presence of the humanities and social sciences (for which the article is not the essential item for publication), a low presence of commercial publishers of scientific journals, and a good existing infrastructure for repositories.

In considering Open Access policies, we should carefully analyze the performance of the science communication system in each country to determine the most suitable approach to providing Open Access. Accordingly, the recommendations of the Finch Report should be confined to the UK and other countries with a powerful publishing industry and well-funded research. Finding the best road to Open Access in other countries is not possible without studying their research systems in detail. 

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