

EDITORIAL

## Discovering science: what opportunities does Open Access give?

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The concept of Open Access first appeared in the media 16 years ago. The main source of this concept was formulated within the framework of the Budapest Initiative [1] that became the response of the scientific community to the toughening conditions for obtaining and distributing information and, as a consequence, the impossibility for scientists to conduct effective international communication.

Over the course of these years, Open Access has been a popular trend in the scientific environment, a constant subject of discussions among scientists, journalists, science popularizers, teachers, librarians, publishers, financial specialists, civil servants, and those in the general public who are interested in science.

### What is Open Access?

According to the generally accepted concept [2], Open Access allows anyone to use and distribute scientific or educational materials on the Internet without licensing or other restrictions (for example, mandatory registration on a website), for free, quickly, and in full text mode.

All of the data that is distributed on the Open Access platform should also contain an indication of the type of open license, support free indexing by search robots, and ensure the delivery of texts to users in the form of machine recognized data.

To date, there are two main ways to put scientific papers in the public domain: deposition and publication in Open Access journals.

### The struggle for the availability of scientific data

The problem of access to scientific articles is a hot issue in many countries, including the Russian Federation. The policy of the major market players – publishers and so-called «elite» scientific resources – is such that scientists have to pay tens of dollars for every article that they want to read.

Dmitry Semyachkin, the head of the CyberLeninka project, the director of the Open Science Association, in an interview with the Indicator.ru portal [3] notes: «Of course, large publishers are not interested in Open Access. It is a big business and big money. As for Elsevier, it is among the 500 largest companies in the world, being in the upper half of the table. For comparison: the company's market capitalization exceeds that of Sberbank of Russia. Marginality of this business is huge; it is higher than that of many world technology companies.»

The lack of funds for scientists to subscribe to expensive scientific databases creates an information vacuum

and deprives them of the proper way to conduct research as, for example, it happened in 2015 in Russia, when, by the decision of the Springer publishing house, our research institutes and universities, which failed to pay the fee, were denied access to thousands of scientific journals [4].

One of the most radical solutions to the problem of access to scientific materials was the project Sci-Hub, which was started by Alexandra Elbakyan in 2011.

The principle of that resource is that volunteers, using the accounts of universities or buying one account from the publisher, actively download the articles and transfer them to the Sci-Hub database, where they are stored and are available for search and download to users without restriction, which complies with the principles of Open Access.

Here are the statistics of the Sci-Hub for 2017: «The results of 2017 on Sci-Hub: about 150 million downloads of scientific articles, which means 400,000 articles daily. According to the number of requests, as expected the leading country is China with 25 million, followed by India with 13 million downloads. In addition, in the group of the top ten countries are the US (12 million downloads), Brazil (7 million), Iran (6.5 million), unexpectedly Indonesia with 5 million, and Russia and France (4 million each). There were 3 million downloads made from Mexico and from some other unknown country (the script Sci-Hub could not establish its location)» [5].

Of course, the Sci-Hub project was condemned by the large publishers: they fined Alexandra \$15 million as a manager of this project [6].

### Initiatives to promote Open Access in the Russian Federation

One of the largest public projects, designed to assist the promotion of Open Access in Russia, is CyberLeninka, which is a part of the Open Science association [7].

Unlike the Sci-Hub, CyberLeninka has on its website only those materials that are initially in the public domain. At present, 1,538 academic scientific journals have changed their publishing model to Open Access and are using CyberLeninka as a platform for the distribution of their materials on the Internet [8].

In an interview with the Indicator portal, the project manager Dmitry Semyachkin emphasized that the universal Open Access of scientific results will allow the authorities (including the government) to significantly improve the quality of the evaluation of the effectiveness of science.

In the same interview, it was noted that Open Access is relatively expensive for scientists currently. When a researcher publishes an article, he/she or the research organization that he/she works for, pays the fee to Open Access journals. However, the development of such projects leads to a reduction of the publication cost [3].

### Advantages of publishing scientific articles in the public domain

*Why is it advantageous for the authors to publish scientific articles in Open Access mode?*

1. Increased citation. A number of studies carried out during the existence of the Open Access concept showed that publication in Open Access increases the article's citation approx. 2.5-5.8 times [9].
2. Publishing research results of current importance in the shortest possible time. Unlike the subscription of scientific journals, where the publication of an article can be held up for a long time – up to a year, Open Access journals provide the opportunity for rapid publication on the Internet, which in turn makes it possible to confirm the precedence in obtaining results [10].
3. Attracting public attention to their work. It is important for scientists to share the results of their research not only with the scientific community, but also with the general public, attracting the media and popularizers of science to cover the topics of their research. Open Access makes it possible for all of the interested parties to read and distribute scientific information.

### Opinion of a popularizer of science

*Ivan Butov, molecular biologist, popularizer of science, founder of the popular YouTube channel “Sciantik”:*

“The problem with the openness of scientific data has existed for a long time, and it cannot be underestimated. Let's consider an example. Suppose you are a graduate student looking for scientific articles on a corresponding topic, and you find 20 papers that seem to be interesting and useful to you after you have read the abstracts. Let's say half of these papers are in the public domain and, in order to get the rest of the publications, you, or rather your institution, which does not have a subscription, will have to spend a significant amount of money. As a result, 8 Open Access and 2 purchased papers are really useful to you, and the rest, at best, could be used as references when writing articles and a thesis. Most of the spent money goes nowhere. Those graduate students who work or study in small institutions in poor countries, in principle, cannot afford to buy the necessary articles. The only way they can read the necessary materials is to use “pirated” resources.

Talking about the popularizers of science or people who want to delve into the study of some issue related to science, they practically do not have the opportunity to do it for free and legally. There is an opinion that you can use libraries, but is that really so? Take, for example,

the Russian State Library, the largest in the country. This library has subscriptions to almost all scientific resources, including electronic access to them. Can I use this resource as a promoter or simply as an interested person? If I have a library card, time, and the opportunity to visit the library, then the answer is ‘yes’. Otherwise, I will face problems: the library provides completely free access to only 24 of the more than 130 electronic resources [11]. Some of them can be accessed from a home PC if you have a library card, but most of them – only from the library's computers.

From my point of view, scientific articles are world heritage, and they should be publicly available in order to help the development of all humankind, not just certain countries or commercial organizations”.

### Conclusion

Publications in Open Access mode are only the first but necessary step in order to make scientific publications widely available in modern conditions with possible limitations of access to scientific information.

Open Access to articles provides ample opportunities for education, combating obscurantism and, above all, for the international expertise of scientific papers, which allows Russian and foreign scientists to become participants in the global research market.

Today, science is a unique language of communication, a bridge between scientists, the media, students and teachers, powerful people, and the masses. President of the Russian Academy of Sciences, academician Alexander Sergeev in an interview with Interfax [12] noted: “the relations between scientists [...] may remain the last link in relations between countries”. Integration into the world of science and the establishment of international scientific contacts, which include as one of the goals the strengthening of the position of the state, are impossible without free access to publications of colleagues from different countries. That is why loyalty and support of the concept of Open Access at various levels are so important: from the participants of the scientific community to charitable foundations, commercial structures, state government representatives and everyone who is interested in the further development of science.

### CITATION

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