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History of Use and Interpretation of the Concept of Open Access

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Abstract: Purpose. To explore the history of the use and interpretation of the concept of Open Access prior to the launch of the Open Access movement in 1991. Methodology. To achieve this goal, an in-depth search for publications containing the terms "open access to knowledge", "open access to research", "open access to science", "open access", "open access", etc. was carried out using the analytical and search tools NGram Viewer, Google Books, Google Scholar and The General Index. Findings. The results of a Google Books search of publications showed that the term "open access", including its translations into major European languages, in the sense of access to knowledge, including religious knowledge, was not used in the literature of European languages before the 17th century. It is shown that in English-speaking literature one of the first to use the expression "free and open accefs in the Scripture" was Beverley (1683), and the expression "Free and Open Accesf to all thofe Truths" was used by Oldisworth (1711). The latter expression is very close to the essence of the concept of "open access to scientific knowledge" in its modern understanding. It is shown that the term "open access to knowledge" was first used by the English educator William Ellis (1868). Originality. This is the first study on the prehistory of the Open Access movement to scientific knowledge.

Keywords: Open Access; Open Access to knowledge; Open Access to scientific knowledge; Open Access to research; Open Access to science; NGram Viewer; Google Books; Google Scholar; The General Index.

Introduction

We will not consider in detail the philosophical issues of openness in the epistemic and social sense (Bergson, 1932; Popper, 1945; Jacobs, 2003; Elbakyan, 2023; Pinfield, 2024), except to say that four epochal events are important for this concept - the creation of writing, printing, scientific journals and the internet. The last three events are included in the table of major historical milestones in the progress of open research publishing (Tennant *et al*., 2016), and the last two of them Bartling and Freisike (2014) refer to the first and second scientific revolutions. In all four stages of the evolution of knowledge, this evolution has taken place in the direction of its increasing openness.

In the first two stages, knowledge had a sacred and secret character, for example, all ancient and medieval mathematical manuscripts gave the final results of calculations and proofs without any means of obtaining them. This situation was also observed in the age of medieval printing. Thus, openness here refers to the results of the application of human reason, not to the means of obtaining them.

With the Enlightenment, the founding of the Royal Society of London and the first scientific journals, the situation began to change towards greater openness and publicity of knowledge in the sense of a better understanding of it. But it was not until the 20th century that an unwritten norm emerged for the presentation of scientific research results - an article should be written in such a way that any other researcher can replicate its results, and this can only be done if the empirical basis and methodology of the research are adequately described. It is only in the 21st century that the

"Materials and Methods" section has become a mandatory feature of scientific articles, and a number of major foundations and programmes require researchers to publish their primary empirical data.

As part of the neoliberal doctrine and the commercialisation of knowledge in the 20th century, when all the prestigious scientific journals were acquired by commercial publishers in order to make super-profits by driving up the price of journal subscriptions, an international Open Access movement emerged whose initiators believed that scientific knowledge, obtained with taxpayers' money, should be free and open to all.

But the Open Access movement also provided commercial publishers with the opportunity to earn additional dividends by introducing Open Access options and selling electronic copies of articles. Only recently has there been an attempt to make Open Access more equitable through the introduction of Plan S, which moves from a subscription-based business model to an Open Access model.

As an overview of the history of the open access movement, it is worth mentioning the works of Das (2015), J.P. Tennant *et al.* (2016), Sheikh and Richardson (2023). The starting year of this movement is considered to be 1991, when a procedure for self-archiving publications was first proposed on ArXiv.org, which was founded in that year (Das, 2015).

However, the essence of Open Access was known much earlier than the launch of the Open Access movement and its definitions, which were proposed at the beginning of the 21st century in the first Open Access declarations and initiatives.

Close to the ideas of Open Access is the Open Society concept developed by Bergson (1932), Popper (1945) and Soros (1988).

In its original sense, the phrase "Publish or Perish", uttered by the eminent American geographer and geomorphologist William Morris Davis (1850-1934) at the founding of the Association of American Geographers in 1904, had a positive character and was close to the idea of Open Access.

This can be seen, as V.M. Moskovkin (2024) has shown, from Isaiah Bowman's obituary (1934) on the death of William Morris Davis, in which one can read:

P.180. "To Professor Davis is due the organization of the Association of American Geographers in 1904, at a meeting in his native Philadelphia. He immediately urged that the Association "publish or perish." "If it's worth doing it's worth printing," was his advice to students".

Merton (1942) was also close to the concept of Open Access when he wrote:

P.122. "The institutional conception of science as part of the public domain is linked with the imperative for communication of findings. Secrecy is the antithesis of this norm;full an open communication its enactment. The pressure for diffusion of results is reenforced by the institutional goal of 'advancing the boundaries of knowledge' and by the incentive of recognition which is, of course, contingent upon publication."

This phrase is quoted by Cabanac (2018) in the context of the above table by Tennant et al. (2016), who believes that the origin of the Open Access concept should be found in this very phrase. Moreover, we believe that Robert K. Merton's statement is fully consistent with both the Open Access concept and the phenomenon of "Publish or Perish" in its original sense.

In the following, we will examine the historical background of the phenomenon of Open Access to scientific knowledge and see when the relevant terminology emerged.

Methodology

We will search the literature up to and including 1991, which, as mentioned above, is considered the year of the beginning of the international Open Access movement due to the launch of ArXiv.org (Das, 2015).

First, using an experiment in NGram Viewer (27.11.2024) based on the entire corpus of books digitised by Google Books, we look at the frequency of occurrence of the terms "open access to knowledge", "open access to research", "open access to science" in this corpus of "English" books and their trends over the last two hundred years. The frequency plots from 1800 to the present day are considered to be a representative period in which a relatively large number of books have been digitised and made available online.

The choice of the "English" corpus of books indicates that books published in English worldwide are included. Note also that the book corpus includes conference proceedings, journals, reports and other publications that are fully digitised.

By N - Gram we mean a term consisting of N words. In our case we have three 4-grams. For example, the frequency of the term "open access to knowledge" in a given year is determined by counting the number of publications with this term divided by the total number of 4-gram terms. Therefore, when we test a set of terms in NGram Viewer, it is desirable that they consist of the same number of words.

In this case, these terms are normalised to the same value, which is important for comparison. However, the methodology of the NGram Viewer calculation algorithm does not specify this circumstance, and even the test example on the first page of this tool contains tests of names of different dimensionality (Frankenstein, Sherlock Holmes, Albert Einstein).

The NGram Viewer algorithm calculates the frequency of occurrence of terms with an accuracy of up to ten decimal places. Therefore, a zero frequency does not always mean that there are no publications containing the term.

The detailed frequency distributions for the three terms under consideration are examined in two ways for the time interval 1940-1991 for "case-intensive" (different combinations of small and capital letters in words): 1. Smoothing by 3; 2. Smoothing by 0. The point is that with three-year smoothing we observe non-zero frequencies for those years for which there are no publications with the term in question.

However, even without smoothing (raw data), we have to use Google Books to check for publications in specific time intervals, due to the imperfections of the optical character recognition (OCR) algorithm, especially for older texts.

In examining these frequency distributions and highlighting key publications within them, we rely on the three book publication statuses used by Google Books: full view, limited view, fragmentary view.

The above three terms with the same dimensionality were also tested in Google Scholar.

The terms in question, together with the additional term "open access to scientific knowledge" and "open access to scholarly knowledge", have been tested separately in Google Scholar, Google Books and The General Index, and the latter tool will be used to search for full-text publications in the Internet Archive.

In addition, experiments will be conducted in Google Books to search for publications in which the term "Open Access" appears, highlighting the oldest publications discussing Open Access to knowledge (17th to 19th centuries).

Results and Discussion

Experiments in NGram Viewer to calculate the occurrence of the terms "open access to knowledge", "open access to research", "open access to science".

Testing the terms open access to knowledge, open access to research and open access to science in NGram Viewer over a representative time interval (1800 -2019), non-zero regular frequencies of occurrence of the term open access to knowledge appear around the beginning of 1950, for the terms open access to research and open access to science - around the end of the 1960s. For the term open access to knowledge, a small peak in the distribution of its frequency of occurrence was observed in the interval 1953-1955. Very small non-zero frequencies for this term, corresponding to single publications, were observed for 1868 and 1927.

For a more detailed analysis, let us perform experiments in NGram Viewer in the time interval 1940-1991. First, we will identify time intervals with non-zero frequencies with the standard three-year smoothing (Smoothing of 3 option) for "Case-intensive". To do this, move the cursor slowly and carefully along the time axis of the abscissa in NGram Viewer and mark the above time intervals (Table 1).

Table 1. Time intervals with non-zero frequencies for the terms studied. 1940–1991, Case - intensive, Smoothing of 3.

TermTime interval

open access to knowledge1949 – 1991
open access to research 1952 – 1962, 1964 – 1991
open access to science1952 – 1958, 1968 – 1981, 1983 – 1991

From this table we can see that the first term is used most often, followed by the second term. Let us clarify these time intervals by carrying out the experiment without smoothing (Table 2).

Table 2. Time intervals with non-zero frequencies for the terms studied. 1940–1991, Case - intensive, Smoothing of 0.

Term Time interval
open access to knowledge 1952 – 1955, 1958 – 1961, 1964 – 1991
open access to research 1955, 1959, 1967 – 1969, 1972,
1975 – 1978, 1980 – 1986, 1988 - 1991
open access to science1955, 1971, 1978, 1986, 1988

In contrast to Table 1, in Table 2, in addition to time intervals, there are also individual years with non-zero frequencies. Note that for the term "open access to knowledge" the largest peak with a frequency of 0.0000001415% was observed in 1954 and the second most frequent peak was observed in 1984 (0.0000000531%).

Search using Google Books and The General Index for publications in which the term "open access to knowledge" appears (1868-1955)

Earlier we used the NGram Viewer to identify the two earliest publications in which the term "open access to knowledge" appears. Let's see what those publications are.

In the first case we have the book by Ellis (1868). On page 15 we can read:

“Instruction in reading and writing, even conducted after the latter of these fashions, may open access to knowledge closed to all who are strangers to those arts. But is there any reason for expecting effects from word-knowledge thus acquired similar to those from word-knowledge acquired through the observation and study of the objects and phenomena of daily life?”

In his book, the author argues that in order to overcome the ignorance of the masses in the age of printing, it is necessary to first teach them to read and write.

We found an electronic copy of this book through Google Books. The title page of this copy of the book bears the stamp "British Muzeum" and the inscription "This book has been microfilmed (2003) N.S.T.C.". This means that this book was microfilmed by the National Science and Technology Council (USA). Another electronic copy of this book was placed on the Internet Archive on 12 January 2007 (hosted by the University of California Libraries).

We believe that the book under review is the first to use the term “open access to knowledge”.

William Ellis (1800 – 1881) was an English businessman, writer of economics, and educational thinker. He founded the William Ellis School in London in 1862, which still exists today.

In the second case, we have a snippet from the Proceedings Northwestern University Conference Business Education, which we have not expanded much by looking at the full text of Gay's (1927) paper at the above conference, which we found online at the Hathi Trust Digital Library:

P.89. “...utilizing this freely divulged knowledge with sagacity, speed, and skill of organization. Open access to knowledge, while an advantage to business and a requisite to its standing as a profession, is absolutely essential to that scientific study which the school of business must make its chief concern. Business men have summoned the new educational institutions into being”.

Here, the author says that open access to knowledge should become a fundamental principle and practice in business education.

In the first time interval from 1952 to 1955 (Table 2), we observe about seven journal references to the first edition of Julius Robert Oppenheimer's Science and the Common Understanding (1953), which used the term "open access to knowledge". Robert Oppenheimer's Science and the Common Understanding (1953), which used the term "open access to knowledge". We found the full text of this 1966 edition of the book using The General Index search tool. Here is an extract from the book (Oppenheimer, 1966):

P. 94. “This open access to knowledge, these unlocked doors and signs of welcome, are a mark of a freedom as fundamental as any. They give a freedom to resolve difference by converse, and,

where converse does not unite, to let tolerance compose diversity. This would appear to be a freedom barely compatible with modern political tyranny. The multitude of communities, the free association for converse or for common purpose, are acts of creation…The open society, the unrestricted access to knowledge, the unplanned and uninhibited association of men for its furtherance— these are what may make a vast, complex, ever-growing, ever-changing, ever more specialized and expert technological world nevertheless a world of human community."

The first part of this extract was just quoted in the above journal articles.

Twelve years later, Rouze (1965), analysing Julius Robert Oppenheimer's thoughts on open access, wrote:

P.169. "This "open access to knowledge'' is ensured by the social order characteristic of Great Britain and the United States, with their freedom of speech and freedom of association."

Note that the famous American theoretical physicist Julius Robert Oppenheimer (1904-1967) was the director of the Manhattan Project's Los Alamos laboratory during the Second World War. He is known as the "father of the atomic bomb", but later strongly opposed the creation of the "hydrogen bomb".

Another strong advocate of open access to knowledge during these years was David E. Lilienthal (1899-1981), first Chairman of the Atomic Energy Commission and previously Chairman of the Tennessee Valley Authority, one of the nation's great public power producers. In an interview with Richard G. Baumhoff, a staff correspondent of the St. Louis Post-Dispatch (6 January 1953), he said:

P. 610. "Until industry can apply itself to the task of bringing down the present out' rageously high costs to a competitive economic level, we will never enjoy the benefits of atomic power except for military purposes. If our great industrial history means anything, this simply won't happen until the whole business management, engineering, and chemical profession and some Edison-type inventors have their chance for a crack at it in a wide-open competition of ideas, based upon a wide-open access to knowledge".

These words were spoken by David E. Lilienthal at hearings before the Joint Committee on Atomic Energy, Congress of the United States (Atomic power development and private enterprise, 1953).

Regarding public-private partnerships in the atomic energy industry, the following was written in an editorial in The Freeman (Private Atomic Energy, 1953):

P. 154. "If adopted, these changes will open the way for eventual integrated, and efficient, government - industry relations in the field. It is worth remembering that is was David Lilienthal, a staunch energy by-government pioneer, who said that "industrial development of atomic energy simply won't happen until business management, the engineering and chemical professions—and some Edison-type inventors—have their chance for a crack at it, in a wide-open competition of ideas, based on wide-open access to knowledge."

The fact that the term "wide-open access to knowledge", first proposed by David E. Lilienthal, quickly took hold is evidenced by Senator Guy M. Gillette's speech in the United States Senate (25 January 1954) on the unfair competition from Latin American coffee producers and their support by some organisations in the United States (such as the National Coffee Association), which led to a sharp rise in coffee prices in the country.

In his speech, he made a strong case for open access to knowledge (Congressional Record - Appendix. January 6 – April 6, 1954):

P. A504 "Is it not great to live in a country where every man has a "crack" at any line of endeavor he desires, where there is a wide - open competition of ideas based on wide - open access to knowledge? In a country where you can do something and rear back and look at your accomplishment, to hold it for your own, or to share, as you please?"

Note that Guy Mark Gillette (1879–1973) was an American politician and lawyer who served as a Democratic U.S. Representative (1933–1936) and Senator (1936–1945; 1949–1955) from Iowa.

And the last person to use the term "open access to knowledge" in the period we are considering (1952 - 1955) was Jawaharlal Nehru (1961), who in his statement at the Dynamo Stadium (Moscow, 22 June 1955) said:

P.573. “We believe in democracy and in equality and in the removal of special privileges and we have set ourselves the goal of developing a socialistic pattern of society in our country through peaceful methods. Whatever shape that pattern or democracy might take, it must lead to open access to knowledge and equal opportunity to all”.

These words by Jawaharlal Nehru in 1955 have been cited in five journal publications and one book publication, according to our search on Google Books for the entire time interval.

Search using Google Books and The General Index for publications in which the terms "open access to knowledge" and "open access to scientific knowledge" appear (1956-1991)

In the second time interval (1958 - 1961, Table 2), Google Books shows two publications from 1959 and 1960, which are actually publications from 2005 (CERN Courier, Vol. 45) and 2007 (Trabajos de Prehistoria, Vol. 64, No. 2). For 1958 and 1961, Google Books does not even show the fake publications.

Thus, we can see that non-zero frequencies on the NGram Viewer graphs do not guarantee the existence of real publications, so it is necessary to look critically and carefully at the search results in NGram Viewer and Google Books.

In the third time interval (1964-1991, Table 2), Google Books gives 69 responses, many of which may be fake, but a quick look at them shows that there are no significant publications. Among them, there are many publications that quote the statements of Julius Robert Oppenheimer and Jawaharlal Nehru that we found earlier.

At the same time, we found interesting full-text publications in this period in the Internet Archive, using the search tool The General Index. Let us look at them in chronological order.

In the works of Local public library administration (1964), Munford (1964) and Sackman (1970), open access to knowledge is considered from the point of view of building a democratic society, social justice and enlightenment. Here are extracts from these works.

Local public library administration (1964, P. 4):

“Our assumptions are those of a democratic society. They come back to individual opportunity and individual decision, both of which rest on open access to knowledge. Furthermore, democracy to be effective must be practiced, whereas other forms of government, whether derived from medicine men, kings, or dictators, need only be accepted to endure. Thus an agency of continuing education such as the library plays a role in the life of the nation as well as of the individual.”

Munford (1964, P. 47):

“These necessary changes could hardly be envisaged, were it not for the fact that the negative institutions that accompanied the rise of the city have for the last four centuries been falling into decay, and seemed until recently to be ready to drop into limbo. . . . slavery, forced labor, legalized expropriation, class monopoly of knowledge, have been giving way to free labor, social security, universal literacy, free education, open access to knowledge, and the beginnings of universal leisure, such as is necessary for wide participation in political duties.”

Sackman (1970, P. 159):

“It might be argued that dedication of computer utilities to free and open access to knowledge in the public domain could lead to a wiser and more enlightened citizenry, and to a higher standard of living for all through the release of latent effective intelligence. It might further be argued that such universalization of information services might lead to greater individual fulfillment in a more humane world.”

On the other hand, Binder (1971) argued that security concerns and commercial competition hindered open access to knowledge:

P. 45. “The modern view values access based on ability rather than initiation and ascription although there are increasingly occasions on which security or other considerations have mitigated against completely open access to scientific knowledge. Commercial rivalries also mitigate free access to scientific knowledge, which tends to be treated as is property in those societies where private property is strongly valued.”

At the same time, Sarkar (1983) writes that knowledge cannot be treated as private property:

P. 176. “The knowledge-seekers will agree that pieces of knowledge should be treated unlike of property, real estate, shares, and bonds, which can be bought and sold on the open, free market.

These knowledge-seekers know that a lack of free, ease, and open access to scientific knowledge and discovery can seriously hamper scientific growth."

As we can see, the last two papers used the term "open access to scientific knowledge" and they are the earliest papers when we search for occurrences of the term in Google Books and The General Index.

Our search of Google Books up to and including 1991 showed that, apart from (Binder, 1971; Sarkar, 1983), there were no other papers in which the term "open access to scientific knowledge" was found.

Let us continue to test the term "open access to knowledge" in Google Books.

In the early 1990s, the debate on open access to knowledge was revived in the US Congress. At a hearing in the House of Representatives on 24 July 1990, Ms Bentlet tried to draw the attention of Congressmen to two newspaper articles about global competitiveness in which the US was beginning to lose ground.

She quoted the following extract from Michael Schrage's article "In R&D, Japan Should Be Willing To Contribute, Not Just Consume", published in the Washington Post on 13 July 1990 (It Needs to Be Said, 1990):

P. 18898. "Morita, who was quick to chide Americans for short-term thinking in his book "The Japan That Can Say No," would immediately get the point. Japan, to Its great credit, has relentlessly and successfully mined America's great research base. For decades, Japan has sent its best and brightest young minds to America's top research universities, the National Institutes of Health and the national labs— tapping into the largest tax-supported research Infrastructure in the world. There is absolutely no question that this open access to knowledge has made a tremendous contribution to Japan's ability to compete so successfully in so many global markets."

At a US Senate hearing on 18 November 1991, Senator Stevens quoted an extract from the statement of James H. Billington (The Librarian of Congress) entitled: "The Rebirth of Russia" (Remark of Dr James Billington, 1991):

P. 32491."It seems only fitting in retrospect that my library colleagues and I were witnesses to the drama of last August. The Russian democrats, scores of whom have visited the Library over the past 3 years, see the Library of Congress as a prime example of what freedom means. They realize that for democracy to work in a complex society, it must be knowledge-based— and that open access to knowledge is the only basis for progress."

Note that Ted Stevens (1923-2010) was an American politician who was a Republican Senator from Alaska (1968-2009). James Hadley Billington (1929-2018) was the 13th Libertarian of Congress after being nominated by President Ronald Reagan in 1987.

Search using Google Books and The General Index for publications in which the terms "open access to research" and "open access to science" appear (1955–1991).

A Google Books search for the term "open access to research" in the time interval 1955-1991, which covers all the smaller intervals and single years in Table 2 yields 17 responses that fall within these smaller intervals and single years, with the exception of one publication from 1973. At the same time, many of them lack publications in which the term in question occurs.

Only the two oldest publications, 1975 and 1976, are of interest in this search. Let us consider them in detail.

In a speech given by Ralph K. Huitt (Executive Director of the National Association of State Universities and Land - Grant Colleges) to the Subcommittee of Health and the Environment of the Committee on Interstate and Foreign Commerce on 30 May 1975, he made suggestions for the future of health sciences research within the framework of the National Institutes of Health programmes. He concluded his presentation by stating (NIH Research Programmes, 1975):

P. 229. "We believe the issue of open access to research information can be resolved to enhance future research."

All of the May 1975 speeches to the Subcommittee of Health and the Environment have been digitised by Google Books and placed in Open Access.

The contradictory attitudes towards open access to research are revealed by Temple University librarian and archivist Miriam I. Crawford in the section "Access and Confidentially" of the book Archive - Library Relations (1976). On this occasion he wrote:

P. 93, 94. “The objective of open access to research materials is based on the assumption that the contents of these papers are of potentially significant general research value — that we are delving into the history or records, not of an individual (unless this is an historic figure), but of a movement or historical period of some social development. In direct opposition to the principle of open access to such historically significant records is the responsibility recognized by the archivist to protect the privacy of personal records – particularly those of living persons – to more so when these are not persons of public reputation.”

It is clear from this extract that the attitudes of librarians and archivists towards Open Access are diametrically opposed. This situation continues to this day. In fact, we do not see any archival leaders and representatives among the signatories of Open Access declarations and initiatives.

We found the full text of this book in the Internet Archive using the search tool The General Index.

A Google Books search for the term "open access to science" in the time interval 1955-1991 yields three responses - two publications in 1971 and one publication in 1986. In 1955, 1978 and 1988, which are marked in Table 2 with non-zero frequencies when searching for this term using the NGram Viewer, Google Books did not find any publications with this term.

Of the two publications in 1971, one on closer inspection was published in 1970, the full text of which we found in the Internet Archive using The General Index. This was a book by Lane (1970) which describing Karl Marx's thoughts on education and science in the Paris Commune:

P.489. “Marx and Engels were less precise about the nature of education under communism. Speaking of the educational policy of the Paris Commune, Marx pointed out that it provided free education for all without ecclesiastical interference and class domination and that there was open access to science and learning.[4] With the abolition of capitalism, society would be free to provide education unfettered by the needs of the ruling classes, based on man’s needs to develop his potential to the full. But the Bolshevik government had to decide what precisely man’s needs were and the ways his potential could be developed.”

Reference number 4 was to "The Civil War in France, Address of the General Council of the International Workingmen's Association", written by Karl Marx on 30 May 1871, quoted in Shore (1947). However, Karl Marx did not use the term "access to science and learning" and David Lane based this on Shore (1947, p. 59), which is in fact close to the concept of Open Access:

P. 59. “The Commune, according to Marx, provided the following educational reforms: a. Free education for all; free school implements; … . Freedom of science; freedom of learning.”

We found the term in question using Google Books in a snippet from a book by Wilson (1971) on the concept of "Open Access curriculum" related to curriculum design in school programmes:

P.205. “... Open Access to Science: Options and Opportunities Creation of the questioning, analyzing individual is often mentioned as a primary goal of education. It is hoped that this mythical individual will want to seek answers for himself ...”

The full text of this book is not available on Google Books. We also found this book in the Internet Archive in a limited view status with the following excerpt:

P. 1. “The OPEN ACCESS CURRICULUM is a comprehensive plan to implement all the current, successful advancements in curriculum design — involving teachers in curriculum planning, team teaching, and flexible scheduling of the school day to give students time to explore and learn.”

The third publication found on Google Books corresponded to an incompletely identifiable source from 1986: Black Issue in Higher Education, 3 (14-22) with the following rather pithy snippet:

P.4 “... open access to science and math - based careers. “Our mission”, said Tanenbaum, " to help bring the vast minority population into the technological mainstream, is extremely important - educationally as well as economically - if ...”

Obviously, these words belong to Andrew Stuart Tanenbaum (born 16 March 1944), a great American - Dutch computer scientist.

Google Scholar search for publications containing the terms "open access to knowledge", "open access to scientific knowledge", "open access to scholarly knowledge", "open access to research" and "open access to science" (1954-1991)

Testing the above terms in Google Scholar before 1953 yields no results (28 November 2024).

Searching for the term "open access to knowledge" in the period 1953 - 1970, we found a journal version of the work by Oppenheimer (1954) entitled "Science and the Common Understanding". Oppenheimer (1954) entitled "Science and the Common Understanding", the book version of which we have already reviewed and quoted an important extract from. Next, we see an article from Nature entitled Interpretation of Scientific Progress (Gellhorn, 1955), which analyses Oppenheimer's (1954) thoughts on open access to knowledge.

This article quotes the following words of his from the Reith Lectures:

P.521. “The open access to knowledge may still be recognized as a fundamental freedom and as one barely compatible with modern political tyranny; but there is less confidence in our ability to achieve the harmony between knowledge in the sense of science and the community of man.”

The remaining 7 responses in the considered time interval considered were erroneous or not verifiable. In the interval 1971-1991, 31 responses were noted, of which 7 were erroneous. Of the responses in this time interval, only the publication by Resnick (1972) is of interest, in which the following words can be read:

P. 70. “An open society requires open access to knowledge for all individuals at any stage of life. It also requires extensive degrees of self-determination with respect to what is learned, when it is learned, and how.”

This article analyses the Open Education movement in the USA.

A further search on Google Scholar for the term “open education” revealed a paper (Walberg and Thomas, 1971) which focuses on the characteristics of open education and provides an overview of the subject. From this paper we learn that "since publication of the Plowden Report (1967), a great deal has been written about Open Education". Thus, we have the exact date of birth of the cluster of publications on open education, as well as the Open Education movement itself.

Let's return to our search terms. Testing the term "open access to scientific knowledge" in Google Scholar in the time interval 1954-1991, two responses are observed, one of which is erroneous, and the other is about social epistemology with the following excerpt (Roth, 1991):

> P. 374. “Why else insist on devoting whatever resources it takes to ensure open access to scientific knowledge for purposes of setting a social agenda, on the one hand, and yet imagine, on the other, that setting the norms of institutional governance might acceptably remain a star-chamber affair?”

When testing the term "open access to scholarly knowledge" in Google Scholar, the first publications appear since 2006, and they are not of interest for our analysis.

When we tested the term "open access to research" in Google Scholar in the time interval 1954-1970, we found the only relevant publication. In West (1969) discusses social change and social science research in Africa and on the lack of open access to research in Nigeria can be read:

P.231. “But neither is there the open access to research sources and freedom of enquiry of the pre-emergency era. In the North, particularly, the propriety of research subjects and the credentials of research workers are subject to question and the old system of protocol and introductions is in disarray.”

The remaining fifty or so responses provided service information on Open Access to research for the University of St Andrews Research Repository and the Pittsburg University Library System. Andrews Research Repository and Pittsburg University Library System. A similar situation occurred when this term was tested in the interval 1971-1991.

Testing the term "open access to science" in Google Scholar in the time interval 1954-1991, we get 6 responses, two of which are relevant.

Note the article by Feibleman (1954) on the place of science in human culture, for which the snippet "...open access to science and culture..." is observed, as well as the book by Wilson (1971), which was previously found in a Google Books search.

Search using Google Books for the oldest publications in which the term "open access" appears (17th - 19th centuries)

Finally, we conclude with similar Google Books experiments using the term "open access" (12 November 2024) to identify the oldest publications related to open access to knowledge.

An advanced search for publications in Google Books (12 November 2024) showed that the term "open access" does not appear in English-language books published before 1600. The same is true for the occurrence of the term in Latin, German, French, Spanish and Dutch.

In the periods 1500-1600 and 1600-1700, the term appears in the books digitised by Google Books in French (access libre) and German (offener zugang) respectively, but without any reference to knowledge or even to the Scripture.

In the English-language corpus of books from 1600 to 1700, the term in question was observed in 18 search results. We did not find any relevant publications among them; open access was considered in the context of divine and secular affairs, specific persons and territories. Below are examples of extracts from these publications that have been digitised by Google Books and made available as full text in Open Access:

... open accefs for all Saints to the throne of Gods grace; ... open accefs to his Throne; ... open accefs unto Places of Dignity and Preferment; ... open accefs to the ordinary channels of Grace; ... open accefs in the Scripture; open accefs to the neceffitics of all, who should prostrate themselves at his feet.

It is important to note that in 16th-18th century English orthography, the letter that read and sounded like an 's' in the middle of a word was written as an 'f'.

At the same time, an extract from this period by Beverley (1683), then Rector of Lilley in Hertfordshire, is of interest to us. He refers to the publicity of religion and the free and open access to the Scriptures. Let us quote this extract:

P.36. “Religion is in this Sense Publick, even as God himself, that it is of free and open accefs in the Scripture, and its Entertainment as liberal as the Light and the Fountains of Water; and no Man need wait till his Religion be drawn out of the private Repofitory of Breaft or Breasts.”

This copy of the book, held at the British Library, was digitised by Google Books on 13 March 2018.

Note that Thomas Beverley (? - 1702) was the most prolific English apocalyptic writer of the late seventeenth century, publishing over forty works expounding the prophecies of the Book of Revelation (Johnston, 2006).

In the period 1701-1800, the term in question was observed in 80 search results, many of which were repeated. In most cases, the situation observed in our previous search was repeated, but philosophical and historical treatises began to appear in which the term in question corresponded to its modern understanding. Let us look at them in chronological order.

The first book was by the famous English writer Oldisworth (1711), who lived between 1680 and 1734. This book from the British Museum was digitised by Google Books on 27 March 2015 and is now in the Open Access. Here is a very interesting excerpt from it:

P. 92. “Now I take it, that the Freedom of Private Judgment in Matters of Religion, conflicts in having Free and Open Accefs to all thofe Truths, which it is poffible for Human Reafon or Private Fudgment to Attain, and in a full Power to Reafon and Argue there upon. And is not this Liberty granted by the Church of EngLand to all her Members?”

The words "Free and Open Accesf to all thofe Truths" from this excerpt are very close to the modern meaning of "Open Access to scientific knowledge". It is now well known that Protestantism (especially Puritanism) had a decisive influence on the development of science in the New Age. Merton (1938) was one of the first to write about it, and Neuburg (1992) outlined the timeframe of the activation of the Open Access to the Scriptures movement: “*… great Protestant tradition of open access to the Scriptures reached its apogee between eighteen hundred and nineteen hundred*”.

We can now say that one of the first ideas about open access to scientific knowledge was expressed by William Oldisworth in 1711.

The second book was by the great French scientist Huet (1725). This book from the Bodleian Library was digitised by Google Books on 15 June 2007 and is now in the Open Access. Here is an extract from it:

P. 173-174. “And if once I get you to own that there is any Rule to difcern Truth from Falfhood, there is of courfe an open Accefs to Truth.”

The first French edition of this book, which the author considered to be his best work, was published in Amsterdam in 1723. Given the importance of this scientist, we will quote information about him from Wikipedia:

“Pierre Daniel Huet (1630 – 1721) was a French churchman and scholar, editor of the Delphin Classics, founder of the Académie de Physique in Caen (1662–1672) and Bishop of Soissons from 1685 to 1689 and afterwards of Avranches”.

The third publication in “The New London Review” was by the great English scholar White (1800). The entire issue of this journal from the UC Southern Regional Library Facility was digitised by Google Books on 3 August 2015, and is in the Open Access. Here is an extract from it:

P. 425. “Paterculus published his memoirs about four years before the demise of Nero; Suetonius and Tacitus wrote on the authority of recent tradition, and conserved with many eminent personages, who had been witnessed of facts, or agents; and, besides, these biographers had open access to the national archives, which they occasionally quoted.”

According to Wikipedia, Joseph White (1745–1814) was an English orientalist and theologian, Laudian Professor of Arabic and then Regius Professor of Hebrew at the University of Oxford.

Note that by 1800 there was already a new spelling without the letter 'f', which read 's' in the middle of words.

In the period 1801-1900, the term in question was observed in about 350 search results, many of which were repetitive and irrelevant.

The time interval in question includes the book by William Ellis (1868), which we considered earlier when testing the term "open access to knowledge" in Google Books.

Also important from the point of view of Open Access to knowledge is the book by Chadwick (1870), in which you can read:

P.110. “Professor Blackie (Edinburgh Essays, 1856) says, - “There is one door through which the English mind has a free and open access to Platonic philosophy, viz., Religion; and it is really astonishing, when we reflect seriously, how little this avenue has been made use of “.

The importance of students' knowledge of modern languages for open access to the educational and scientific literature of the learned nations of Europe can be read in the Year Book (1890), published by Albion College:

P. 34. “Also modern languages open access to the valuable living literature of the learned nations of Europe, and it is important that the student possess the key to this storehouse of learning early in his course, …”

The principle of Open Access for Lending Libraries, i.e. specifying the number of volumes to which access is available, began to be advocated in library literature in the late 19th century. This principle was called the Open Access System or Open Access to Public Libraries, which became a powerful movement at the time (Foskett, 1894). This became clear when the archive of "The Library" (London) was digitised.

A look through this archive shows that from the early 1890 this journal began to publish many articles and correspondences both for and against the movement. The criticism in the correspondence was often under the heading "Attacks on Open Access Libraries".

We see the first articles in this journal from 1894 (Brown and Finchman, 1894; Foskett, 1894). The attitude of Brown and Fincham (1894) to the principle of open access is very interesting from a historical point of view. They write:

P.344."There is absolutely no novelty about the principle of open access, because it has been allowed in all kinds of libraries, both reference and lending, for some hundreds of years. As most librarians know, the libraries of mediaeval times were perfectly open, but in keeping with the manners of the age, the books were chained to their places above or below suitable reading desks."

The same view was expressed by Hulme (1898):

P. 50. "The library is, and always has been, administered upon the principle of open access to the shelves, a privilege, the value of which is enhanced by a minute system of classification, which to some extent renders the student independent both of the library staff and catalogue."

Jast (1901) argues that open access libraries may no doubt get along very well without catalogues, while at the same time the importance of annotated catalogues is discussed by Doubleday (1899):

P. 195." But it has yet to be shown that borrowers are, as a matter of fact, and apart from all sentiment, better served by going to the shelves than by using a library that is fully and intelligently catalogued. The general sense of librarians agrees that a good general catalogue is preferable to the class-lists which apparently are thought sufficient for open- access libraries. And this view must be strengthened if the catalogous pay due attention to subject-headings and are annotated".

In addition to the British journal "The Library", "The Library Journal", the official organ of the American Library Association, was published in the United States during these years, often highlighting the British experience with Open Access Libraries.

In addition to these two journals, whose publications can be found online, the "Annual Reports of the Public Libraries Committee" and "Annual Reports of the Commissioners", published since 1892, which mention the term "Open Access" in the context of Public (Free) Libraries, have been digitised and made publicly available.

Earlier, we found out the date of the launch of the Open Access movement (1991). The latter movement gave rise to the Open Science movement, which combines open access, open source software and open data. Our experiments in Google Scholar show that the first publications on this movement appeared around 2005-2006 (Gonzalez, 2006).

Conclusions

Thus, before the Open Access movement was launched in 1991, there was a rather long history of publications using the terms open access to knowledge, open access to scientific knowledge, open access to science, open access to research, open access, which were identified through deep searches in Google Books, Google Scholar and The General Index, using the NGram Viewer analysis tool in combination with Google Books.

The NGram Viewer analysis tool allows you to study trends in the frequency of occurrence of different terms over more than two hundred years across the entire corpus of books indexed by Google Books.

An analysis of the frequency distribution of the term "open access to knowledge" revealed the earliest book by William Ellis, published in 1868, which argued that in the age of printing, in order to

overcome the ignorance of the masses, it was first necessary to teach people to read and write, and only then would they have access to knowledge.

The importance of this book is demonstrated by the fact that two of its electronic copies have been digitised and made open access by the Internet Archive and Google Books.

The next single but less significant work on economic education was published in 1927.

We found a cluster of publications generated by the term "open access to knowledge" in the period 1953 - 1955, and it was related to the book by J. Robert Oppenheimer (1953) and Jawaharlal Nehru's speech in Moscow in 1955. It shows that references to these were actively pursued over the next ten years.

In addition to J. Robert Oppenheimer, another American figure who actively promoted the idea of open access to knowledge in the 1950s was the first Chairman of the Atomic Energy Commission, David E. Lilienthal. We have been able to show that he was the first to use the term "open access to knowledge". J. Robert Oppenheimer's ideas and David E. Lilienthal's ideas about open access to knowledge triggered a broad debate at the highest level in the USA in the 1950s.

In the early 1990s there was a renewed debate in the US Congress about open access to knowledge, which was linked to the country's loss of global competitiveness, and the Japanese experience was cited as an example of a radical improvement in this competitiveness, as well as the need to implement the idea of open access to knowledge for democratic progress, which came from library circles.

We have shown that the first works using the term "open access to research" date from 1975 and 1976. The most important of these was the work of Miriam I. Crawford, librarian and archivist at Temple University, which revealed a diametrically opposed attitude to open access to research materials on the part of librarians and archivists. As we can see, this situation has persisted to the present day, as we rarely see archival leaders and representatives among the signatories of Open Access declarations and initiatives.

In order to study the background to the emergence of these terms, we searched Google Books for publications using the basic term "open access" in different languages, starting from the birth of the printing press. It was shown that the term appeared in French (access libre) and German (offener zugang) in the 16th and 17th centuries respectively, but was used without reference to knowledge or even to Scripture.

It is shown that in English-speaking literature one of the first to use the expression "free and open accefs in the Scripture" was Beverley (1683), and the expression "Free and Open Accesf to all thofe Truths" was used by Oldisworth (1711). The latter expression is very close to the essence of the concept of "open access to scientific knowledge" in its modern understanding.

As far as the various open access movements are concerned, it is well known that the open access to scientific knowledge movement was launched in 1991 (Open Access movement), but we found that such a movement for public libraries was launched much earlier, in the early 90s of the 19th century, and the Open Education and Open Science movements were born in 1967 and 2005-2006 respectively.

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