

DENTIFICATION OF HYBRID OA, DELAYED OA & HYBRID CUM DELAYED OA JOURNALS IN THE FIELD OF PHYSICS: AN ANALYTICAL STUDY FOR QUALITY CONSIDERATION

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ABSTRACT

The study was an endeavor to identify the different types of Open Access journal cited by researchers of the top-ranked institutions (MIT, CIT & STANFORD) in the field of physics, particularly hybrid, delayed & hybrid cum delayed OA journals. Scientometric indicators (viz; citation count, I.F, h-index, immediacy-index & SJR) were used for evaluation of identified journals. The study reveals that these journals are quite impressive, as their performance indicated by employed parameters is decent. The study also succeeded in enlisting the top 5 (hybrid, delayed & hybrid cum delayed OA journals) as per each scientometric parameter applied. The study is limited to only top 3 universities in the USA and only concerned with the field of physics. The results may or may not be the same to the other parts and institutions of the world. The study also implicates that, OA journals particularly hybrid, delayed & hybrid cum delayed OA journals identified could be very useful for researchers, as well as knowledge dissemination centers, R&D institutions & libraries around the world, which aims to use, provide access to qualitative scientific literature to its clientele especially in the field of physics.

Keywords: OA type (viz: hybrid & delayed), Top 5 journals, Scientometrics(h-index, I.F, citation count, Immediacy-index & SJR)

1. INTRODUCTION

The scientific literature is of vital importance for researchers to nourish their scientific shrewdness but mostly it was available in Toll-Access mode. Open Access has resolved the said problem to some extent by providing the free access to quality scientific literature. Today the concept of Open Access is much more popular throughout the globe and is deeply influencing every aspect of human understanding. Open Access removes the barriers, like subscription, technical and legal barriers in accessing the scholarly scientific literature and enables a free and unrestricted access to full-text journal articles, technical reports, conference papers, thesis and other scientific literature, across the globe [1; 2; 3]. Open Access has lot of advantages, which makes its importance increased day by day but one should harness the ability to understand the concept of Open Access in its all

ramifications. Especially, researchers from developing countries, who are facing the financial problems, are not able to access toll access journal literature. They should be aware of Open Access and its various forms like the hybrid, delayed OA & hybrid cum delayed OA. The Open Access is a broad concept not so easy to understand, generally a person perceives that open access is only free access to scholarly contents, but there are restrictions on these contents even if it comes under the banner of Open Access like, some journals support Open Access and provide free access to its contents instantly after publishing it's all contents these are termed as fully open access journals. Similarly, some provide free access after going through an embargo period these could be called as delayed open access journals, and some provide both Toll-Access contents as well as some proportion of free access contents these are termed as hybrid OA journals. The common term Open Access is tagged among all the three forms, which can mislead the understanding of a person, there is vital need to shed light on these various facets of Open Access to acquaint the audience with a systematic clarification of, what actually Open Access means and what are its various forms/types. In this milieu, the present study is an effort to analyze and explain Open Access particularly hybrid, delayed and hybrid cum delayed OA .The study also makes an attempt to identify the core, delayed OA journals, hybrid OA journals as well as hybrid cum delayed OA journals.

2. PROBLEM

Generally, a person considers that OA means the free access to the scientific literature, accessed, downloaded and distributed freely without any financial and other barriers. But, the concept of Open Access is par what actually it seems, little is known about different types of OA like, hybrid Open Access, delayed Open Access & hybrid cum delayed OA etc. There is a need to explore the meaning and understanding of these concepts along with the identification of certain journal resources, in order to make a clear understanding of Open Access and its sub-facets. Besides, the quality of identified journals needs to be evaluated. In this milieu, the present study is an attempt to assess, observe and explain the concept of hybrid OA, delayed OA, & hybrid cum delayed OA, the proportion of hybrid OA, delayed OA & hybrid cum delayed OA journals cited by the researcher of MIT, CIT & SANFORD universities.

3. LITERATURE REVIEW

The researchers from every field are heavily dependent on the accessibility of latest scientific literature in their field. Mostly the scientific literature is subscription based, only financially capable researchers are in a position to access them, and those who were economically poor can hardly afford to access these publications. The concept of Open Access has changed the scene of accessibility to scholarly literature to a greater extent but the concept is still lesser known to those who could get major benefits out of it like the researchers who face financial problems. It is believed that "open access is a cost-effective way to disseminate and use information. It is an alternative to the traditional subscription-based publishing model made possible by new digital technologies and networked communication" (Association of Research Libraries, 2004) cited by [3a]. Similarly, Open Access to literature means its free availability on the internet without any restriction to download, distribute, copy, print and use it for any lawful purpose (Budapest Open Access Initiative, 2002) as cited by

[3b]. In the same vein, Open Access means the free access, without subscription, payment or registration, to the full text of scientific journal articles, working papers, thesis and dissertations and other grey literature [4;5] Open Access is a cost-efficient approach to disseminate and use the scientific literature and accelerates the creation and widens the dissemination of scientific knowledge[6]. Similarly, the literature shows that OA diminishes the costs of scientific literature publishing, this advocacy could be a valid reason for researchers to make use of OA routes [7], and secondly, the impact of individual authors can get enhanced due to OA[8]. Open Access helps in building the linkages between the individual scientists and fosters interdisciplinary research [9]. Similarly, [10] it has been founded that OA has a significant positive impact on the availability of the scientific journal literature, there are major differences between the scientific disciplines in the uptake, and the reason is lack of awareness of OA publishing among the scientists. The concept of OA is wide and deep in its scope, it is an umbrella term encompasses various types like, “gratis OA (free of charge, but not free of copyright or licensing restrictions), libre OA (free of charge and expressly permits uses beyond fair use), delayed OA (paid access initially, becoming open after a set time period), green and gold OA (pay-for-production followed by delayed publication in an OA repository or gratis OA) and so on” (Suber, 2013) as cited by [11]. Similarly, OA to scientific articles can be made in two ways: authors can self-archive their publications on the web (Green OA) or by publishing their papers in OA journals (Gold OA)[12; 13; 14; 15] asserts “gold OA publishing is rapidly increasing its share of the overall volume of peer-reviewed journal publishing, and there is no reason for authors not to choose to publish in OA journals just because of the ‘OA’ label, as long as they carefully check the quality standards of the journal they consider”.

The concept “types Open Access” can also be understood more easily by the terms viz; Hybrid OA & Delayed OA. The hybrid OA is “the term commonly used for describing individual articles being provided openly within subscription-only journals through an optional author payment; it is only recently that this type of OA has been properly studied” (Björk B-C) as cited by[16]. The scholarly publishers have started to offer the authors an option to make their papers freely accessible under hybrid-OA by paying the OA publication fee; these papers also go through a standard peer review process and ask the authors to choose the option of OA. Copyright still remains with the author, he/she has the right to publish the final version of the article in institutional repositories without any embargo period[17].According to [18], the trade-off between Open and Closed access to scientific articles can be seen as the technique if hybrid access. In comparison to this, [19] opines, “To publish those papers whose authors do not want to pay Open Access publishing fees in non-Open Access form for a certain period of time, before making them Open Access — so-called “delayed Open Access”.Similarly, “the delayed access model indicates that researchers (and their libraries) place a premium on immediacy of access. This immediacy is also important for news releases, which would not be able to access these articles at the time news releases are issued. However, news releases remain online and indexed in search engines for years after they are released, as demonstrated in this study. Therefore, hyperlinking to articles will, over time and with no additional effort, facilitate access to an increasing number of the articles mentioned, from one-third to over one half” [20]. There are different ways by which authors can publish their articles, giving them Open Choice; whether they would like to publish their articles traditionally with access restrictions or

whether they prefer to pay a publication fee & make their works freely available to everyone. Or delayed Open Access; provide open only after a certain period of time, e.g. six months [21]. Thus it can be deduced that both hybrid Open Access and delayed Open Access are recognized routes to publish the scientific articles, former provides the partial access to some proportion of scientific contents and the latter provides Open Access after a delayed time of, at least six months. The concept of ETD's has influenced the OA movement to a great extent as it has enabled the sharing of scientific literature in an electronic mode, made possible to access the same literature via multiple nodes from different locations across the globe. [22] Asserted, "ETDs can be easily located, readily accessible, and delivered over the Web". Similarly, [23] believes that quality of a university will be linked to its digital library of these and dissertations (ETDs digital library). The contents of ETD's are in electronic format, made it possible to reach & access by the wider audience from far-off distances via World Wide Web. The ETD's are used to disseminate the OA scientific literature and are made available through different OA repositories. Presently there are more than 2,600 repositories registered in Directory of Open Access Repositories [24]. Similarly, there were more than 9,925 Open Access journals published in all subjects [25].

Concluding the above-cited literature, it can be said that OA can serve as a backbone to access to scientific literature; OA has different characteristics which advocate its usage. But the concept is not clearly understood due to unawareness of its appearance in different forms, under various terms like hybrid OA & delayed OA and hybrid cum delayed OA etc. Scientific literature can be accessed via these forms of OA; they too strengthen the OA movement. These resources particularly journal resources need to be identified. The study makes an effort to explore these resources especially the hybrid journals & delayed OA journals along with their impact, using various performance indicators in the field of physics.

4. SCOPE

The scope of this study is confined to the top three universities in the USA (MIT, CIT & STANFORD) to find the core hybrid OA, delayed OA journals & hybrid cum delayed OA journals their quality & usage, cited by researchers in the field of physics in their selected ETDs submitted during the year 2014

5. OBJECTIVES

The main objectives of this study are:

- i. To measure the hybrid, delayed & hybrid cum delayed Open Access content cited by select ETD's in the field of physics.
- ii. To identify the core hybrid, delayed, hybrid cum delayed OA journals widely used by researchers of MIT, CIT & STANFORD in the field of physics.
- iii. To evaluate the hybrid, delayed & hybrid cum delayed OA journals cited by the select ETD's in terms of various scientometric parameters viz. citation count, h-index, I.F, Immediacy-index, SJR

6. METHODOLOGY

The study was on a quest to identify & evaluate the hybrid delayed & hybrid cum delayed OA journals in the field of physics, cited by researchers of top institutions of the USA. In order to give smooth impetus to present study, top three institutions (viz; MIT, CIT & STANFORD) were selected through The Times Higher Education World University Rankings. Theses submitted by researchers in the field of physics during the year 2014 were selected. The references of each select thesis were scanned & extracted, accordingly run on the Google Scholar to identify the source journals along with nature of access provided by these journals. The study was successful in finding out that around (21.7715%) references were OA, in which (6.25%) were fully OA, (6.294%) were hybrid OA, (3.0418%) are delayed OA & (6.179%) comes under hybrid cum delayed OA. Quality of these journals was checked by employing the scientometric parameters viz; citation count, I.F, h-index, Immediacy-index, SJR. After applying these indicators to identified source journals it was found that a majority of journals have a decent impact, indicating their quality itself. The study was keen to identify the core hybrid, delayed and hybrid cum delayed OA journals, and succeeded in listing the top 5 journals under each said category.

7. RESULTS AND DISCUSSION

7.1. Aggregate Corpus of References

The study was conducted on hybrid OA ,delayed OA & hybrid cum delayed OA resources cited by researchers of top institutions of the world(MIT, CIT & STANFORD).it was found that a total of 36 ETD's (out of which 2 ETD's were available in closed mode)were deposited in respective repositories of the selected institutions during the year 2014. Accordingly, these ETD's were scanned to extract references from them. Around the total of 5227 references were extracted from these selected ETD's. Google Scholar was used to running these extracted references and pursued up to the referred article. The purpose was to check the source journals one by one to confirm the nature of access offered by the journal. The study reveals that a total of (1138; 21.77%) references are OA with the subdivision of :(327; 6.25%) fully OA, (329; 6.294) hybrid OA, (159; 3.0418) delayed OA & (323; 6.179) hybrid cum delayed OA references. Table 1 offers a detailed view.

7.2. Top 5 hybrids, delayed& hybrid cum delayed OA Journal on the Basis of Citation count

Citation analysis is the process whereby the impact or "quality" of an article is assessed by counting the number of citations or the number of times an article is cited by other works to measure the impact of a publication or an author. The present study attempted to employ this indicator to check the quality of hybrid OA, delayed OA & hybrid cum delayed OA journals cited by selected ETD's by researchers from MIT, CIT & STANFORD in the field of physics. As per this performance indicator, the top 5 hybrids, delayed & hybrid cum delayed OA journals, cited by researchers in the field of physics were identified. The most popular among them as per citation count is, hybrid OA Journals: Classical and Quantum Gravity(64), followed by neuron (36), Journal of Cosmology and Astroparticle Physics(21), Euro physics Letters (EPL)(17),& Nucleic Acids Research(15).Similarly, The most popular among them as per citation count is, delayed OA Journals: PNAS(Proceedings of the National Academy of Sciences of the United States of America)(63),followed by;

Astronomy & Astrophysics(46), JOURNAL OF NEUROPHYSIOLOGY(23), EMBO Journal(9), & cell(8). While, the most popular among them as per citation count is, hybrid cum delayed OA Journals: The Astrophysical Journal (220), followed by; The Astrophysical Journal Letters (45), Journal of Bacteriology (16), The Astrophysical Journal Supplement Series (13), & Publications of the Astronomical Society of the Pacific (11). These top journals are frequently cited by researchers. [Table 2 offers a lucid view.](#)

7.3. Top 5 hybrid, delayed & hybrid cum delayed OA Journal on the Basis of Impact Factor

The most widely used scientometric indicator is Impact factor. It aims to allow direct comparison of sources in a specific subject field. It measures the average number of citations to recent articles published in the journal. The impact factor of a journal is calculated by dividing the number of current year citations to the source items published in that journal during the previous two years. As the study was desirous to check the value of hybrid, delayed & hybrid cum delayed OA journals, I.F was quite beneficial to serve the purpose. Top 5 (hybrid, delayed and hybrid cum delayed OA journals) were selected based on highest I.F. These include, hybrid OA journals: Physics Reports (16.24), neuron (15.054), Trends in Cell Biology (11.532), Trends in Genetics (9.918), & Progress in Particle and Nuclear Physics (9.472). Among delayed OA journals, the most popular are Cell (32.242), Microbiological Reviews (17.31), Cell Stem Cell(15.05), Genome Research (11.351), & EMBO Journal (10.4). Similarly, the most popular hybrid cum delayed OA journals as per I.F are: The Astrophysical Journal Supplement Series(11.215), The Astrophysical Journal (5.909), The Astrophysical Journal Letters (5.487), Monthly Notices of the Royal Astronomical Society: Letters (5.487), & Monthly Notices of the Royal Astronomical Society: Letters (4.952). [Bird's eye view is offered by Table 3](#)

7.4. Top 5 hybrids, delayed & hybrid cum delayed OA Journal on the Basis of H-index

Scientometric parameter H-index is another vital performance indicator used to measure the productivity and impact of a journal. This index is based on the set of the scientist's most cited papers and the number of citations that they have received in other publications. It aims to allow direct comparison of sources in a specific subject field. H-index can be applied to the productivity and impact of a group of scientists, such as a department or university or country, as well as a scholarly journal. As features associated with the h-index are numerous, that compels us to use this indicator to evaluate the hybrid, delayed & hybrid cum delayed OA journals. A list of top 5 hybrid, delayed and hybrid cum delayed OA journals was compiled, based on highest H-index of these journals, among them the highly influential hybrid OA journals are: Physical Review Letters (471), Nucleic Acids Research (379), Neuron (372), APPLIED PHYSICS LETTERS (346), & Bioinformatics (271). In the same vein, most popular delayed OA journals as per highest H-index includes: PNAS(Proceedings of the National Academy of Sciences of the United States of America)(604), The Journal of Biological Chemistry (435), EMBO Journal (336), The Journal of Cell(318), & Genome Research (232). While as, the qualitative highest h-indexed OA journals among hybrid cum delayed OA journals are: The Astrophysical Journal(309), Journal of Bacteriology(196), The Journal of Physiology(191), The Astrophysical Journal Supplement (184), & Publications of the Astronomical Society of the Pacific (116). [Table 4 offers a lucid picture.](#)

7.5. Top 5 hybrid, delayed & hybrid cum delayed OA Journal on the Basis of Immediacy index

Immediacy Index is the average number of times an article is cited in the year it is published. For comparing journals specializing in cutting-edge research, the immediacy index can provide a useful perspective. The study employed this metric to evaluate the performance of hybrid, delayed and hybrid cum delayed OA journals. List of top 5 (hybrid, delayed and hybrid cum delayed OA journals) as per immediacy index was created; hybrid OA journals: Physics of Life Reviews (16.57), Progress in Particle and Nuclear Physics (5.5), Physics Reports (3.92), neuron (3.22), & Trends in cognitive sciences (3.15). Among delayed OA journals; Cell Stem Cell (6.14), Cell (5.93), Genome Research (3.2), EMBO Journal (2.66), & Astronomy & Astrophysics (2.04) were top journals with highest immediacy index among the rest of delayed OA journals cited by researchers. Similarly, most impressive immediacy index indicating hybrid cum delayed OA journals are: The Astrophysical Journal Supplement Series (3.28), The Astrophysical Journal (1.74), Monthly Notices of the Royal Astronomical Society: Letters (1.66), The Astrophysical Journal Letters (1.58), & The Journal of Physiology (1.46). **Table 5** offers a detailed view.

7.6. Top 5 hybrids, delayed & hybrid cum delayed OA Journal on the Basis of SJR

The SC Imago Journal Rank (SJR) is a prestige metric, measures the scientific prestige of journals based on the idea that "all citations are not created equal". With SJR, the subject field, quality, and reputation of the journal has a direct effect on the value of a citation. It aims to allow direct comparison of sources in different subject fields. Using this parameter to explore the performance of journals especially the hybrid, delayed & hybrid cum delayed OA journals is a purposeful effort because of its unique features. Top 5 (hybrid, delayed & hybrid cum delayed OA journals) were selected based on highest SJR. Top 5 hybrid OA journals are neuron (11.46), Trends in cognitive sciences (10.16), Trends in Cell Biology (9.57), Molecular Biology and Evolution (8.17), & Physics Reports (8.10). Delayed OA journals with highest SJR includes Cell (23.58), Genome Research (14.35), Cell Stem Cell (13.12), Microbiological Reviews (9.8), & The Journal of Cell Biology (7.92). whereas top 5 hybrid cum delayed OA journals are The Astrophysical Journal Supplement Series (6.52), Monthly Notices of the Royal Astronomical Society: Letters (3.48), The Astrophysical Journal Letters (3.37), The Astrophysical Journal (2.81), & The Journal of Physiology (2.67). **Table 6** offers a lucid view.

8. CONCLUSION

The findings of the present study revealed that around 6.294% hybrid OA, 3.0418% of delayed OA & 6.179% of hybrid cum delayed OA journal literature is cited by the researchers of MIT, CIT & STANFORD universities in the field of physics. Even being capable enough to access the Toll-Access literature, these researchers make use of a good amount of OA literature, thus intimate that OA resources are qualitative in nature and must be utilized by researchers across the globe. The study succeeded in identifying the numerous core (hybrid, delayed & hybrid cum delayed) Open Access journal resources with high impact factors, and other performance indicators applied. These journals could be used by researchers from any part of the world without any financial and other constraints. The present study also posits that the usage percentage of (hybrid, delayed & hybrid cum

delayed OA journals) is low to some extent; the reason is lack of awareness about these types of OA. The study also depicts that there will be a trending increase in usage of these resources in coming years throughout the globe, the need is to expose these resources to researchers, libraries and Research & Development Agencies, and they can make optimum utilization of these resources. The study finally suggests that Open Access publishing along with its use should be encouraged and strengthens by whatever means necessary.

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Table 1. Percentage of references OA & CA					
Total References	Total Open Access (OA)				Closed Access (CA)
	Fully Open Access	Hybrid Open Access	Delayed Access	Hybrid cum Delayed Open Access	
5227	1138 (21.7715%)	327 (6.25%)	329 (6.294)	159 (3.0418)	4900 (78.2284%)
				323 (6.179)	

Table 2: Top 5 hybrid ,delayed & hybrid cum delayed OA Journal on the Basis of Citation count

S.NO	HYBRID JOURNAL	Citation count	DELAYED JOURNAL	Citation count	HYBRID & DELAYED JOURNAL	Citation count
1	<i>Classical and Quantum Gravity</i>	64	PNAS(Proceedings of the National Academy of Sciences of the United States of America)	63	The Astrophysical journal	220
2	neuron	36	Astronomy & Astrophysics	46	The Astrophysical Journal Letters	45
3	<i>Journal of Cosmology and Astroparticle Physics</i>	21	JOURNAL OF NEUROPHYSIOLOGY	23	Journal of Bacteriology	16
4	Europhysics Letters (EPL)	17	EMBO Journal	9	The Astrophysical Journal Supplement Series	13
5	Nucleic Acids Research	15	Cell	8	Publications of the Astronomical Society of the Pacific	11

Table 3: Top 5 hybrid ,delayed & hybrid cum delayed OA Journal on the Basis of Impact Factor

S.NO	HYBRID JOURNAL	I.F	DELAYED JOURNAL	I.F	HYBRID & DELAYED JOURNAL	I.F
1	Physics Reports	16.24	Cell	32.24	The Astrophysical Journal Supplement Series	11.215
2	neuron	15.05 4	Microbiological Reviews	17.31	The Astrophysical journal	5.909
3	Trends in Cell Biology	11.53 2	Cell Stem Cell	15.05	The Astrophysical Journal Letters	5.487
4	Trends in Genetics	9.918	<i>Genome Research</i>	11.35 1	Monthly Notices of the Royal Astronomical Society: Letters	4.952
5	Progress in Particle and Nuclear Physics	9.472	EMBO Journal	10.4	Publications of the Astronomical Society of the Pacific	4.422

Table 4: Top 5 hybrid ,delayed & hybrid cum delayed OA Journal on the Basis of *H-index*

S.N O	HYBRID JOURNAL	H- IND EX	DELAYED JOURNAL	H- INDE X	HYBRID & DELAYED JOURNAL	H- INDE X
1	<i>Physical Review Letters</i>	471	PNAS(Proceedings of the National Academy of Sciences of the United States of America)	604	The Astrophysical journal	309
2	Nucleic Acids Research	379	The Journal of Biological Chemistry	435	Journal of Bacteriology	196
3	Neuron	372	EMBO Journal	336	The Journal of Physiology	191
4	APPLIED PHYSICS LETTERS	346	The Journal of Cell Biology	318	The Astrophysical Journal Supplement	184
5	Bioinformatics	271	<i>Genome Research</i>	232	Publications of the Astronomical Society of the Pacific	116

Table 5: Top 5 hybrid, delayed & hybrid cum delayed OA Journal on the Basis of *Immediacy index*

S.NO	HYBRID JOURNAL	Immediacy-index	DELAYED JOURNAL		HYBRID & DELAYED JOURNAL	Immediacy-index
1	Physics of Life Reviews	16.57	Cell Stem Cell	6.14	The Astrophysical Journal Supplement Series	3.28
2	Progress in Particle and Nuclear Physics	5.5	Cell	5.93	The Astrophysical journal	1.74
3	Physics Reports	3.92	Genome Research	3.2	Monthly Notices of the Royal Astronomical Society: Letters	1.66
4	neuron	3.22	EMBO Journal	2.66	The Astrophysical Journal Letters	1.58
5	Trends in cognitive sciences	3.15	Astronomy & Astrophysics	2.04	The Journal of Physiology	1.46

Table 6: Top 5 hybrid ,delayed & hybrid cum delayed OA Journal on the Basis of SJR

S.NO	HYBRID JOURNAL	SJR	DELAYED JOURNAL	SJR	HYBRID & DELAYED JOURNAL	SJR
1	neuron	11.46	Cell	23.58	The Astrophysical Journal Supplement Series	6.52
2	Trends in cognitive sciences	10.16	Genome Research	14.35	Monthly Notices of the Royal Astronomical Society: Letters	3.48
3	Trends in Cell Biology	9.57	Cell Stem Cell	13.12	The Astrophysical Journal Letters	3.37
4	Molecular Biology and Evolution	8.17	. Microbiological Reviews	9.8	The Astrophysical journal	2.81
5	Physics Reports	8.10	The Journal of Cell Biology	7.92	The Journal of Physiology	2.67