

## Chapter 16

# Article Processing Charges and Their Impact in Open Access Publishing

**Mary Metilda Jayaraj**

*CHRIST University (Deemed), India*

**Anil Joseph Pinto**

*CHRIST University (Deemed), India*

**Sathish Pachiyappan**

*CHRIST University (Deemed), India*

### **ABSTRACT**

*Knowledge transfer is the key to the sustained growth of human civilization. This chapter on open access and article processing charges aims at addressing the various issues associated with open access publishing as a business model with a distinct opportunity. The chapter throws light on article processing charges (APC), the relevance of impact factor, citations, and pricing. The complexities the researchers confront, and the rise of predatory journals and their concerns are discussed in detail. The ethical dimensions of publishing and the role and relevance of the Committee on Publication Ethics (COPE) are also explored. This chapter dwells on some of the remedial measures to improve the awareness and practices among the diverse stakeholders.*

DOI: 10.4018/978-1-7998-9805-4.ch016

## **INTRODUCTION**

Knowledge is power and acquired knowledge has to be shared for humanity to survive and progress. With the development in communication technologies, the shared knowledge space has increased manifold. Dissemination of knowledge is one of the key factors in the progress of civilization, as is evident in the advancements in science and technology, education, healthcare etc. In this era of internet and digital communication, there is no dearth of information, but evidence-based knowledge transfer is the key to the sustained growth of human civilization. This is of paramount importance in academia and research. However, access to authentic and relevant information is not easy. One of the reasons for low-quality research across the globe is the lack of access to relevant, credible and appropriate resources. Individual authors need to make payments to access articles from quality journals. Open access publication is an important development in this context and has come as a distinct opportunity for the academic and the research community to publish and to have access to quality research work.

The open access publishing model helps the research community in having access to a wide range of research work not accessible earlier to a majority of knowledge creators and was a deterrent to research progress. They can now have better access and greater scope for publication. It also gives high visibility to the authors' works and creates wider scope for collaborative work. With the publication, citation, h-index, i10 index becoming the Academic Performance Indicators (API) in institutions of higher education, the open access model of publication is more welcoming to the academia. The discussions in this chapter will focus on the open access centred on the academia. The chapter begins by introducing the Open Access as business model with its variants. The focus is on Article Processing Charges (APC), the relevance of impact factor, citations, and the pricing of the big players in the publishing industry and its impact on the researchers. This is followed by a discussion on the concerns and complexities faced by the researchers and how APC is both an opportunity and at times a burden to the authors in the new open access model. The ethical dimensions of publishing and the concerns over the rising predatory journals are also explored. The role and relevance of the Committee on Publication Ethics (COPE) and the need and ways in which the scientific community can mitigate the problems in publishing has also been touched upon.

## **OPEN ACCESS AS A BUSINESS MODEL**

Knowledge is not only power, it is power and money. And it is power and money like never before (Kerr, 1994, pp. 9-15). Open access (OA) is the provision of free and unrestricted online access to research outputs such as journal articles, books, amongst others. Published research outputs can now be accessed without the usual subscription fees. Open access (OA) supports the researcher to access the earlier work of most authors with little or no restrictions. Publication of Journal articles usually fall under two business models

1. Subscription based, where individuals or institutions subscribe to the journals and make the payment.
2. Open access journals where Article publishing charges (payments) are borne by the authors, institutions /universities or funding agencies. Article Processing Charge (APC) is the central funding mechanism for open access journals (Solomon & Bjork, 2012).

Interestingly the open access model seems to fall under different variants depending on the business model followed by publishers (Omiunu 2019; Suber, 2012). This at least primarily includes “gold, green, and hybrid models”. In Gold open access model, the publications is freely available on the publisher’s website immediately. This has the advantage of increased visibility and has an impact on how frequently it is cited.

The green Open Access enables authors to archive their own work on a website controlled by them, or their funder, or on an independent repository. This version of the article is called as the post print which is almost the accepted manuscript after peer review. The green open access allows the authors to republish the articles in various other open access repositories like Google scholar, research gate etc. The third is the hybrid open access journals where some articles are openly available after payment while other articles remain closed as in subscription based journals. Journals that do not come with any financial obstacles for authors as well as readers are called diamond or platinum open access (Fleming et al., 2021; Haschak, 2007).

Now with the open access publishing and breakthrough in technology, it is easier to collaborate across disciplines and across national boundaries. The research output has increased manifold from across the globe unlike in earlier times where the research output was more from the west. More scientific papers being published from China compared to United States (US National Science Foundation, 2018) is a testimony to it. The open access model is one of the biggest positive changes in the publishing industry and benefits the research community. This business model has also some questionable issues which need to be fixed. A few of the trends and developments in the industry is discussed below.

## **The Big Players**

A small number of big publishers with their competitive advantage get more submissions and assert themselves in the market place (Woodmass et al., 2015). The Open access publishing has created an explosion of titles, most of which seem to be competing for a small slice of a fixed pie (Davis, 2009, pp. 3-8). When open access journals are highly selective to maintain rigorous quality control and use innovative technologies in disseminating information, it becomes very expensive. It can also be noted that while highly selective journals running in the open access mode struggle to break even at times, large-volume of low-selectivity open access publishing generates substantial profit (Leptin, 2012, pp. 1279-1282).

## **Gold Access Model and Research Institutions**

As the number of researchers publishes their work in gold access model, the universities and other research institutions have to bear the APC charges which are beyond the annual budgets for journal subscriptions. The Research-intensive institutions would pay the lion’s share and this would subsidise free access for less research-intensive institutions. This may lead to questionable dominance of scientific publishing by richer institutions (All European Academies Report, 2018).

The other publishers who are highly selective may struggle to break even and large number of open access journals may end up compromising on quality and increasing volumes. These complexities along with different requirements and reporting for gold, green, hybrid model raises a number of ethical concerns and also creates confusion for the researcher’s both in having access to and contributing to the knowledge pool.

## **Article Processing Charges (APC)**

The Open access model is a matter of much debate on certain dimensions. One of the contentious issues is the Article Processing Charges (APC). With the rise in publication costs, the authors have to pay APCs upfront to cover the cost of publishing most of the time. Publishers mention different criteria they use to decide on the APCs. Elsevier publication, one of the leading private publishing houses, claims that it uses journal quality, the journal's editorial and technical processes, competitive considerations, market conditions and other revenue streams associated with the journal as criteria for deciding on APCs for its journals. Such business models bring a lot of revenue to the publishers. However, the fact remains that the authors and their institutions pay for knowledge creation and also to access the same.

Majority of the publishing houses generally do charge the same APC for authors coming from countries with deep economic disparities. But some journals do charge variations of APC. Considering the disparities in income they charge moderately for lower-middle income countries and comparatively lesser for authors from the low income countries. Also, APCs are based on the number of pages of article submitted by the researcher. The adoption model of APC is sometimes different based on the field and region (Asai, 2019, pp. 44-56). It has to be stated that not all open access journals charge their authors with publishing fees. It is evidenced that most of the open access journals found in Latin America, followed by Middle East and Eastern Europe Countries do not charge APC (Appel & Albagli, 2019).

## **Pricing**

The APCs are listed on publisher websites or are recorded by Directory of Open Access Journals (Morrison et al., 2015). The average prices paid for Article Processing Charge (APC) is between 905 EURO (Pinfield & Middleton, 2016) and 1479 EURO (Pieper & Broschinski, 2018). This has only increased over time.

In 2021 (Morrison et al., 2021) it was evidenced that global average APC per journal has increased from 906 USD to 958 USD per journal whereas global average of per article has been raised from 904 USD to 1626 USD which reflects that there are tremendous changes in APC especially in articles than in journals. The study also highlights that authors prefer to publish in most expensive journals. The highest APC collected is in the field of biomedicine, health sciences, followed by biology, education, social sciences, law, political sciences and life sciences (Solomon & Bjork, 2012).

APC or publication fees shifts the burden of payment from readers to authors. Authors end up paying sometimes both, to have access to relevant journals from subscription journals and also end up paying to get their work published in open access journals. They also have to pay to publish in Hybrid journals in which individual articles in a subscription journal can be made open access. 'Nature' has recently made its articles open access moving from its subscription only publishing. The publishers charge a whopping \$11390. Higher the popularity and citation index, higher the processing charges. The average APC for hybrid journals has been calculated to be almost twice as high as APCs from full open access publishers (Björk et al., 2014). Journals with high impact factors from major publishers tend to have the highest APCs.

## APC, Citation Index and Impact Factor

The reputation of the journal is determined by the journal metrics such as number of individual citations, institutional citations, impact factor and scholarly publications. The impact factor will be estimated on the basis of number of citations done in the previous two years in the respective journals. If the articles in the respective journals gets more citations, it will increase the impact factor and vice versa. At times many researchers may not have access to articles in subscription journals due to the high APC and may look for freely available sources. This may lead to decrease in the citations of the papers in the respective journals. Accordingly, the impact factor of those journals tends to be affected. However, the evidence found in a study (Budzinski et al., 2020) shows that Journal Impact Factor has a positive and significant relationship with the Article Processing Charges (APC). Wren's study found that papers from high-impact journals were more likely to have free online copies at other locations around the web than papers from low-impact journals (Wren, 2005, pp. 1128-1145).

(Asai, 2019, pp. 44-56) has identified publisher strategies with regard to APC. The first is the generation of revenue from the open access publishing which makes APC positively correlated with the citation index and the second is that APCs do have a high correlation with the number of articles submitted, which further attracts more submissions from the researchers. Also the type of publisher plays a major role in attracting more submissions (Budzinski et al., 2020). The study explored the correlation matrix and evidenced that the size and age of the publishers is correlated with the APC. The five popular publishing houses charging higher APC are SAGE, Elsevier, Springer, Wiley and Taylor & Francis (Asai, 2019, pp. 44-56)

## APC - A Burden to the Authors?

In a study conducted at Icahn School of Medicine at Mount Sinai, which includes 310 faculty members, (Halevi & Walsh, 2021), to examine how authors prepare for and fund APCs, 50% of them include anticipated APC costs in grant applications, and 16% of faculty pay APCs using personal funds. The institution published around 5714 articles, out of which 2860 were published as Open Access (OA) and the payment requirement in the form APC, for most of these articles ranged from \$1500 to over \$5000. Faculty members across institutions are required to publish every year. When publishing happens every year, one can imagine the amount of money that goes into payment as APC especially from personal sources. One reason could be that not all authors have access to funders or are not aware of its sources. The journals of five major academic publishers like Elsevier, Springer Nature Group, Wiley-Blackwell, Taylor & Francis, and Sage are found to be hybrid journals. A Hybrid Open Access publishing model is one in which some articles are made openly available, against the payment of an Article Processing Charge (APC). Here the readers need a subscription or pay to view individual articles. This model allows the authors the possibility to open up their individual article as Open Access immediately upon publication, but only on payment of charges similar to APC. Most top subscription journals as already mentioned, are hybrid journals, whose price levels are typically around 3,000 USD, which many authors and their institutions perceive as high (Tenopir et al., 2017). This is a matter of even greater concern to the authors from developing and under developed nations.

The growth in hybrid journals has obviously brought about major changes in the funding infrastructure with more and more research funders coming up with grants to bear APC. However the flip side to it is that if the author uses the grant fund for APC, it correspondingly decreases the use of fund for other

## ***Article Processing Charges and Their Impact in Open Access Publishing***

assignments like conferences, research assistants etc. It gets wrapped into the general research funding. Sometimes institutional funds such as library budgets are also used to pay APCs, which creates a situation wherein an institution is paying subscription fees as well as APCs, often to the same publishers (Cantrell et., 2020; O’Hanlon et al.,2020). These factors suggest that the burden of APC is more on the authors who have to pay for knowledge creation.

### **APC- The Ethical Dimension**

The Open access models have the potential to breed unethical practices among authors. With publication being one of the academic performance indicators, academicians choose to publish regularly especially in journals with high impact factor and potential for greater citation. Though APCs are higher depending on the geographical location, discipline and the type of journals, most authors prefer publishing in journals with APCs high or low. With more and more submissions and not very high standards of review, causes the journals to be delisted from popular databases. This is unfortunate and goes against the career prospects for authors whose work has been up to certain standards. Resultant duplicate submissions and redundant publications in open access journals can be on the rise only to be categorised as clone or predatory journals on a later date. Sometimes original work and significant findings published in such journals may not get noticed.

Ethical issues can be classified to include the following (All European Academies Report, 2018)

1. Possibility of restriction in academic freedom
2. Emergence of APC figure as a measure of quality
3. Mushrooming of bogus (‘predatory’) journals
4. Increased use of bogus journals
5. Hybrid journals – ‘double dipping’

As publishers move their economic model from high-priced subscription journals to high-priced article-processing fees, it creates new pressures on research budgets for those without generous funding. This is a bigger problem in low income countries where funding is sparse. The ethics of access have to do with recognizing people’s right to know what is already known, as well as having access to it. The level of access is often reduced by the financial interests of publishers in a market in which there is little sense of a rational order, given huge discrepancies in prices for similar products (Willinsky & Alperin, 2011). This becomes a limitation to the researchers in having access to scholarly resources in terms of quality of knowledge that is already there but access limited and for the new knowledge it would have likely inspired.

Circumstance may warrant that researchers may find themselves restricted to publishing their work in less appropriate journal either due to the APC charges (non-availability of funds) or may be due to the requirement of different open access models. This especially is a matter of concern for researchers in third world countries where they are deprived of an equal opportunity compared to their peers from other developed nations and the funding process is well organised. This creates a wider gap in the research outputs between countries and questions of freedom of science and principle of equal opportunity (All European Academies Report, 2018)

## The Rise of Predatory Journals

The 'publish or perish' bench mark for career advancements and high APC charges as a metric for quality can create a false standard or criteria for assessing scientific excellence. These pressures indirectly or directly lead to the uncontrolled growth of predatory and cloned journals which are a main concern. This vicious cycle has to be addressed. The researchers in a way get penalised in spite of their knowledge creation. (Shen & Björk, 2015) survey found 8,000 predatory journals published around 400,000 articles. The number only increases over the years. In the process good quality research can also be delisted which is a big discouragement to the scientific community. Some of the unethical practices in closed-access journals but which are not generally seen as unethical are practised in open access journals as well. For example, citation manipulations where authors are deliberately encouraged to include references which can increase citations of the journal.

## Why Researchers Publish in Predatory Journals?

With all the complexities discussed above, researchers may find it easier to disseminate their work in predatory or bogus journals. Genuine researchers may do so either out of ignorance or poor guidance from their peers. Increasing the career prospects is found to be one of the main reasons for researchers to pay and publish with low standards of peer review leading to low quality output. Awareness is also a main issue. Researchers may not be able to differentiate between a quality open access journal and a bogus one. The reason is predatory journals appear to be legitimate (Lalu et al., 2017).

Below are the Salient evidence-based characteristics of potential predatory journals as described by (Riley et al., 2017)

1. The scope of interest includes non-biomedical subjects alongside biomedical topics.
2. The website contains spelling and grammar errors.
3. Images are distorted/fuzzy, intended to look like something they are not, or which are unauthorised.
4. The homepage language targets authors.
4. The Index Copernicus Value is promoted on the website.
5. Description of the manuscript handling process is lacking.
6. Manuscripts are requested to be submitted via email.
7. Rapid publication is promised.
8. There is no retraction policy.
9. Information on whether and how journal content will be digitally preserved is absent.
10. The Article processing/publication charge is very low (e.g., < \$150 USD).
11. Journals claiming to be Open Access either retain copyright of published research or fail to mention copyright.
12. The contact email address is non-professional and non-journal affiliated (e.g. @yahoo.com).

Some of the recommendations by (Lalu et al., 2017) can be considered to minimise getting trapped into publishing in bogus journals.

- Publishers, research institutions and funders should issue explicit warnings against illegitimate publishers.

### ***Article Processing Charges and Their Impact in Open Access Publishing***

- Funders and research institutions should prohibit the use of funds to support predatory journal publications;
- Make sure that researchers are trained in how to select appropriate journals when submitting their work
- Audit where grantees, faculty members and research staff publish.
- When seeking promotion or funding, researchers should include a declaration that their CV is free of predatory publications.

Having discussed the ethical concerns in detail on various dimensions it becomes imperative to understand the role of COPE on publication ethics.

### **THE ROLE OF THE COMMITTEE ON PUBLICATION ETHICS (COPE)**

COPE and its members since its inception play a major role in addressing the ethical concerns of research and the scientific community. The Committee on Publication Ethics (COPE) which was founded in April 1997 is a non-profit organization with a mission to define best practices in the ethics of scholarly publishing.

Cope encourages editors of peer-reviewed academic journals, companies that publish peer-reviewed academic journals and universities to become an individual or corporate member of COPE. To ensure that the members are sufficiently transparent about their business practices, COPE alongside Open Access Scholarly Publishers Association (OASPA), Directory of Open Access Journals (DOAJ), and World Association of Medical Editors (WAME) has compiled a minimum set of criteria that journals will be assessed against when they apply for membership. Membership in COPE helps individual authors and institutions who are concerned about the ethical dimensions of publishing to be more transparent and adhere to the principles of scholarly publications. COPE members are free to attend annual seminars organised but COPE, seek advice on individual cases via forums, have access to eLearning package, use ethical audit tool to see how well their journal matches the COPE's guidelines on ethical publishing etc., Individual authors too should make efforts to become more aware of the ethical practices of the journal they propose to publish. They can use these criteria for assessing a journal before considering the journal for publication. They can also have access to the COPE's other resources which are available to both members and non-members including the, flowcharts, Core Practices, Best Practice guidelines, newsletters, cases database, podcasts of forum discussions and retraction guidelines.

### **CONCLUSION**

The open access publishing model is an important development in the transfer and sharing of knowledge. Therefore it becomes essential for all the stakeholders including researchers, publishers, universities, funding agencies, institutions like ICAI and COPE along with its partnering organisations to have a shared understanding of what our obligations are in undertaking this research and scholarship. Commercialization of OA has to be evaluated in comparison to non-commercial approaches, including those pursued by the vast majority of OA journals, which do not charge article-processing fees. Publishers need to relook at the criteria for APCs and reduce the charges so that more researchers have equal opportunity and



contribute to the pool of knowledge. It is such an irony that knowledge creators should bear the burden of the complexities in the process of disseminating the same. Researchers too on their part can assess journals for their authenticity before submitting to journals. The Cabell's index regularly lists the predatory journals, so does The Directory of Open Access Journals which provides useful information about credibility of OA journals. Assessing on the criteria used by COPE to evaluate journals is also useful. All this can help researchers in identifying the right journal for publication. Institutions and administrators of higher education should also have a more realistic approach to Academic Performance Index and recognize and affirm academic integrity as a core institutional value so that this model is here to stay for the benefit of the academic and research community. As open access publishing is unfolding as a significant alternative in academic publication and radically promising and it is important to nurture it.

## REFERENCES

- All European Academies. (2018). *Report- Ethical Aspects of Open Access: A Windy Road*. ALLEA. [www.allea.org](http://www.allea.org)
- Appel, A. L., & Albagli, S. (2019). The adoption of Article Processing Charges as a business model by Brazilian Open Access journals. *Transinformação*, *31*, 151–159. doi:10.1590/2318-0889201931e180045
- Asai, S. (2019). Determinants of article processing charges for medical open access journals. *The Journal of Electronic Publishing: JEP*, *22*, 44–56.
- Björk, B. C., & Solomon, D. (2014). Developing an effective market for open access article processing charges. *Abgerufen am*, *22*, 1-68.
- Budzinski, O., Grebel, T., Wolling, J., & Zhang, X. (2020). Drivers of article processing charges in open access. *Scientometrics*, *124*(3), 2185–2206. doi:10.1007/11192-020-03578-3
- Cantrell, M. H., & Swanson, J. A. (2020). Funding sources for open access article processing charges in the Social Sciences, Arts, and Humanities in the United States. *Publications*, *8*(1), 1–13. doi:10.3390/publications8010012
- Davis, P. M. (2009). Author-choice open-access publishing in the biological and medical literature: A citation analysis. *Journal of the American Society for Information Science and Technology*, *60*(1), 3–8. doi:10.1002/asi.20965
- Fleming, J. I., Wilson, S. E., Hart, S. A., Therrien, W. J., & Cook, B. G. (2021). Open accessibility in education research: Enhancing the credibility, equity, impact, and efficiency of research. *Educational Psychologist*, *56*(2), 110–121. doi:10.1080/00461520.2021.1897593
- Halevi, G., & Walsh, S. (2021). Faculty Attitudes Towards Article Processing Charges for Open Access Articles. *Publishing Research Quarterly*, *37*(3), 384–398. doi:10.1007/12109-021-09820-x
- Haschak, P. G. (2007). The 'platinum route' to open access: A case study of E-JASL. *The Electronic Journal of Academic and Special Librarianship*, *1*, 131–144.
- Kerr, C. (1994). Knowledge ethics and the new academic culture. *Change: The Magazine of Higher Learning*, *26*(1), 9–15. doi:10.1080/00091383.1994.9938486

## **Article Processing Charges and Their Impact in Open Access Publishing**

Leptin, M. (2012). *Open access—pass the buck*. Academic Press.

Morrison, H., Borges, L., Zhao, X., Kakou, T. L., & Shanbhog, A. N. (2021). *Open access article processing charges 2011-2021*. Academic Press.

O'Hanlon, R., McSweeney, J., & Stabler, S. (2020). Publishing habits and perceptions of open access publishing and public access amongst clinical and research fellows. *Journal of the Medical Library Association: JMLA*, 108(1), 47–58. doi:10.5195/jmla.2020.751 PMID:31897051

Omiunu, O. G. (2019). An Open Access Model for Quality Scientific Outputs in a Quasi-Linear Information Society: A Pareto Optimality Approach. In *Exploring the Relationship Between Media*. Libraries, and Archives. doi:10.4018/978-1-5225-5840-8.ch001

Pieper, D., & Broschinski, C. (2018). Open APC: a contribution to a transparent and reproducible monitoring of fee-based open access publishing across institutions and nations. *Insights*, 31.

Pinfield, S., & Middleton, C. (2016). *Researchers' adoption of an institutional central fund for open-access article-processing charges: A case study using innovation diffusion theory*. Academic Press.

Riley, D. S., Barber, M. S., Kienle, G. S., Aronson, J., von Schoen-Angerer, T., Tugwell, P., ... Gagnier, J. J. (2017). CARE 2013 explanations and elaborations: Reporting guidelines for case reports. *Journal of Clinical Epidemiology*, 89(1), 1–27.

Shen, C., & Björk, B. C. (2015). 'Predatory' open access: A longitudinal study of article volumes and market characteristics. *BMC Medicine*, 13(1), 1–15. doi:10.1186/12916-015-0469-2 PMID:26423063

Solomon, D. J., & Björk, B. C. (2012). A study of open access journals using article processing charges. *Journal of the American Society for Information Science and Technology*, 63(8), 1485–1495. doi:10.1002/asi.22673

Suber, P. (2012). *Open access*. Sections 3.1 and 3.2. MIT Press. doi:10.7551/mitpress/9286.001.0001

Tenopir, C., Talja, S., Horstmann, W., Late, E., Hughes, D., Pollock, D., Schmidt, B., Baird, L., Sandusky, R., & Allard, S. (2017). Research data services in European academic research libraries. *LIBER Quarterly*, 27(1), 23–44. doi:10.18352/lq.10180

Willinsky, J., & Alperin, J. P. (2011). The academic ethics of open access to research and scholarship. *Ethics and Education*, 6(3), 217–223. doi:10.1080/17449642.2011.632716

Woodmass, J. M., Esposito, J. G., Ono, Y., Nelson, A. A., Boorman, R. S., Thornton, G. M., & Lo, I. K. (2015). Complications following arthroscopic fixation of acromioclavicular separations: A systematic review of the literature. *Open Access Journal of Sports Medicine*, 6, 97–105. PMID:25914562

Wren, J. D. (2005). Open access and openly accessible: a study of scientific publications shared via the internet. *BMJ*, 330, 1128-1145.

## **ADDITIONAL READING**

Beasley, G. (2016). Article processing charges: A new route to open access? *Information Services & Use*, 36(3-4), 163–170. doi:10.3233/ISU-160815

Bruns, A., & Taubert, N. (2021). Investigating the Blind Spot of a Monitoring System for Article Processing Charges. *Publications*, 9(3), 41. doi:10.3390/publications9030041

Budzinski, O., Grebel, T., Wolling, J., & Zhang, X. (2020). Drivers of article processing charges in open access. *Scientometrics*, 124(3), 2185–2206. doi:10.1007/11192-020-03578-3

Fruin, C., & Rascoe, F. (2014). Funding open access journal publishing: Article processing charges. *College & Research Libraries News*, 75(5), 240–243. doi:10.5860/crln.75.5.9120

Ghane, M. R., Niazmand, M. R., & Sabet Sarvestani, A. (2020). The citation advantage for open access science journals with and without article processing charges. *Journal of Information Science*, 46(1), 118–130. doi:10.1177/0165551519837183

Graf, C., Wager, E., Bowman, A., Fiack, S., Scott-Lichter, D., & Robinson, A. (2007). Best practice guidelines on publication ethics: A publisher's perspective. *International Journal of Clinical Practice*, 61, 1–26. doi:10.1111/j.1742-1241.2006.01230.x PMID:17206953

Lawson, S. (2015). Article processing charges paid by 25 UK universities in 2014. *Journal of Open Humanities Data*. <https://research-repository.st-andrews.ac.uk/handle/10023/17021>

Marincola, F. M. (2003). Introduction of article-processing charges (APCs) for articles accepted for publication in the Journal of Translational Medicine. *Journal of Translational Medicine*, 1(1), 1–2. doi:10.1186/1479-5876-1-1 PMID:14527344

Mathers, C. D., & Murray, C. J. (2003). Introduction of article-processing charges for Population Health Metrics. *Population Health Metrics*, 1(1), 1–3. doi:10.1186/1478-7954-1-8 PMID:14613521

Phillips, C. V. (2005). Introducing article-processing charges and inviting "detailed methods sections" articles. *Epidemiologic Perspectives & Innovations*, 2(1), 1–4. doi:10.1186/1742-5573-2-5 PMID:15941486

Suber, P. (2002). Open access to the scientific journal literature. *Journal of Biology*, 1(3). <https://jbiol.biomedcentral.com/articles/10.1186/1475-4924-1-3#citeas> PMID:12144706

## **KEY TERMS AND DEFINITIONS**

**Article Processing Charge (APC):** APC is a fee charged to make an article open access on publication. It is the central funding mechanism for open access journals.

**Citation Index:** A citation index is a kind of bibliographic index, an index of citations between publications, allowing the user to easily establish which later documents cite which earlier documents.

**COPE:** Committee on Publication Ethics is a non-profit organization with a mission to define best practices in the ethics of scholarly publishing.

## ***Article Processing Charges and Their Impact in Open Access Publishing***

**Diamond or Platinum Open Access:** Journals that do not come with any financial obstacles for authors as well as readers are called diamond or platinum open access.

**Double Dipping:** When a publisher benefits twice from an author to make an article “open-access.” and from a library for a subscription to that journal.

**Gold Open Access Model:** The publication is freely available on the publisher’s website immediately.

**Green Open Access:** Enables authors to archive their own work on a website controlled by them, or their funder, or on an independent repository.

**Hybrid Open Access Journals:** Some articles are openly available after payment while other articles remain closed as in subscription-based journals.

**Impact Factor:** Impact factor of a journal is defined as total number of citations for the articles published in a proceeding 2 years divided by total number articles published in 2 years.

**Open Access (OA):** Open access is the provision of free and unrestricted online access to research outputs such as journal articles, books, amongst others without the usual subscription fees.

**Retraction Policy:** The policy of a publisher in retracting a published article: An article may be retracted when the integrity of the published work is substantially undermined owing to errors in the conduct, analysis and/or reporting of the study. Violation of publication or research ethics may also result in a study’s retraction.