The scope of open peer review in the scholarly publishing ecosystem

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This study explores the selective corpus of existing literature on Open Peer Review (OPR) to understand and map the extent of adoption of OPR in the scholarly communication, the reflection of different aspects of human emotion embedded in the open peer review reports and authors' response as well, the influence of OPR reports on citation status of articles, and application of Blockchain, Artificial Intelligence and similar technologies in improving the operational viability as well as acceptability of OPR among the scholarly community. The study finds the emergence of various OPR adoption policies and levels of adoption together with emerging models of scientific publishing. Clearly, there is a lack of uniform OPR adoption policy. It also highlights the association of different sets of human emotional traits with OPR reports. The experimentation with the possibility of treating preprint servers and open access repositories as a manuscript marketplace for the eventual selection of articles for open peer review and journal publication is noticed. More research on the influence of human behavioural aspects on OPR practice and the application of emergent technologies in OPR would be required before finally settling down on a stable roadmap for OPR.

Introduction

The present scientific publication market is shared by societies such as the American Chemical Society; institutions like the Institute of Physics, and the Institute of Electrical and Electronics Engineers (IEEE) and a few profit-making major industry players such as Elsevier for journals and SCOPUS databases, Clarivate for metrics as well as the Web of Science database. Most of the services of these for-profit industry players are kept behind paywalls. There is a certain degree of secrecy in their operations which raise a concern about fairness, quality, performance, cost, unpaid labor, transparency, and accuracy of the evaluation processes they employ[1]. This traditional publishing industry has so far been largely successful in making the scholarly community believe the well-crafted myth that their way of reviewing and publishing is the most prestigious one.

Peer review has been an integral part of the editorial process since the dawn of dissemination and communication of research through journal and periodical publications. In the peer review process reviewers painstakingly judge the scholarship of an article by involving themselves either in single or multiple rounds of reviews to suggest bringing incremental improvements to the article. At each round, reviewers' comments guide the author(s) to bring in the desired changes in the article. In that sense, arguably reviewers may be viewed as co-contributors in an article and together they form the essence of collaborative science that is supposed to bring out possibly the best of a paper.

In the traditional peer review process, most of the time, reviewers remain anonymous, and their comments are not disclosed generally which is why the reviewers may be said to act as a sort of ghostwriter[2]. But the policy of anonymity and secrecy in traditional peer review practices perhaps has been the weakest spot[3] that has been well documented in the history of scholarly communication when the fabrication of data by Hwang Woo-Suk of Seoul National University in two infamous articles on human embryonic stem cell research had gone undetected during peer review and editorial process of the famous journal *Science*[4] and thereby literally backfired the closed system.

With a phenomenal increase in research activity together with the 'publish or perish' syndrome among research scholars looking for career advancement, there has been an exponential increase in article submission out of either the urge to disseminate the research outcome or of compulsion to publish for career advancement. This has created tremendous pressure on an existing pool of the limited number of

reviewers attached to the traditional publishing industry to accommodate an ever-increasing number of articles for review within the shortest possible timeframe. Such a bottleneck situation has encouraged the critiques of the traditional peer review process to doubt its effectiveness and value. Notorious delay in the traditional peer review process might also have robbed innumerable submitted manuscripts of their contemporariness. On the other hand, the advent of the internet has challenged the modus operandi of the traditional publishing and distribution industry by introducing the possibility of decentralization in scholarly publishing and knowledge dissemination. Could this be considered a favorable circumstance for alternative approaches including open and post-publication review and the possible use of article-level metrics as a replacement of traditional peer review[5] or supplementing pre-publication peer review with some form of postpublication evaluation[6]?

Open Peer Review

Open peer review (OPR) as an alternative to traditional peer review could be seen as one step advancement toward open knowledge practices as it is expected to bring fuller scrutiny, objectivity, and transparency of assessments around research by exposing the identities of authors and reviewers along with reviews[7]. It is easier said than done. Like any endeavor in the scientific realm, OPR must withstand scientific rigor, its applicability must be put under a microscope to find and verify its pros and cons time and again before it becomes an established practice in the system of scholarly communication. OPR could also be seen as a part of open editorial processes and part of a larger context of open journal publishing practices. It is again expected that in the long run, OPR would address the geographical disparity present in the traditional peer review system in terms of underrepresentation of non-western nations[8].

The concept of OPR presents itself in many flavors such as signed review, disclosed/non-anonymous (named) peer review, editor-mediated review, transparent review, crowd-sourced review, pre-publication review, synchronous review, and post-publication review[9,10]. Against this backdrop, a definition of OPR would aid in consolidating our idea about OPR. In absence of a universally accepted definition, the author selected the definition given by Ross-Hellauer (2017)[11] which was the outcome of a critical examination of 22 different definitions of OPR

and his definition goes as: "Open peer review is an umbrella term for a number of overlapping ways that peer review models can be adapted in line with the aims of Open Science, including making reviewer and author identities open, publishing review reports and enabling greater participation in the peer review process." With so much of promises OPR holds, the present review tries to understand the issues surrounding OPR which are expected to have been captured, dissected, and evaluated in the existing pool of published literature, and finally to pick up hints for future research direction.

Objectives of the study

- To understand the extent of adoption of OPR at the publisher, discipline, reviewer, and individual scholar level;
- To get an idea of the interplay of different human emotions during OPR vis-à-vis traditional peer review;
- To investigate any possibility of the Influence of OPR in the citation profile of articles;
- To find if OPR can arrest the untimely disappearance of 'at-risk' articles;
- To understand the role of emerging technologies such as Artificial Intelligence, Machine learning, Blockchain, and InterPlanetary File System (IPFS) in addressing different issues of OPR; and
- To examine the role of library professionals in promoting OPR.

Methods

Library, Information Science and Technology Abstract (LISTA) powered by EBSCO, was consulted for preliminary screening of articles on OPR and sub-themes under OPR. Several inbuilt filters such as peer-reviewed articles, articles published in English, academic journals, etc. were applied to retrieve relevant information on the search terms "Open Peer Review", "OPR", "transparent peer review", and "signed peer review". Fifty articles covering the period of 2000-2021 were ultimately chosen and sub-themes such as "Adoption of OPR", "Psychological foot-prints in OPR", "Influence of OPR on citation profile", "OPR and at-risk articles", "Emerging technologies and OPR" were identified. The term OPR came to common usage in the mid-1990s[12] and hopefully by the year 2000 research articles on OPR might have been published. This explains the inclusion of the year 2000 for literature search. In the

second stage, relevant research works on these sub-themes were searched for in Google Scholar and Mendeley for wider coverage of research findings and twenty more articles were added to the existing list. Although Mendeley is a citation manager service, yet due to extremely impressive coverage[13] literature search has been made. Editorial communication, short communication, papers written in languages other than English, and non-peer-reviewed articles were not considered for this study. Abstracts of the selected papers were studied carefully and the full text of some articles was consulted depending on the degree of complexity of the subject matter that warranted detailed insight into the texts. In a few instances, the full text of cited references from some of the selected articles was consulted too for proper understanding of the antecedents. Special attention was paid to the research problems and research findings in the selected articles.

Merits, drawbacks, and challenges for OPR

At this juncture, it is prudent to critically judge the merits and drawbacks (if any) of OPR and put the process under a microscope so that a comprehensive mapping could be done about its perceived benefits and shortcomings and possible challenges that lie ahead[14]. Unlike traditional blind or double-blind peer review reports, open peer review reports have the advantage of being put to investigations to assess their merits in representing or adding values to scientific papers and to assess their informativeness as a kind of social comment in a scholarly setting. To this end Rashidi et al. (2020)[15] found merits of open review reports in terms of their relatedness to their mother articles in specific, and the knowledge tree in general together with adding values to the contents of the articles. Comprehensive issues related to merits, drawbacks, and challenges for OPR have been taken up further in the following narrative.

Adoption of OPR

Although, OPR, as a concept related to transparency and accountability in the context of scholarly publishing, is steadily gaining ground since the turn of the 21st century, yet in absence of a comprehensive OPR policy, different adopter publishers might have implemented OPR in different ways with different levels of transparency. Transparency could either be at the identity level (Open identities) or review report level (Open reports) or both be included simultaneously. Identity level

disclosure may include reviewer names, affiliations, and credentials whereas review report level disclosure may include time-stamped review histories with provision for referee reports, author rebuttals, or a letter from the editor incorporating reviewers' comments. When a group of reviewers exchanges comments on a manuscript under the OPR set-up, this group is called the informed reviewer group as opposed to traditional review where reviewers do not communicate with each other. In some open access journals review reports may be sought by editors from both informed and uninformed reviewers[16]. OPR could be accommodated in a new editorial model comprising the trinity of open submission, open peer review, and augmented publication[17]. Discipline-wise adoption of OPR also may vary.

All the above factors were investigated by Wolfram et al. (2020)[18]. They found that medical and scientific disciplines (STEM[19]) adopted OPR more than other disciplines and as early adopters, publishers implemented OPR in different ways, so also there exist different levels of transparency. They proposed that time and place of accessibility of open reports might act as important factors for judging transparency level and that publishers of optional OPR journals may as well add metric data in their annual status reports. Introducing the option to rate a review as an integral part of OPR could be used to generate metrics around those ratings which eventually could be used by journal editors to judge the quality of a review as well as to decide the worthiness of a reviewer for future review assignment[20].

Contrary to medicine and life sciences and more generally to the broad field of STEM, social sciences and humanities (SSH) have not been keenly interested in adopting OPR (digital humanities being the only exception)[21]. The reluctance was well reflected during the interview of editors of select social science and humanities journals by Karhulahti and Backe (2021)[22] in their effort to map the perception of SSH editors about OPR. The majority of SSH journal editors not only expressed their satisfaction with anonymous peer review by designating this traditional practice as the "gold standard' but also perceived it as ethically superior and pragmatic in approach in comparison to OPR and acknowledged editorial decision-making power in the traditional journal publication process. Ford (2016)[23], while researching open peer review effects on library and information science journals, found an ideological split between traditionally published journals and open access and association-

affiliated journals where editors of the second group were more willing to consider investigating OPR.

Open peer review may not be occupying the same status in the minds of all scholars. Several factors such asage, gender, years of professional experience, and perception and use of social media might influence authors' opinions. A survey on contributors to Spanish academic journals by Segado-Boj, Martín-Quevedo, and Prieto-Gutiérrez (2018)[24] revealed that contributors, especially younger and female scholars exhibited skepticism and reluctance to accept OPR[25]. Hodonu-Wusu, Noorhidawati, and Abrizah (2021)[26] surveyed Malaysian university researchers to understand the level of awareness, experiences, and attitudes toward OPR. Their findings supported the earlier study by Wolfram et al. on the disciplinary difference in OPR adoption but contradicted findings of Segado-Boj, Martín-Quevedo, and Prieto-Gutiérrez. Younger Malaysian researchers have shown a keen interest in OPR. A low level of awareness of open identities, open interactions, and open reports traits of OPR has been noticed among most researchers. Researchers have expressed their strong concerns about the transparency traits of OPR.

On a different note, pre-prints do not follow the traditional publication route but have so far been extremely successful in disseminating moderated (but not peer-reviewed) research communication. The best example is arXiv, an open-access repository of electronic preprints and postprints, serving scholarly articles in the fields of physics, mathematics, computer science, quantitative biology, quantitative finance, statistics, electrical engineering and systems science, and economics for the last 30 years. Boldt (2011)[27] proposed a simple extension of arXiv.org to open peer review and publishing wherein editors would invite referees for writing public and signed reviews to be attached to the posted preprints and ultimately elevate selected articles to 'published' status. Perakakis et al. (2017)[28] demonstrated the integration of an Open Peer Review Module with two major Spanish DSpace repositories (namely DIGITAL.CSIC and e-IEO) which enabled any scholar to provide a qualitative and quantitative evaluation of any research object hosted in those repositories. With some promising initial results, this technology demonstrator may pave the way for open participation by scholars in reviewing repository resources.

Eysenbach (2015)[29] designated the preprint servers as the "manuscript marketplace" for participating journals to do marketing for community-reviewed manuscripts with healthy positive review ratings to be considered for publication under their editorial ship with prior consent from the author(s) and applicable for the servers agreeing with this ecosystem. JMIR (*Journal of Medical Internet Research*) Preprints is one such kind that demonstrated the success of the "manuscript marketplace" concept.

Resources in repositories are generally kept in a structured manner with metadata and stable Uniform Resource Identifiers (URI). Open publication repositories, with their affordable and sustainable approach, provide a reliable mechanism for registration of authors and their affiliations as well as timestamping to the registered resources which together with metadata and URI ensure greater visibility and long-term availability of the deposited resources. Taking cognizance of these inherent traits, Overlay Peer Reviewing and Overlay Journal Publishing- the two interrelated concepts have recently surfaced which are complementing the existing infrastructure of open publication repositories like arXiv and Hyper Articles enLigne (HAL), i.e., journals that are built as an additional peer-reviewing layer on top of a publication repository. Here peer review begins after the publication of a paper. The possibility of overlay peer reviewing and overlay journal publishing has been successfully demonstrated by Episciences, an overlay publication platform designed by the Centre pour la Communication ScientifiqueDirecte (CCSD) service unit, France[30] with the launch of two journals in the computer science domain onto it.

Meanwhile, the Confederation of Open Access Repositories (COAR), with a motto to bring various projects and systems engaged in managing and developing overlay peer review on the institutional, preprint, or data repositories under a set of common protocols and vocabularies, proposed a draft model of Overlay Peer Review Processes[31] wherein URIs would be the backbone for passing notifications between repositories and other services (having useful functionalities such as annotation, review, etc.) related to the resources held in repositories with the help of two W3C recommendations namely Linked Data Notifications (a standard way for a system to send a notification often bearing a URI to a remote system) and Activity Stream[32] (provides syntax to express metadata about activities in a rich, human-friendly but machine-processable and extensible manner).

Although, much research and prototyping are needed before the proposal becomes viable and highly distributed, technically efficient overlay peer review architecture with seamless participation of any compatible repository and peer review services.

On the other hand, Web 2.0 ushered in new ways of science communication beyond the traditional route of journal/conference proceedings/book publication. The immediate extensions to the traditional publications are blogs and different social media platforms that have rapidly become popular among the scientific community due to their inherent nature of reaching wider audiences with ease and transforming science practices by releasing research outputs from the confines of a few elite to the larger global arena. With all the benefits of these seemingly unparalleled new approaches to science communication comes the obvious issue of the quality and credibility of what is being shared and consumed. Is it possible to bring certain checks to assure the quality of what the larger scientific fraternity is accessing? Could full OPR or optional OPR practice be introduced in this mode of dissemination of scientific literature?

Vesnic-Alujevic (2014)[33] explored the possibilities for peer review and quality control of blogs and social media as an extension of the standard peer review process with a view to bring quality control on the internet and open the sciences to a wider audience. In this connection, the adoption of a collaborative "Coached peer review" process that includes an open exchange of ideas and comments among learner-author, editor(s), and reviewers of academic blogs, could go a long way not only to help publish high-quality academic materials by learner-authors but also help them develop academic writing skills in their early career by providing focused feedback[34].

The plurality of comments and participatory discussion on a research article by the competent public at large in addition to the views communicated by anonymous reviewers working under a traditional peer review environment could eliminate the existence of or possibility of biased judgment if any. But how could the advantages of open access, public peer review, and interactive discussion possibly be combined with traditional peer review and publishing environment? The publisher Copernicus and the European Geosciences Union (EGU)[35] successfully demonstrated the possible combination by adopting a two-stage process of publication and peer review combined with interactive public discussion for open access journal *Atmospheric Chemistry and Physics* and a growing number of sister journals and thereby promoting rapid scientific exchange and thorough quality assurance. Supplementing pre-publication peer review with some form of post-publication evaluation would act as a value addition to improve scientific communication[36, 37].

Some journal publishers like PeerJ Inc.[38] are coming up with new innovative ideas and platforms by blending traditional publishing models with new flavors such as optional OPR, open access, etc. with a larger goal of addressing the requirements of the academic community in several additional ways.

With the emergence of various OPR adoption policies and levels of adoption together with emerging models of scientific publishing and new possibilities of peer review practice, a legitimate question is knocking at our door: would it be possible to sever the traditional tie between peer-review function and journal publishing system so that judging the significance and publication worthiness of a paper would no longer remain with a handful of formal reviewers', rather the scholarship would be judged by whole readership community i.e., a kind of open peer review or to be more appropriate as crowd-sourced peer review.

A kind of contradictory opinion is doing the rounds. Early career researchers are uncomfortable with OPR and favourably want publishers to continue organising peer review because of their perceived independence[39]. But research findings of Fresco-Santalla & Hernández-Pérez (2014)[40] pointed in favour of delinking peer review from traditional editorial initiatives although there could be multi-front challenges to overcome. The immediate issue would be the concern regarding scholarship or degree of domain expertise of crowd-sourced peer reviewers as it is beyond doubt that expertise and experience are two important pillars of peer review that add real value to this scholarly process to ensure and promote a high standard of a research article. Pilot projects and various experiments might be required to run to assess the viability of such an idea before final implementation. Emerging technologies such as artificial intelligence (AI) and blockchain could come in handy but again much research is needed before settling down on a stable roadmap for OPR adoption.

The adoption of new OPR procedures, by and large, has been very slow and appears to be restricted

to specific niches in academic publishing[41]. The fact that the adoption of social peer review is influenced more by extrinsic factors than by researchers' intrinsic motivation or normative influences in making science more open, could explain the lukewarm reception[42].

Psychological footprints in OPR

Exposing peer review report as an integral part of OPR policy paved the way for research on review report itself to throw light on different aspects of reviewer-author interaction i.e., apart from hardcore technicalities of review, this kind of research has the potential to reveal a lot about the psychology of reviewer(s) and author(s) toward review decisions. The research of Bolek et al. (2020)[43], while comparing review reports of the articles from the *European Scientific Journal* that maintains a single-blind peer review process and optional open review, shed light on the interplay of human psychology at the time of communicating review verdicts and reaction from authors thereafter. The research findings point towards a clear gender difference in the matter of anonymity on the part of reviewers. Given the optional open review choice, female reviewers more frequently decided to maintain anonymity than their male counterparts. Irrespective of gender, reviewers who recommended rejection in their review reports were found to prefer remaining anonymous. On the contrary, reviewers, whose identities were revealed, were more likely to recommend in their review reports acceptance without revision or a minor revision.

The language of review reports and responses by authors in OPR could be viewed as a literary gold mine for sentiment analysis as well as mining and understanding the reviewers' choice of words that carry positive vibes and the use of words that carry negative vibes. Acceptance and rejection trigger a different emotional state of mind which is manifested by the reactive expressions in words.

Delgado, Garretson, and Delgado (2019)[44] in their research tried to analyse the words and expressions used in peer reviews of manuscripts and to estimate the differences in net sentiment between peer review reports on manuscripts subject to one or more rounds of peer review and review reports on initially rejected manuscripts that were accepted after appeal. They sourced their data from *BMJ*. The outcome of the study noticed some frequently occurring positive words such as "well", "important", "clear" which appeared in the positive comments such as "well-written paper", "well-written manuscript", "this is an important topic", "answers an important question". Negative words such as "risk", "bias", and "confounding" were found in comments such as "high risk of bias" and "selection bias". The comments in the peer review reports were found to mainly address the methodologies rather than the actual results. The sentiment analysis recordedhigher scores for negative words expressing sadness, fear, disgust, anger and lower scores on review reports for joy and positive sentiment for manuscripts that were accepted after appeal than the manuscripts that were initially accepted.

Again, analysing the language being used during reviewer-author interaction to convey criticism may give a wealth of information about how reviewers employ politeness strategies to pacify authors' criticisms. This was confirmed by research carried out by Nobarany and Booth (2015)[45] wherein they found the general tendency of less experienced researchers to express unmitigated criticism (in response to negative review reports) more often than their experienced counterparts and reviewers' use of compliments and other more positive politeness strategies to handle the situation. Here, answer to two most pertinent questions must be sought: does a reviewer become biased when assessing the manuscript of an author in case both belong to the same country? and is there any influence of exposure to other reviewers' comments as well as the origins of a previous reviewer on a present review? Indeed Thelwall et al. (2021)[46] found some weak evidence that being based in the same country as an author may influence a reviewer's decision. Fear of covert or overt reprisals and professional blow-back on the part of authors who may be criticised or by competitors may pose the toughest challenge for OPR in its quest to be adopted as an industry-wide impartial standard[47]. The possibility of such incidences may increase many folds when both open peer reviewer(s) and author(s) of a manuscript reside in the same country. The answer to the second question remained inconclusive.

Influence of OPR on citation profile

It is interesting to investigate if there is any influence of disclosed reviewers' comments and authors' responses on an article's citation profile. Could there be any association between the length of review comments or the number of rounds of the

review process with a paper's citation? Contradictory results have been reported in the literature. Ni et al (2021)[48] in their research on *Nature Communications* neither found any evidence of a citation advantage for the articles with disclosed peer review documents, nor any association of the number of peer review rounds with citations. Although, they noticed a weak inverse relationship between the length of comments and the number of citations.

But in the quest for finding an answer to the influence of OPR on citation count, Zong, Xie, and Liang (2020)[49] performed a propensity score matching with the radius matching method using 14 confounding variables on articles published in PeerJ during 2013 and 2015 and foundthat articles with open peer review history could be expected to have significantly greater citation counts than articles with closed peer review history. Their results suggest that OPR can improve citation count. According to them the best practice for OPR might be a compromise OPR.

OPR and at-risk articles

Inexperienced authors, especially in their early career, might get their papers published in predatory publications which might be due to the compulsory inclusion of a certain number of research publications for time-bound promotion and career advancement. Apart from the psychology of earning quick name-fame as exercised by some seasoned players (with substandard works), the 'Publish or perish' phenomenon has led to a situation where many serious research scholars fall prey to predatory publishers whose publications are neither indexed (rendering those articles to be less visible, less discoverable, and less citable) nor these publishers have well-planned short term maintenance goal or long term archiving policy. Hence, some potentially valuable articles run the risk of getting disappeared prematurely from the academic arena. Predatory journals thrive on for-profit business models and do not bother about the accepted standards for professional scientific publications[50]. There is little or no scope for real peer review and this is evident from swift online publication of the submitted manuscripts within days of receipt of the publication fees. In this sense, articles published in predatory journals may be treated as non-validated research and authors of such papers may retract their papers[51] and submit the same to pre-print servers for peer review. Hatherill (2020)[52]

in his article advocated that research disciplines should look at developments in OPR and frequent use of preprint servers for their potential to recover and reintegrate those at-risk articles into the scholarly record and arrest their sudden disappearance.

Emerging technologies and OPR

There is a growing trend of application of emerging technologies like artificial intelligence (AI), blockchain, and InterPlanetary File System (a peer-to-peer hypermedia protocol that enables the distribution of files using a decentralized network and is popularly known as IPFS) to tackle a multitude of problems in different spheres of scientific endeavour. Could these technologies be applied to make OPR more adaptable as well as acceptable, i.e., optimising the peer review to minimise the time from a submission to the first review comment(s) and at the same time increasing the objectivity of reviewers' comments in order to steer clear of human error and bias?[53] Is there any scope for an interoperable decentralised review reputation system that could be developed for an OPR ecosystem?[54] Can technology assist to manage 'who can do what with what' in a transparent manner in OPR? Would the cost-benefit ratio of implementing such technology be within the project viability range and realistic in its appeal?

In a nutshell, could any system be developed to address the overwhelming issues of quality of reviews, fairness of the process for the authors and recognition of reviewers, and finally search-cum-selection of capable reviewers for journal editors? These emergent questions need to be addressed as it is understood that with opening the peer review process from a closely guarded private process, there would be the issue of the abundance of review comments, quality and standard of review comments, and reviewers' credentials.

The existing literature on the application of blockchain and associated technologies indicate the possibility of blockchain-assisted time-stamping to assert authorship and provenance[55], incentive collaboration[56], management of data access permissions[57], detecting-exposing-reducing bad practices such as fraud and abuse in the peer review process[58,59], reproducibility of studies[60], or novel methods of funding research[61].

The proposal of an interoperable open peer review ecosystem namely "Decentralized Science" (DecSci) using blockchain by Tenorio-Fornés et al. (2021)[62]

and their experimentation with two prototypes (a proof-of-concept prototype to validate DecSci's technological feasibility, and a Minimum Viable Product prototype co-designed with journal editors) revealed that an open access decentralized infrastructure for Peer Review powered by Blockchain and IPFS is technically feasible with reviewer community showing interest to improve quality, fairness, and recognition. They believed that a hybrid architecture could tackle decentralized/centralized interoperability challenges.

Although, at this stage of maturity everything with the application of blockchain technology is not hunky-dory as researchers raised a number of issues to be settled with stable solutions. The first and foremost problem with blockchain is its scalability in a large-scale system with a high transaction rate resulting in network congestion and followed by a dramatic increase in latency and associated transaction cost[63] (Faqir-Rhazoui, Ariza-Garzón, Arroyo, & Hassan, 2021). Also, there exists a difficulty in detecting fake identities and fake peer reviews that have the potential to break the integrity of the reviewing process and damage the quality and fairness of academic publishing. Current blockchain technologies, being new entrants, are exhibiting low levels of inclusiveness and usability.

Of late artificial intelligence (AI) and machine learning (mimicking how the human mind learns and processes data) have emerged as the two most influential technology applications of the 21st century in all the activities where human cognition like trait is essential for critical decision-making. As peer reviewer evaluations of research papers are considered important academic publishing safeguards, a lot would be at stake if there is any dip in the quality of reviews and the best way to judge the quality and standard of review reports is by analysing the content of the reports not only in terms of their scholarship but also the psychological impression associated with the review decisions. Could an AI-enabled bot be deployed to pick up and do a sentiment analysis associated with review reports to support editorial management decisions in the scholarly publishing process and for grant funding decision workflows? Can AI detect praise and criticism in peer evaluations?

Thelwall et al.[64] (2020) while experimenting with PeerJudge, the first transparent AI approach initially tailored for reviews from F1000Research's open peer review publishing platform and customised to use a lexical sentiment analysis approach with a human-coded initial sentiment lexicon and machine learning adjustments and additions, found that PeerJudge was able to predictF1000Research judgments from negative evaluations in reviewers' comments more accurately than baseline approaches. This is very significant as within the F1000Research mode of post-publication peer review, the absence of any detected negative comments is accepted as a reliable indicator to say that an article will be 'approved' but the existence of moderately negative comments casts doubt about its acceptability. Also, according to Thelwall et al., PeerJudgemay be used to identify anomalous reviews with text potentially not matching judgments for individual checks or systematic bias assessments.

Role of library professionals to promote OPR

Academic libraries have proved their mettle as active partners in teaching, learning, and research activities such as providing resources, imparting information literacy skills among stakeholders, building and maintaining institutional repositories, etc. within their respective institutions[65]. Academic librarians as agents of open ethos movement like open data, open access to information, open source software, and open educational resources[66], have the responsibility of educating patrons to face critically the disruptive changes in scholarly communication and publishing[67] in terms of open peer review, open access publishing, encourage and advice more to patrons about effective use of open access resources[68]. But before convincing patrons about the benefits of the open ethos movement, especially OPR and open-access publishing, academic library professionals themselves need to adopt and practice the same. To understand this, Neville and Crampsie (2019)[69] surveyed academic librarians about their approaches to journal selection, awareness of open-access options, self-archiving and open-access publishing practices. They found that half of the librarians prefer free open access when selecting a potential journal for publication. Although many librarians publish in open-access journals, hesitations exist in the matter of article processing charges, the tenure and promotion culture, and uncertainty around intellectual property rights which need to be sorted out.

Active involvement of academic librarians in promoting and advancing different facets of open

initiatives such as open access, open data, open peer review, etc. by educating campus stakeholders about these issues continuously could go a long way in realising the aim of sensitising the greater academic community about open movement. Bazeley, Waller, and Resnis (2014)[70] documented the successful implementation of one such initiative by three librarians at Miami University, USA who created a Faculty Learning Community on Scholarly Communication for imparting open movement education. The community was comprised of faculty, graduate students, staff, and librarians. The outcome was positive evaluations by community members about the community and the topics (open access, journal economics, predatory publishing, alternative metrics, open data, open peer review, etc) about which the community members learned.

Discussion

The concept of Open Peer Review has challenged the very foundation of the centralised scholarly selection-publication-distribution system monopolised by a few industry players (as designated by Larivière et al. (2015)[71] as an oligopoly of traditional publishers). In this sense, Open peer review is an emerging open movement with open journal publishing practices.[72] The present review is carried out under the following heads: "Merits, drawbacks, and challenges for OPR", "Adoption of OPR", "Psychological foot-prints in OPR", "Influence of OPR on citation profile", "OPR and at-risk articles", "Emerging technologies and OPR", and "Role of library professionals to promote OPR". Exposing peer review reports enable them to be put under investigations to know their relatedness to the manuscripts they evaluate and their ability to value addition to the research.

But, several issues such as the scripting of a comprehensive and uniform OPR adoption policy for all stakeholders, need to be addressed. Much research is needed to understand the underrepresentation of non-western nations especially the global south in traditional peer review to contextualise OPR. Studies and research on exposed peer review reports threw light on human behavioural aspects. Adoption of OPR varies with discipline, gender and age. The review also highlighted the downside of revealing the identities of reviewers and their review reports as well as a rebuttal of authors where covert apprehension of offending the other might be chocking the voice to

call a spade a spade and could in the long run go against the very foundation of purpose of peer review i.e., integrity.

Acknowledging the contribution of faculty as an open peer reviewed by introducing faculty credit point[73] on the part of higher education regulatory bodies such as the University Grants Commission (UGC) or All India Council for Technical Education (AICTE) in the Indian context and similar regulatory bodies elsewhere would not only give a fillip to career advancement/promotion or securing research grant but would also encourage more faculty to engage themselves in quality peer review practices[74].

The technology-mediated decentralised scholarly production-cum-dissemination practice has shown the possibility of not only bringing a new dimension to peer review process but also unrestricted open access, facilitated by its decentralized infrastructure may free the system from the shackles of for-profit scholarly publishing behemoths. Associated activities such as provision of a sophisticated public discussion system and application of impact metrics might encourage high quality review and at the same time inhibit self-serving behaviour[75]. Overlay peer review has the potential of evolving into a new peer review service (maybe on-demand) and an integral part of a new business model of overlay journal publishing.

A concerted effort to involve government, research institutions, and funders would go a long way to realise the successful implementation of open access agenda which would eventually encompass different scholarly formats such as books, chapters, proceedings, preprints, and textbooks along with journal articles to be disseminated through several open access dimensions such as immediacy, diamond open access, open metadata, open peer review, and open licenses. Involving governments would likely ease the financial burden and at the same time would improve infrastructural capability provided an appropriate policy framework is constituted and communicated to government machinery and other stakeholders of open access[76].

Conclusion

At present, the concept of Open Peer Review and its implementation seems to be in a state of transition where both supporters and sceptics are voicing their concern for and against OPR respectively. On one hand, there is the mindset desirous of maintaining the status quo along with the profit-making publishing

industry players that have been engaged in consolidating the place for the traditional peer review process, the thinkers and adopters of a new system, on the other hand, are experimenting with the possible and probable benefits of OPR. The third player in this tug-of-wire is a bunch of new technology applications like artificial intelligence, blockchain technologies, etc that are steadily making inroads in the quest of making peer review a more transparent process. In this backdrop and in absence of standardized OPR adoption guidelines across the global academic and research fraternity, the review indicates the need to focus research on the concept of OPR and its applicability in a real-life situation to iron out issues that have been highlighted in the corpus of the existing literature. So that an informed conclusion could possibly be reached in the future about implementing OPR in its present shape or repackaging it in a new form considering emerging technology applications.

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