Description

[Peer review](#) has been the gatekeeper of research for decades. However, this crucial process faces a numerous issues including, but not limited to, bias, lack of transparency and accountability, oversight of ethical concerns in a manuscript, and extreme delays. Moreover, reviewers are often overburdened with their academic and research responsibilities in addition to their review duties. Therefore, there is a growing need to adopt innovative peer review models that seamlessly enhance the efficiency of the process and keep pace with the growing volume of research output.

Innovative Models in Peer-Review

Open Peer Review Model

Contrary to the traditional single-blind and double-blind peer review models that advocate anonymity, open peer-review model promotes Open Science by making the reviewer's identity publicly available. Various journals in life sciences, including *Nature Communications, EMBO, Royal Society Open Science, eLife,* and *the PLOS journals* have implemented this model.
In the open peer review model, the review reports are published alongside the article, enabling documentation of reviewer comments and the authors' responses. As a result, this approach improves transparency and review quality, promotes accountability, and minimizes potential biases.

Pre-publication Peer Review Model

Pre-publication peer review model leverages the expertise of the research community to review and share constructive criticism on a manuscript even before it is submitted to journals. This model allows authors to address the gaps or oversights identified by contemporaries in their field before submitting their manuscript to a journal for publication. Therefore, this helps in avoiding multiple rounds of revisions and resubmissions. Furthermore, it facilitates rapid dissemination of research, increases

visibility, fosters community feedback, and contributes to the principles of open science.

Professional services like **Enago Pre-Submissions Peer Review** Service can provide a comprehensive review of your research manuscript and actionable suggestions to improve the quality of your submission to the journal of your interest.

Preprints is as another example of pre-publication peer review model. The first preprint server, arXiv.org, launched in 1991, gained significant traction particularly during the pandemic, with the introduction of medRxiv in 2019. This highlights the timely need for quicker and transparent methods of sharing crucial research findings within the community.

Post-publication Peer Review Model

Scrutiny of research articles doesn't stop once they're published; in fact, it intensifies in the months that follow! While post-publication peer review (PPPR) has existed in multiple journals in the form letters and commentaries, a modern version of this model enables quicker and more dynamic discussions within the scientific community.

Platforms like Retraction Watch, ResearchGate, PubPeer, and social media (including X and LinkedIn) have become popular in promoting post-publication peer review, allowing researchers to engage in real-time dialogue. This model serves as a quality checkpoint to identify ethical issues such as data manipulation, statistical errors, and fundamental flaws that might otherwise go unnoticed. Detecting these issues is crucial as this allows the publication community to prevent the dissemination of false claims by retracting such articles. Over 10,000 papers got retracted last year and PPPR plays a central role in this by upholding the integrity of the publication industry.

AI-assisted Peer Review

The automated peer review model, also known as the AI-assisted peer review model, aims at reducing the reviewers' burden and fatigue by screening the manuscript for initial checks and detecting common flaws in manuscripts. This enables reviewers to reduce their time on the preliminary checks and focus on the scientific underpinnings of the study for a more thorough and critical evaluation.

A preprint reported that the use of AI in the peer-review process can improve the review quality and streamline the workload for reviewers, ultimately boosting the speed and review efficiency.

Tools like Enago Read, has been developed and tested for their performance over the last few years. With proper human oversight, these tools promise to lead the next generation of the peer-review process.

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## Innovative Peer Review Models in STM Industry: A Comparative Analysis

Parameters	Open Peer Review	Pre-Publication Peer Review	Post-Publication Peer Review	AI-Assisted Peer Review
Transparency	High Reviews and Comments are made public	Moderate Reviews are often confidential	High Public comments and discussions	Varies* Subjective to its implementation by the stakeholders
Accountability	High Reviewer identities are known	Varies* Subjective to its implementation by the stakeholders	High Identified reviewers can engage with comments	Moderate Review quality depends on AI training models
Speed	Moderate Depends on reviewer availability	Fast Accelerates review by minimizing resubmission	No effect	Fast AI does the initial checks
Bias	Potentially low Diverse reviewers encouraged	Varies* Subjective to its implementation by the stakeholders	Potentially low Community engagement reduces bias	Varies* Subjective to its implementation by the stakeholders
Ethical Breach Detection	Varies* Subjective to its implementation by the stakeholders	Varies* Subjective to its implementation by the stakeholders	Easier Public scrutiny is encouraged	Easier Robust tools and software in place

*Variation is introduced by multiple stakeholders involved - training data sets in case of AI-assisted peer review and the choice of publication, among others

Which of the following peer review models have you experienced or are you interested in exploring? (Select all that apply)

Open peer review model
Post peer review model

In conclusion, publication industry, like most industries, is constantly evolving to match the modern day's demand. This necessitates the need for innovative peer-review models that address the fundamental shortcomings posed by the traditional models. Various promising models aimed at fine-tuning the process of peer-review have been set in motion and are currently being implemented by the scientific community to uphold the cornerstone of publication industry – the peer review system. These models not only address the challenges posed by the existing system but offer innovative solutions that enhance the overall experience of all the stakeholders involved.

AI-assisted peer review model

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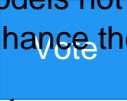
Category

1. Publishing Research
2. Understanding Reviews

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