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From Invitation to Recommendation: A Project-Management Perspective on the Peer-Review Process

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Abstract: *The peer-review process is a key responsibility of qualified experts to provide critical, independent, and unbiased feedback on scientific manuscripts submitted to journals for publication. Becoming a reviewer is widely considered as recognition of a scientist's standing within their field of expertise and an indication that their experience, judgment, and perspective contribute meaningfully to decisions assessing the quality, rigor, and novelty of scholarly work. Entering the complex peer-review process carries significant responsibility, as recommendations may influence whether research is ultimately disseminated to the scientific community. Therefore, experienced reviewers should share practical insights and guidance with newer generations of reviewers preparing to contribute. While numerous publications describe strategies for evaluating manuscripts and writing effective reviews, our manuscript focuses on peer-review's logistical dimensions. In this conceptual study, we present an insider perspective, critically examining the process as a continuous activity encompassing pre-review, review, and post-review phases. Using a project-management conceptual framework, we analyze the functional efficiency of the process and highlight practical considerations that are often overlooked. We provide tips, tools, and strategies to help reviewers navigate online submission systems, manage reviewer invitations, organize workloads, communicate effectively with editors, and complete assessments efficiently. We also reflect on procedural challenges, opportunities for improvement, and practices that may enhance transparency, consistency, and reviewer engagement. Through this initiative, we hope to inform, inspire, and motivate emerging scientists to join the peer-review community, strengthen their professional development, contribute to rigorous manuscript evaluation, and support the integrity, quality, and advancement of scientific publishing worldwide across disciplines.*

Keywords: Peer-review; reviewer; scientific manuscripts; online portals; practicality

Introduction

Peer-review remains a central responsibility of qualified experts within the scientific community to contribute directly to the safeguarding of scientific integrity and to the

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enrichment of the published work's quality. Through evaluation of originality, methodological rigor, significance and clarity, reviewers are tasked to provide critical, independent and unbiased feedback to authors of scientific manuscripts disseminated through scholarly journals. New generations of scientists enter the research community and are inevitably introduced to the peer-review process first as authors and then possibly as reviewers. To ensure continuity of the conduct of peer-review, it is the duty of all involved to prepare the successive generations of researchers who engage with the process by taking themselves this responsibility. Our conceptual study evaluates the peer-review framework within the Biological Sciences and related specialty fields based on our experience with the challenges commonly encountered in these areas. Although focused on these disciplines, many of the issues examined and recommendations proposed are relevant and beneficial across other fields of research.

While substantial scholarship examined peer-review from conceptual (Benos et al, 2003; Manchikanti et al., 2015; Miller et al., 2024), ethical (Sellke, 2003; Peh, 2022) or methodological standpoints (Freshwater, 2011; Dhillon, 2021; Proctor et al., 2025), comparatively less attention has been paid to its everyday functionality. Inevitably, scholars participating in the peer-review process have identified numerous challenges and opportunities for improvement, with some critics going so far as to characterize the system as a failed experiment. For example, in a thought-provoking blog post, Adam Mastroianni of Columbia Business School describes peer-review as a large-scale weak-link intervention. He argues that while gatekeeping mechanisms can be effective at filtering out poor-quality research, they may also suppress some of the most innovative work. As he notes, "These policies, like all forms of gatekeeping, are potentially terrific solutions for weak-link problems because they can stamp out the worst research. But they're terrible solutions for strong-link problems because they can stamp out the best research, too. Reviewers are less likely to greenlight papers and grants if they're novel, risky, or interdisciplinary" (Mastroianni, 2023).

As the peer-review process has undergone substantial transformations, moving from largely email-based exchanges to sophisticated online platforms, it is critical to examine its mechanics in support of reviewers who must navigate multiple platforms, policies and expectations. These developments have reshaped not only how manuscripts are submitted, reviewed and published, but also how reviewers, editors, and authors interact with increasingly complex systems. Rather than revisiting well-established descriptions of the peer-review models or offering guidance on how to conduct reviews, in this conceptual study we focus on the aspects of usability, efficiency and communication.

To structure this discussion, we divided the peer-review process into three sequential phases: pre-review, review and post-review (Figure 1), which closely align with the five steps of project management: initiation, planning, executing, monitoring and controlling, and closing (Tables 1-3). This integrative approach provides a disciplined strategy to conduct the peer-review of a manuscript, described herein through the lens of practical experience. Our study reveals how a project management conceptual framework can help the scientific community address functional challenges, by providing supporting tools, strategies and concepts revolving around technical interoperability. Our novel approach of the peer-review process through the

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structured project management framework facilitates sharing day-to-day user experience with the process. We will navigate the intricacies of timelines, interfaces, communication pathways and levels of transparency that all shape the experience of the reviewer with the evaluation process.

Surprisingly, very few scholars, whether novice or seasoned, are formally trained to conduct peer-review with confidence and rigor. This stands in contrast to the broader academic culture, where structured training is fundamental to the professionalization of researchers and research practices. Despite the critical importance of peer-review to scientific quality assurance, the process remains largely unstandardized and unevenly professionalized across disciplines and journals. Although isolated efforts have been made to strengthen reviewer training, they have not yet matured into a comprehensive and universally recognized system. Thus, in sharing the practical learnings included in our manuscript, we aim to offer support to the new reviewers entering the peer-review process to become more proficient and professionalized in the art of peer-reviewing. These end-user insights will help them learn how to explore and use the online platforms, build awareness of anticipated challenges, and exercise time and project management skills applied in a way customized to this activity. Furthermore, the reviewers will gain the ability to fully utilize the online platforms to their own advantage to communicate and collaborate with editors, reviewers and authors. They will also become well-equipped on how to provide constructive criticism generated from their own experience with the peer-review process. As a result, we hope that valuable time will be saved in learning from each other's experiences rather than discovering on our own, one platform or system at the time.

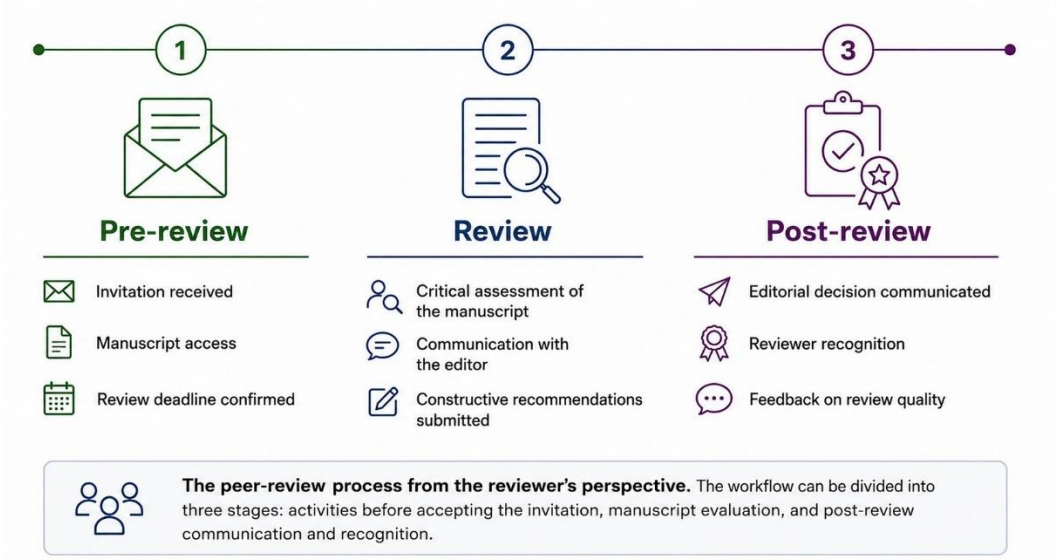


Figure 1 The peer-review process from the reviewer's perspective. The workflow can be divided into three stages: activities before accepting the invitation; manuscript evaluation; and post-review

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communication and reviewer's recognition. The figure was generated with the assistance from 365 Microsoft Copilot.

A Structured View of the Peer-Review Process

To better understand the operational dynamics of the peer-review, it is useful to consider the process as a sequence of interconnected phases that will be detailed below and in the associated Tables 1-3. Although each phase is characterized by unique interactions and expectations, all play an important role in shaping the efficiency and overall quality of the peer-review process. The accompanying tables present practical considerations and stakeholder expectations for peer-review when examined through a project management perspective. Accordingly, we aligned the five project management phases with the triadic peer-review framework as follows: pre-review (Initiation), review (Planning, Execution, Monitoring and Controlling), and post-review (Closure). This progression is represented through a race analogy: Start → Ready → Set → Go → Finish.

The Pre-Review Phase: First Contact Matters

The pre-review phase establishes the initial engagement between journals and potential reviewers. Thoughtfully crafted, personalized invitations can strongly influence willingness to engage, especially if characterized by clarity and efficiency in communication. When invitations clearly indicate the relevance of the manuscript to the reviewer's expertise, they convey intentional selection and increase the likelihood of acceptance. Besides providing concise practical details such as journal name, manuscript type, title and abstract, editorial contact and expected timelines, this first encounter indicates professionalism and respect for the reviewer's time (Table 1).

Table 1. Pre-Review as Project Management Phase Initiation

Connecting email from the editor 	**First impression** - The standard approach is to send personalized email invitations to the potential reviewer(s), asking for their interest and availability to participate in the review process. - This approach intends to motivate the reviewers to become involved, indicating that they were purposely selected because the topic of the manuscript was likely a fit for their expertise.
	Content - The level of detail in the initial communication varies by journal. In general, the emails clearly state: the journal extending the invitation, editorial contact, manuscript's title, abstract and type (review, letter to editor, research, comment, etc.), and timeline/deadline. - This approach immediately provides context and sets expectations that contribute to the reviewer's decisional process.

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Reviewer's decision on invitation acceptance and communication with the editor	**Availability selection** - The online peer-review platforms make it convenient for the reviewer to share about their availability to review. - Extensions for the review time may be allowed (sometimes upon request by reviewer). - At this step, it is often customary for the reviewers to be asked if they prefer or have availability to review a revised version of the manuscript.
	Declined invitation - For instances when the reviewer declines the invitation, the platforms may offer the possibility to share the reasons by offering a selection option (conflict of interest, outside of expertise, limited availability, etc.). - Some platforms give the opportunity to share a personalized note to the editor that allows the reviewer to provide more details regarding the declined invitation and/or to express their interest to review in the future. - Some platforms allow the reviewer to share their specific area of expertise. This feature is often part of the user profile setup for online reviewing platforms and it supports the editorial selection of reviewers. - Most of the platforms offer the possibility to recommend reviewers based on their expertise, if the reviewer approached originally declines the invitation.
Follow-up email(s) – access to the manuscript	- Once the reviewer accepts the invitation, a follow-up email is usually sent to provide further instructions for review. - Included in the follow-up email are the credentials for the online platform (user name and password or option to reset the password). In general, for security reasons, providing the reviewer's credentials in the same email is avoided. The option to retrieve credentials is a default feature of the online platforms. - Some journals provide a direct link to the manuscript, bypassing the login. For some platforms this works only for the first time the manuscript is accessed; for the upload of the review or when accessing the paper again for any other reasons, the credentials are usually required.
Retracted invitation	- On occasion, an invitation extended to a reviewer may be retracted by the editor even though within the window provided to them for the acceptance/rejection of the invitation. More often than not, a second email informs the reviewers that they are no longer needed. - The reason might be driven by the tendency of some journals to send numerous invitations which increase their chances of acceptance. When the journal reaches the number of needed reviewers, the rest of the invitations may be retracted to avoid exaggerated redundancy.
Invitation extended during an ongoing review process	- A reviewer might be recruited during an existing peer-review process if one of the previous reviewers dropped off or was unresponsive. This instance might be indicated by a revised version of the manuscript being provided to the reviewer to evaluate. The reviewer should reach out to the editor and ask additional contextual questions, as needed.

Providing deadlines for both acceptance of the invitation and submission of the review also supports informed decision-making and allows the reviewer to exercise or improve their time

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management skills. Flexibility that allows reviewers to request extensions or to indicate periods of unavailability further enhances goodwill and participation. Online platforms increasingly support structured reasons for declining invitations, including conflicts of interest or lack of subject-matter expertise. When paired with opportunities to update reviewer profiles or suggest alternative reviewers, such features improve matching between manuscripts and appropriate expertise (consult Table 1 for more details).

Examined through the perspective of project management framework, the activities in the pre-review phase overlap with the initiation phase. During this time, invitations to review a manuscript are received by the reviewer who determines whether the topic matches their expertise and whether they can complete the review within the required timeframe. This phase needs to be completed with a decision to continue with the review or to decline the invitation.

Drawing from our "under the hood" perspective on practical aspects of this peer-review phase, we identified the accessibility of peer-review platforms as an area that might benefit from better communication support systems. The existing variability between platforms, associated differences in interface design, navigation and submission requirements remain a significant challenge for reviewers who engage with multiple journals. In this context, it is worth examining the concept of technical interoperability: a practical consideration would be for publishers to allow their systems to communicate *via* shared protocols. For instance, a "reviewer passport" system might be of consideration, leveraging the existing Open Researcher and Contributor ID (ORCID) infrastructure not just for logging completed work, but also for automatic credential validation. This would eliminate the friction of forgotten passwords and the redundancy of creating duplicate profiles for every journal and would support streamlined, interoperable systems that would better support sustainability of the entire process. This is certainly an operational adjustment of complexity that could be approached incrementally, starting with the proof of principle, followed by repetitions if the preliminary results indicate reasonable practicality as a possible outcome.

The Review Phase: the Nuts and Bolts

The review phase represents the core analytical component of the process, where the quality of both the manuscript and the reviewing system becomes most apparent to the reviewer. Three project management phases are intertwined when applied to the review phase. During planning, the reviewers usually organize their reviewing approach by identifying key areas to evaluate, such as the study design, data analysis, and scientific significance. The execution phase involves conducting the detailed review and documenting strengths, weaknesses, and recommendations. In monitoring and controlling, the reviewer might revisit the manuscript to ensure that the comments are objective, constructive, and supported by evidence, while verifying that all critical aspects have been assessed.

Several practical considerations influence the quality and efficiency of the review process. High-quality manuscript formatting - including consistent pagination, line numbering, and figure resolution - is essential to facilitate precise feedback. Deficiencies in these areas can

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significantly slow the review process and introduce otherwise avoidable back-and-forth communication (Table 2). In this regard, setting minimum technical standards for the formatting of all files associated with the submission should be within the capabilities of the online platforms to agree upon and implement. In doing so, valuable time would be saved for all parties involved and the engagement of the reviewer would not be impacted.

The structure of review forms also warrants consideration. While highly structured templates aim to standardize evaluations, they can sometimes constrain reviewers or introduce redundancy. In contrast, more flexible formats allow for nuanced and comprehensive feedback, which may better reflect the complexity of scientific assessment (Table 2). Allowing a hybrid approach between the two existing systems might contribute to flexibility and accommodate multiple reviewing styles or preferences needed for a well-rounded review.

Table 2. Review as Project Management Phases Planning, Execution, Monitoring & Controlling

Peer-review platform 	- While rare nowadays, manuscripts review may be conducted through email exchanges for certain journals. One caveat of this approach is that it may rely on a (semi)-automatic system for sending reminders to reviewers about approaching deadlines. - The online peer-review platforms make possible convenient and timely communications between the publisher, editor(s), reviewer(s), and author(s).
Shape (quality) of manuscripts	**Plagiarism** - The editorial team is in charge of screening the submitted manuscripts for plagiarism. This can be conducted using platforms that have various degrees of precision. - However, it is the duty of the reviewer to check for any forms of plagiarism during the evaluation process and report them to the editor.
	Page and line numbers - While page numbers are almost always provided, line numbers are not a default procedure and seem to be dependent on the journal and the associated peer-review platform. - The page and line numbers are both necessary and must be the same in the versions that the authors and reviewers submit and evaluate, respectively. This helps with the easy identification of the parts of the paper that the reviewer might ask to be modified, deleted, etc. - In the absence of line numbers, the reviewer can refer to the page and paragraph number and provide the part of the paragraph they are referring to.
	Figures quality - The editorial team is in charge of ensuring that high resolution figures are provided to facilitate the proper review. - The reviewer may connect with the editor and ask for better quality figures be provided if the peer-review process is hindered by low resolution files being submitted.

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	Supplementary files - It is frequent nowadays for the manuscripts to be accompanied by large or numerous supplementary files. This is an appropriate approach as many journals limit the length/number of characters or words in the body of the manuscripts. - Sometimes, the supplementary files may be provided to the reviewer as a zip file for a single, convenient download.
Communication with the editor	**Manuscript-related needs** - The online platforms provide the possibility to interact with the editor for any manuscript-related needs during the review process. - The aspects that might require the editor's input are: questions on the functionality of the platform, requests for high quality figures be provided for review, pointing out missing references or figures that otherwise make the review difficult/impossible, sharing concerns on plagiarism not detected at the preliminary screening, reporting authors' lack of compliance with the journal's or publisher's guidance, etc.
	Notes to editors - The reviewers have the possibility to share confidential comments with the editor. - These comments are usually part of the review itself.
	Opportunity to provide suggestions/recommendations - Depending on the platform, the reviewer might have the opportunity to provide feed-back or suggestions to the editor regarding optimizations or improvements to the peer-review process. - In the absence of an established feed-back system, the notes can be added in the confidential comments shared with the editor.
Type of peer-review 	**Blinding (author-reviewer)** - Single blind: authors are blinded to the reviewers' identities while the reviewers are aware of authors' identities and affiliations. This format allows the reviewer to easily find what other manuscripts the authors published previously on the topic and that are relevant to the manuscript being reviewed, or to detect plagiarism. - Double blind: both authors and reviewers are blinded to each other's identities. The editorial team is in charge of making sure the authors remove from the paper any other references to their identity or affiliation (besides the front page). This approach intends to avoid bias on the reviewers' side. - Open: while still relatively rare, this approach exists by which both authors and reviewers are aware of their respective identities. For some journals, the reviewers are listed on the manuscript (with prior approval obtained from the reviewers). - Other types of peer-review models exist, as detailed by Dhillon, 2021.

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	Blinding (reviewer-reviewer) - Depending on the journal, at the completion of the review process ending with an editorial decision, comments made by all reviewers may be shared while still maintaining the confidentiality of each other's identities. This approach provides transparency to the process, makes it possible to see if conflicting revisions were requested by separate reviewers, and seeing how the editor reconciled them. Furthermore, this approach gives an opportunity to reviewers with less peer-review experience to learn from those who have conducted this type of work longer and to calibrate their process as a result.
Review format/content  	**Time to review** - In general, the time allowed for the first review of a manuscript varies by publisher and/or journal. It is possibly dependent on the type/length of the manuscripts. As a range, reviewers may be given anywhere from 7 to 21 days to review a scientific manuscript, irrespective of its type or length. - For a review of the revised version of a manuscript, the time allowed is anywhere from 3 to 14 days, depending on the journal.
	Review forms/format - A free style review is common for most of the journals. This approach offers more flexibility to the reviewer because it allows for general notes, special notes, comments for the editor be provided. The space for these comments are rarely limited in terms of number of words or characters allowed. - Some journals provide the reviewer with a standard form, based on specific rubrics. The forms accommodate the standard entries as a free style review; on occasion, some of the sections may be redundant and request a mandatory entry (even if in the form of "Not Applicable") in order to facilitate the submission of the review.
	Review grading system - Some platforms provide an evaluation scale and require the reviewer to provide a grade for the manuscript based on its novelty, importance for the field, etc. The grading system's criteria should be made available to the reviewer as guidance. - For some journals, the grading system may be requested for a revised version of the manuscript being evaluated.
	Artificial Intelligence (AI) usage by reviewer - Most of the online platforms used for the peer-review of scientific manuscripts request the reviewer to state if they used AI for the preparation of their review. This acknowledgement of AI use is a mandatory field which, if left unaddressed, will prevent the submission of the review. - It may not be obvious to the reviewer if the editorial team screens the reviews to identify AI use or what measures may be taken if AI use by reviewer is detected.

The role of Artificial Intelligence (AI) in peer-review remains an area of ongoing debate that warrants serious reflection and evaluation, especially as AI's role is fast expanding. This can

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be considered the most pressing existential threat to the peer-review process today. It warrants a rigorous discussion on data security and intellectual property that is outside of the immediate focus of our manuscript, but we consider it critical to address even if in a limited capacity. All platforms that we were exposed to thus far asked the reviewers to acknowledge that they have not used AI in the writing or their review. We fully support this as the most appropriate strategy to continue being enforced for this high responsibility role. And yet, it is unclear whether the platforms have the capability to determine if a reviewer in actuality used AI for their review. If that is identified, would the review written with AI be eliminated from the overall evaluation of a manuscript? Or would the reviewer who used AI for their review not be considered for future evaluations of manuscripts for the same journal?

Reviewers must remember that a manuscript is an authorship teams' intellectual asset and personal work. While an author owns their work and can choose to risk it by using AI tools, a reviewer is the custodian of someone else's intellectual property and cannot make that choice. Feeding a confidential manuscript into a public AI model constitutes a massive breach of confidentiality, with deep ethical or legal implications. The publishers, editors and reviewers must work together to ensure the necessary protection of the author's unpublished work. Thus, publishers should develop or adopt secure, closed-loop AI environments. In this model, a reviewer could use AI tools for language checking or summarizing of their notes within the journal's own protected platform, ensuring that the data never leaves the secure server. This is a sophisticated policy recommendation that respects expected legal and ethical boundaries.

The Post-Review Phase: Coming Full Circle

The post-review phase fully overlaps with the closure phase of project management and consists in the reviewer's submission of the review and recommendations to the editor. Thus, the reviewers complete their contribution to the decision-making process and help maintain the quality and integrity of the scientific literature. From the reviewer's perspective, the process is fully complete after editorial decisions are communicated to them - whether acceptance, revision or rejection; this part remains an important professional courtesy, particularly when reviewers have invested substantial effort.

Also as part of this phase, incentives in forms of credits to reviewers are made available, in various forms detailed in Table 3. A sustainable business model would be designing a system of cumulative, non-expiring credits. It is conceivable that these rewards may directly increase invitation acceptance rates and reduce overall publication lag. Thus, publishers might see it as a clear financial and operational motive to comply. All the strategic arguments we brought up thus far for operational efficiency serve the publishers' bottom line as much as the academic's workload.

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Table 3. Post-Review as Project Management Phase Closure

Communication of the review process outcome 	**Manuscript revision(s)** - For most journals, the revised version(s) of manuscripts are shared with the reviewers for verification and final decision. Generally, the revised version of the manuscript is provided with tracked changes and accompanied by the authors' responses to all reviewers' comments (referencing page, line and paragraph numbers, as applicable). - This approach is no longer used by some current/newer platforms that aim to decrease the review time significantly (unless the manuscript requires extensive revisions).
	Manuscript decision (acceptance/rejection) - For the vast majority of journals it is customary that the editor will inform the reviewers of the outcome of the manuscript's evaluation (whether accepted or rejected). - Some journals no longer inform the reviewer on rejections of the manuscript(s) they reviewed. From a reviewer's perspective, being informed on this type of outcome is especially important if the reviewer was in favor of publication. In the absence of the opportunity to see other reviewers' comments or rationale for the rejection, it is difficult for the reviewer to calibrate their own reviewing criteria/system.
Process transparency	**Review transfer** - Some journals institute the practice of offering the possibility to transfer reviewer's notes and comments to another journal if the manuscript is rejected by the journal that it was originally evaluated for. - These transfers usually occur within the confines of the same publisher. - Most of the journals using this procedure ask for permission from the reviewer for the transfer to occur.
	Reviewer's name on published manuscripts - Although a more recent trend, this approach is rather limited to few platforms which ask permission for such disclosure. - Some reviewers might find this practice acceptable when the reviewer may have a professional relationship (but not a conflict of interest) with the authors, in which case this disclosure would be comfortable for both parties.
	Demographics - More and more journals survey the reviewers for their demographics, on an optional or mandatory basis. - For example, several platforms/publishers restrict the acceptance of an invitation to review by mandating taking a short survey on demographic aspects. However, the survey allows to select the option to "prefer not to disclose" for those reviewers not comfortable to share such details.
	Requesting feed-back from reviewers - Some publishers request feed-back from reviewers in regards to their experience with the platform. This is usually accomplished as an annual campaign and/or when adjustments are made to the portals and the publishers are interested in the functionality of the implemented changes.

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Reviewer's recognition	**(Annual) listing on journal's website** - This seems to be a common practice for several publishers. - The reviewers are usually asked to confirm whether they would like to be listed on the website of the journal.
	Certificates/awards - Most if not all journals provide certificates of review and some provide awards for reviewers who frequently evaluate for the same journal or for the same publisher.
	Contribution as editor - Invitation to become a member in the editorial board of the journal they reviewed for is sometimes extended to the reviewers. Considered for this type of recognition are the reviewers evaluating numerous manuscripts and providing high quality reviews. - Invitations to guest edit special issues of the journal may occur, however they are not as frequent as those to join the editorial board.
	Tracking of peer-reviewed activities - Several platforms keep records of reviewers' reports on manuscript evaluation, such as Open Researcher and Contributor ID (ORCID), Clarivate, Scholastica, Loop (Frontiers Research Network).
Discounts	**Discounted Article Publication Charges (APCs)** - Some platforms provide discounts on APCs for manuscripts published by reviewers in the same journal they reviewed for or in other journals from the same publisher they evaluated manuscripts for. - The discounts may be provided in the form of vouchers that are sometimes tied to an expiration date (standard 1 year).
	Access to manuscripts during the review time - As an example, the Elsevier publisher grants access to Scopus during the review time and/or for a time after the review is completed (usually 1 month). - Other journals provide the reviewer with access to the journal's entire suite of articles during the review time or for a set limited time covering the review time. This approach supports the review, especially if authors published before in the same journal on the same or similar topic. - It is not a standard process for the journals to grant reviewers access to the final version of the reviewed manuscript in case the journal only offers access by subscription. This might be the process of a limited number of journals as currently most articles are published open access or based on a hybrid approach.

Training Resources to Support Reviewers

Numerous resources are available to help reviewers navigate the peer-review process. Although a detailed discussion of these resources is beyond the scope of this manuscript, a brief overview provides important context for the training tools proposed here.

Scholars have published extensively on journal and publisher expectations (Miller et al., 2024), ethical considerations (Kelly et al., 2014), reviewer-author-editor interactions (Mandviwalla et

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al., 2008), manuscript evaluation (Proctor et al., 2025), and strategies to minimize bias (Manchikanti et al., 2015). Practical reviewer checklists are also available from publishers and subject-matter experts. In toxicology, for example, specialized tools support the evaluation of New Approach Methodologies (NAMs), including checklists for assessing animal-free testing approaches and the INVITES-IN framework for evaluating internal validity and bias in *in vitro* studies (Mathisen et al., 2023; Svendsen et al., 2023). Such resources complement traditional peer-review and can be especially valuable for new reviewers.

Formal reviewer training is also available, although it is often focused on manuscript evaluation rather than the practical workflow challenges discussed in this manuscript. Examples include the Elsevier Researcher Academy Certified Peer-Reviewer Course, Nature Masterclasses: Focus on Peer-Review, the American Chemical Society Reviewer Lab, and Wiley Peer-Review Training. While not exhaustive, these programs provide useful starting points for reviewers seeking structured instruction.

In our assessment of peer-review, we followed the sequence of activities typically undertaken by reviewers and organized them into pre-review, review, and post-review phases (Tables 1-3). Within each phase, we identify common challenges and offer practical recommendations to improve reviewer engagement with the process. The details included in the tables serve as faculty development resources and tools that support the development of peer-reviewers and the professionalization of the peer-review process from a practical perspective. We hope this structured overview serves as a useful resource for both new and experienced reviewers undertaking this important scholarly responsibility.

Conclusions and Future Directions

Peer-review remains an indispensable component of scientific communication and its practical implementation continues to evolve. By examining the process through a structured, experience-based lens, we shared on the functionality of its internal elements and drew attention to several aspects that might be possible to improve across peer-review platforms. We emphasized day-to-day functional aspects, underscoring the need to have an inside look not only at how the peer-review is conducted, but how it is also designed to work, through the perspective of the end-user (the reviewer).

We also reflected on aspects that can be improved and shared several strategic audit notes. For such initiatives to be considered practical, we must acknowledge that some market constraints exist, such as brand competition, however some collaboration should be possible within the confines of such limitations. Focusing on immediate, solvable issues like setting minimum technical standards for supplementary files or ensuring transparency between peer-reviewers represent possible solutions that do not require any global governing body and are within the capabilities of the online platforms. These incremental adjustments support the enrichment of reviewers' pool and help improve their ability to navigate the peer-review process.

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The goal of this manuscript is to encourage all peer-reviewers to share their experience, to provide genuine, organic advice to generations that follow, and to contribute to the quality of the reported work in their respective fields of expertise. Furthermore, they should critically evaluate the process themselves and contribute to its continuous improvement that is needed to keep up with the face pace of science itself. Looking ahead, ongoing dialogue among publishers, editors, reviewers, and authors will be essential to shape the future of peer-review. For our shared goal remains clear: to support a robust, fair and efficient system that upholds the quality and integrity of scientific research.

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Conflict of interest
The authors declare no conflict of interest.

Author contributions
Both authors made significant contributions to the writing and editing of the manuscript.

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