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MERIT (Manuscript Evaluation Reflecting Intrinsic Tenets): A Framework For Efficient and Equitable Academic Peer Review

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Abstract

Peer review is a cornerstone of academic integrity and rigor in research dissemination. This process, bridging knowledge creation and publication, demands considerable time and effort from content creators, reviewers, and editors. Peer review often entails multiple iterations across various journals, requiring hundreds of hours of commitment and often leading to frustration. However, this investment can be fruitful, enhancing manuscript quality, correcting errors, and ensuring appropriate audience targeting. Collectively, peer review consumes millions of hours and incurs billions in costs, largely borne by funding agencies and governments. This scenario raises critical questions about optimizing the process and the potential impact of reviewer education on efficiency and outcomes.

Surprisingly, formal training for reviewers is scarce across undergraduate and graduate programs globally. Learning is predominantly informal, through mentorship or personal experience. Journals typically offer minimal guidance, relying on basic questions and rankings to assist editors. It is quite remarkable that such a loosely structured approach for peer review, with minimal guidance, is the norm for a process of great consequence. The outcomes of peer reviews can delay publications for years, significantly impact careers, and influence decisions on grants and promotions.

This course introduces novel tools and concepts to refine the peer review process: 1) The “Main

Result Justification Sheet," created to make reviews more efficient and transparent for readers; 2) "Publicon," a term inspired by the fundamental units of quantum physics such as the photon, representing the minimum quantum of information necessary to advance a field and merit publication in a peer-reviewed journal; and 3) A MERIT-based peer review model (Manuscript Evaluation Reflecting Intrinsic Tenets), outlining new guidelines that base acceptance solely on the intrinsic merits of the manuscript, with assessments of potential audience engagement and distribution determined subsequently.

A key innovation of the MERIT-based model is the separation of the peer-review process from the distribution of the manuscript. Once a manuscript is validated through independent peer review, its distribution becomes a separate consideration. Authors or independent platforms can disseminate validated work efficiently, whether through evolving forms of what we currently call journals or social media. This separation ensures that the focus remains on the quality of the research itself, rather than on the prestige of the distributing entity.

This course is designed to provide a structured framework to academic peer review with the goal of elevating quality, fostering equity, and minimizing bias. The course includes interactive sections with open-ended and multiple choice questions to stimulate thought and understanding. This course is designed for both novices and seasoned reviewers, aiming to refine their skills and adapt to specific academic fields.

General introductory questions

Open-ended questions

- Experience sharing: Please consider your most challenging experience with the peer-review process, either as an author, reviewer, or editor. What made it challenging, and how do you think it could have been improved?
- Perceived gaps in training: In your opinion, what are the key areas in peer review that currently lack sufficient training or guidance?
- Suggestions for improvement: What specific aspects or skills would you like to see addressed in a peer-review training course?
- Impact of training: How do you think formal training in peer review could change your approach to reviewing manuscripts?
- Feedback mechanism: What would be an effective feedback mechanism for a peer-review course to ensure it stays relevant and practical for its participants?

Multiple choice questions

Prior experience with peer review:
A) I have never been involved in peer review
B) I have some experience as a peer reviewer
C) I have extensive experience as a peer reviewer
D) I have experience as both a reviewer and an editor

Preferred mode of training:
A) Online modules
B) In-person workshops
C) Webinars with Q&A sessions
D) Mentorship and shadowing experienced reviewers

Challenges in current peer-review process:
A) Time constraints
B) Lack of clear guidelines
C) Inconsistency in review quality
D) Bias in the review process

Benefits of effective peer-review training:
A) Improved manuscript quality
B) Faster publication process
C) Reduced bias and increased equity
D) Enhanced reviewer satisfaction and engagement

Why peer review matters: A historical insight

The practice of peer review, as it is known today, emerged as a pivotal element in academic publishing after World War II (Burnham, 1990). Its development was driven primarily by two factors. Initially, it was a response to the growing imbalance between the increasing volume of academic papers and the limited availability of publishing spaces in print. This issue was further compounded by the rise of specialization across various disciplines, which highlighted the necessity for editors to rely on experts in specific fields to evaluate the merit and accuracy of submissions.

The advent of the digital era has transformed this landscape. Now, the majority of academic papers can find a home online, whether in standard journals or preprint servers. In this context, peer review serves not only as a mechanism to filter and direct articles to appropriate audiences based on perceived quality but also plays a vital role in maintaining the integrity, validity, and reliability of scholarly work. The emphasis on quality versus trendiness varies among journals, underscoring the subjective nature of the process.

The peer-review process, though crucial, is often a demanding and iterative journey. A fitting comparison might be with the grant review process. Like grant applications, where funding is a finite resource, academic papers vie for limited spots in prestigious journals, undergoing rigorous scrutiny to ascertain their relative contribution to the field.

Innovation within the peer review system has been gradual. The most significant shift in recent decades was the transition from traditional postal communications to email and online submissions, enhancing efficiency. Nonetheless, subsequent modifications, such as changes in reviewer anonymity policies or attempts to balance scholarly rigor with current trends, have been relatively minor. The general consensus suggests that the system, while functional, could greatly benefit from more substantial and innovative reforms to improve both efficiency and quality (Jefferson, 2002; Tennant, 2018; Craig, 2022; Garcia, 2022).

Open-ended questions

» Historical perspectives: How do you think the peer review process has evolved over the years in your field of study?
» Innovations and improvements: What innovations or changes would you like to see implemented in the peer-review process?
» Impact of digitalization: How has the shift to digital platforms affected the peer review process in your experience?
» Future directions: What do you envision as the future of peer review in academic publishing?
» Role of technology: How do you think emerging technologies could transform the peer-review process?
» Personal adaptation: How have you adapted your approach to writing or reviewing papers in response to changes in the peer-review system?
» Balancing quality and timeliness: How can the peer-review process balance the need for thorough, quality reviews with the demand for timely publication?
» Global perspectives: How does the peer-review process vary across different countries or cultures, and what can be learned from these differences?

Multiple choice questions

Satisfaction with current peer-review process:
A) Very satisfied
B) Satisfied
C) Neutral
D) Dissatisfied
E) Very dissatisfied

Impact of peer review on manuscript quality:
A) Significantly improves quality
B) Generally improves quality
C) No impact on quality
D) Sometimes lowers quality
E) Often lowers quality

Peer-review training:
A) Strongly needed
B) Somewhat needed
C) Neutral
D) Not very needed
E) Not needed at all

Perceived effectiveness of current peer-review system:
A) Ineffective
B) Moderately effective
C) Effective
D) Highly effective

Impact of specialization on peer review:
A) Negatively impacted the review process
B) Had no significant impact
C) Positively impacted the review process

Peer review now and in the future: Upholding integrity and rigor in the age of information overload

Peer review is an indispensable component in maintaining the integrity and rigor of academic work, crucial for the advancement of humanity. As we move into 2024 and beyond, the role of peer review becomes even more significant. What endures through generations? Our genes, knowledge, values, and traditions. Peer review plays a vital role in ensuring the accuracy and reliability of the knowledge we pass on, the values we instill, and the traditions we uphold.

In an era where anyone with a significant social media following can disseminate information, the distinction between opinions, beliefs, and scientifically validated knowledge becomes increasingly blurred. While freedom of expression is a cornerstone of many societies, it also underscores the need for mechanisms to differentiate personal viewpoints from empirical evidence. Peer review offers such a tool, providing a layer of scrutiny and validation, especially in areas where certainty and controversy intersect—from climate change and politics to economics, biology, medicine, and the burgeoning field of artificial intelligence.

Consider recent history, like the COVID-19 pandemic, where public discourse on masks, vaccines, ventilators, and the virus' origins often collided with scientific findings. During such times, the role of expert review in evaluating and communicating scientific knowledge became ever more crucial (Horbach, 2021). A humble stance regarding these societal challenges is prudent, advocating for peer-reviewed knowledge to be universally accessible as a reference point. While it is not the place of academics to impose peer-reviewed content as the definitive truth, peer review appears valuable and relevant, not just within academic circles but as a vital part of societal discourse and decision-making.

Open-ended questions

- Evolving role of peer review: How do you think the role of peer review has changed in the age of digital information and social media?
- Challenges and opportunities: What are the biggest challenges and opportunities you see for peer review in maintaining the integrity of academic knowledge in today's society?
- Balancing freedom and accuracy: How can we balance the freedom of expression inherent in platforms like social media with the need for accurate, peer-reviewed information?
- Impact of technology: In what ways do you think emerging technologies will further influence the process of peer review?
- Public perception: How can the academic community better communicate the importance and role of peer review to the general public?

Multiple choice questions

Importance of peer review in social media era:
A) More important than ever
B) Equally important as before
C) Less important than before
D) Not important

Impact of misinformation on peer review:
A) Greatly increased the need for peer review
B) Somewhat increased the need
C) No change in the need
D) Decreased the need

Trust in peer-reviewed information:
A) Completely trust
B) Generally trust
C) Neutral
D) Skeptical
E) Do not trust at all

Role of peer review in public discourse:
A) Essential for informed decisions
B) Helpful but not essential
C) Neutral
D) Of little importance
E) Unnecessary

A paradigm shift in peer review

The tension between content creators (authors) and curators (editors, reviewers, publishers) in the traditional peer-review process often hinges on subjective criteria: the novelty of results, the paper's impact on the field, and the burden of proof for claims. Authors might not always accurately gauge the significance of their work, while journals and reviewers may struggle to fully assess the true value of a scientific breakthrough. This subjectivity has driven the evolution of the current journal ecosystem, which is essentially a publishers' market. Authors aim for high-impact journals through an iterative submission process, engaging in a trial-and-error approach to find the best placement for their papers. In turn, journals strive to publish the most notable papers by setting increasingly stringent criteria.

This dynamic underscores the substantial influence publishers have in dictating research visibility and prestige, primarily through impact factors and audience targeting. Although this system has facilitated significant scientific communication and advancement, it is not without its inefficiencies, biases, and elements of elitism (Lee, 2012; Haffar, 2019). Yet, its role in academic progress remains vital. In some respects, the system can be considered fair, as it allows anyone, from anywhere, to submit papers to high-ranking journals. Although the majority of submissions are rejected, the

opportunity for consideration is still present. We will revisit this issue of fairness later in this section. This course advocates for a shift towards an authors' market in academic publishing. This approach aligns with modern trends, recognizing content creators as central to both content generation and dissemination. While we see value in preprint repositories as a step forward (Wingen, 2022), we believe their impact is limited, particularly for non-specialists and the general public who benefit more from peer-reviewed, validated content. This course bridges this gap by offering efficient peer review while maintaining the author's prominence in the publication process.

In the current landscape of peer review, there is often an aimless execution of tasks, primarily due to the lack of explicit guidelines from journals. This situation can lead to a cycle where both authors and reviewers engage in an extended process with unclear objectives. This course proposes to alter this dynamic by clearly outlining peer review goals.

Peer review is a process designed **to provide authors with constructive, unbiased feedback that genuinely enhances their work.**

This approach recognizes the evolving nature of academic validity, which, though a crucial aim, is always a work in progress and subject to the influence of various methodologies. It is important to note that the assurance of a work's validity ultimately resides with the authors, who are both the creators and guarantors of their content.

- **Emphasis on improvement:** The primary goal of peer review should be to enhance the quality of the manuscript. This involves offering constructive feedback, suggesting improvements, and identifying areas where the argument, methodology, or presentation can be strengthened. Improvement also encompasses ensuring that the manuscript is clear, well-written, and well-structured, making it accessible and understandable to its intended audience.
- **Upholding validity:** While focusing on improvement, it is essential not to overlook the validity of the work. Validity refers to the soundness and robustness of the research methodology, the appropriateness of the analyses, and the accuracy and reliability of the conclusions drawn. Peer reviewers must critically assess these aspects to ensure that the research is credible and trustworthy.
- **Striking a balance:** To balance these goals, peer reviewers should approach manuscripts with a mindset of constructive criticism. While identifying weaknesses or errors is important for maintaining validity, it is equally crucial to provide specific, actionable suggestions for improvement. Reviewers should aim to help authors refine their work, not just critique it.
- **Fostering a cooperative spirit:** The peer review process should be seen as a cooperative effort between authors and reviewers to advance knowledge. Reviewers should communicate their feedback in a way that encourages dialogue and understanding, rather than confrontation. Using the term "cooperative" instead of "collaborative" in the context of peer review is appropriate, particularly considering the distinct roles and responsibilities of reviewers and authors.
- **Distinct roles:** In the peer-review process, authors and reviewers have different roles. Authors create and present their research, while reviewers evaluate and provide feedback. The term "collaborative" might imply a joint effort in creation or research, which is not the case in peer review.
- **Cooperative nature:** "Cooperative" accurately describes the nature of the interaction in peer review. It suggests a process where both parties, though independent, work towards a common goal—the improvement and validation of the manuscript. It implies a mutually respectful and constructive engagement, where feedback is provided and received with the aim of advancing

knowledge and ensuring quality.

- **Objective distance:** The term "cooperative" maintains and promotes the concept of objective distance, which is crucial in peer review. Reviewers provide independent, unbiased assessments without being directly involved in the research. This term respects the boundaries between authorship and evaluation.
- **Encouraging a positive environment:** Emphasizing this cooperative approach in peer review fosters a positive, supportive environment. It encourages authors to view feedback not as criticism but as valuable input from informed peers, contributing to the overall enhancement of their work.
- **Peer review as a service:** Recognizing peer review as a service to authors marks a crucial step in our transition towards an author-centric market in academic publishing. In this model, the author is seen as the customer, entitled to high-quality, respectful, and timely service—a significant shift from traditional practices. This redefinition is central to reshaping the academic publishing landscape to be more author-focused and efficient.

Open-ended questions

- Paradigm shift evaluation: How do you perceive the shift from a publishers' market to an authors' market in academic publishing?
- Review process objectives: In your opinion, what should be the primary objectives of the peer-review process in an author-centric model?
- Handling subjectivity: How can reviewers effectively manage the subjectivity inherent in assessing the novelty and impact of research?
- Role of preprint repositories: What role do you believe preprint repositories should play in the current landscape of academic publishing?
- Cooperation vs. collaboration: How do you think the distinction between a cooperative vs. a collaborative role of reviewers and editors helps peer review?

Multiple choice questions

Importance of author-centric approach:
A) Crucial
B) Important
C) Moderately important
D) Slightly important
E) Not important

Effectiveness of preprint repositories:
A) Very effective
B) Effective
C) Neutral
D) Ineffective
E) Very ineffective

Reviewer's role in an author-centric market:
A) Guide and mentor
B) Critical evaluator

C) Gatekeeper
D) Collaborator
E) Cooperator

Decentralization and game theory perspective of academic peer review

This course advocates for a peer review model where reviewers and editors focus not on selecting papers for publication as a competition but on providing constructive feedback for improvement. The guiding question shifts from “Should this paper be published considering the limited spots in a journal?” to “Why should it not be published, if via peer-review it has demonstrated improvement and validity?” This approach aims for a more inclusive, author-centric model, focused on manuscript enhancement rather than exclusion and selectivity.

This shift in the goal and process of academic publishing may require transformations of the current publishing models to move away from the traditional models that often result in multiple rejections and delays. Under this new model, acceptance for publication is determined only based on merits with decisions about audience and distribution decided afterwards. A proposed name for this approach is “Manuscript Evaluation Reflecting Intrinsic Tenets” (MERIT), which encapsulates a principle-centered approach to academic peer review, focusing on the essential qualities of the work. A MERIT-based approach suggests that the evaluation process mirrors the fundamental scholarly values inherent in the manuscript.

To scale, this new approach will necessitate the development of additional tools to ensure that groundbreaking works of general interest achieve broader circulation, while more specialized articles reach the appropriate audience. However, though the development of such tools is of interest to the author, they are out of the scope of the current manuscript and may be developed by others if MERIT is widely adopted.

By decoupling the assessment of quality from the distribution of content, a new academic publishing model will strive for a more equitable and efficient system that fosters academic advancement across diverse disciplines.

This new model of academic peer review can be conceptualized in game theory as a shift from a competitive to a cooperative game. In traditional publishing, the game is competitive, with authors and journals navigating a high-stakes environment of acceptance and rejection, akin to a zero-sum game. MERIT’s model, emphasizing improvement and author-centric review, transforms this into a cooperative game, where the success of one party (authors) does not necessitate the failure of another (journals). This model is innovative in that it reduces the adversarial nature of publishing and aligns more with modern cooperative trends in content creation and dissemination. It addresses inherent inefficiencies and biases in traditional peer review by fostering a more inclusive and constructive approach.

The traditional competitive model in academic publishing involves multiple rounds of submissions,

peer reviews, and rejections before achieving publication and ranked placement in a journal, which can be inefficient. Ranked placement here refers to publication in a specific journal with predetermined ranks (e.g. impact factors (IF) associated with the journal, with a high IF being a proxy of high quality). Getting accepted into a highly ranked journal currently implies the quality of a paper and provides exposure to a wide audience. For example, if the editor of the journal Science Magazine receives a paper, sends it for peer review, and it ultimately gets accepted, most of the general public, faculty search, promotion committees, and funding agencies may assume the content of the article is of high quality and/or of general interest. This is largely because Science has a high IF, as it usually publishes very few articles (high rejection rate), and they tend to be cited often.

However, this rarely happens straightforwardly, as the same paper may have already gone through peer review once or twice at different journals and been ultimately rejected before landing at Science. Effectively, under the current system, journals manage peer review, publishing, and act as gatekeepers. Was the paper rejected before because the content was dubious, because of an editorial decision, or because the journal was full with all its limited slots taken? The author and the journals may have different perceptions about the reasons, but the process is certainly iterative, often inefficient, and slow as a norm.

In contrast, MERIT's model streamlines this process by separating approval for publication via peer review from ranked placement and distribution to specific audiences. In the newly proposed system, a paper will be peer-reviewed and approved for publication based on its merits without regard to the impact factor of any journal. Distribution will be conducted to specific audiences, either specialized or broad, after peer review has been completed and the paper has been accepted. This changes the gratification dynamics for authors, as the reward of wide distribution comes post-publication, based on the paper's measured impact and relevance, which may grow or be limited over time. This delayed (about a week or two) but potentially broader recognition could be a crucial aspect, emphasizing efficiency and merit-based recognition over immediate placement success. This fundamental shift could be seen as a significant evolution in the academic publishing process if widely implemented.

A logical question arises: Who or what distributes the manuscript after approval for peer review under MERIT? From a practical perspective, does it matter? Or more specifically, does it matter who distributes the article if it has already been validated via independent peer review? The answer is that it probably does not matter as much as it currently does. Today, distribution is paramount, and the distributor serves as a proxy for quality.

After a MERIT-based peer review, work may be distributed by new platforms that evolve from what we currently call journals. Alternatively, some may choose to distribute their work themselves after peer review if they have a sufficiently efficient platform, such as social media.

From a game theory perspective, MERIT's model can be conceptualized as shifting from a high-frequency, competitive game (traditional publishing) to a low-frequency, cooperative and outcome-based game. In the traditional model, authors engage in numerous iterative rounds (submissions and rejections) akin to repeated plays in a game, seeking immediate success. MERIT changes this to a single, cooperative interaction focused on improvement and eventual merit-based recognition. This reduces the 'game' to one iteration with delayed but potentially greater rewards, emphasizing efficiency and long-term value over immediate gratification. This approach aligns with cooperative game theory, where the focus is on mutual benefit and shared success. A simple mathematical representation is shown below.

Traditional Publishing Model (Competitive Game):

Iterations **(n):** Multiple (high n), representing rounds of submission and rejection
Reward **(R):** High if accepted in high-impact journal; low or zero if rejected
Probability of Success **(P):** Lower due to competitive nature

Utility Function (U): U = P(success) × R - Cost(n), where Cost(n) increases with each iteration

MERIT Model (Cooperative, Outcome-based Game):

Iterations **(n):** Single (n=1), representing one round of review and improvement
Reward **(R):** Post-publication recognition based on merit, potentially high but delayed
Probability of Success **(P):** Higher as focus is on improvement

Utility Function (U): U = P(success) × R - Cost(n), with Cost(n) being significantly lower

In game theory terms, the traditional model can be akin to a repeated prisoner's dilemma with higher individual costs, while MERIT's model aligns more with a single-shot game with a focus on cooperative strategies for mutual benefit. This simplified representation underscores the efficiency and collaborative nature of MERIT's approach compared to the traditional method.

In game theory, a "repeated prisoner's dilemma" involves players repeatedly facing the same strategic decision. This scenario often occurs in competitive settings where individuals choose between cooperation and self-interest. The repeated nature means players have multiple interactions, influencing their strategies based on past outcomes.

A "single-shot game," on the other hand, is played only once, so decisions are made without the opportunity to modify strategies based on past interactions. This setup is common in situations where players have one chance to cooperate or act in self-interest, often emphasizing mutual benefits and collaborative strategies.

Traditional publishing follows a repeated prisoner's dilemma, where authors continuously face a competitive, high-stakes environment, influencing their strategies over multiple iterations. In contrast, MERIT's single-shot game approach simplifies this dynamic, focusing on cooperation and improvement in one interaction. This shift not only alters the strategy but also changes the fundamental nature of the publishing "game," promoting efficiency and mutual benefit. Such a transition in academic publishing signifies a novel application of cooperative game theory principles.

The original Prisoner's Dilemma is a game theory problem that illustrates why individuals might not cooperate, even when it is in their best interest to do so. Two prisoners, isolated from each other, are offered a deal by the authorities. If one confesses (betrays the other) while the other remains silent (cooperates), the betrayer goes free while the silent prisoner receives a heavy sentence. If both remain silent, they get minor sentences, but if both betray, they receive moderate sentences. Despite mutual cooperation being the most beneficial outcome, the dilemma arises from the lack of trust and communication, often leading to both choosing to betray.

In a single-shot game, unlike the repeated interaction of the Prisoner's Dilemma, players interact just once. The decision-making process does not benefit from learning or strategy adjustments based on past outcomes. Each player makes their choice (to cooperate or defect) without the chance to modify their strategy in subsequent rounds. This setup often emphasizes immediate payoffs and the individual evaluation of risk and reward, without the dynamic of evolving trust or retaliation.

In the context of academic publishing, if we were to use the Prisoner's Dilemma model, one could conceptualize the author and the journal as the two "prisoners." Each submission and review cycle represents an iteration, where both parties decide whether to cooperate (accept and publish the article) or defect (reject the article). Authors aim for high-impact journals, while journals seek high-quality papers. This iterative process reflects a game of strategy and decision-making under uncertainty, similar to the Prisoner's Dilemma scenario.

Applying a single-shot game approach to resolve the dynamics typical of the Prisoner's Dilemma could be groundbreaking in academic publishing. This approach significantly shifts from the traditional, iterative submission process to a more streamlined, one-time interaction focused on collaboration and improvement. By altering the fundamental game-play of academic publishing, it introduces a novel way of thinking about and managing the publication process. This innovation could potentially transform the traditional publishing model, emphasizing efficiency and author-centric practices.

Under the MERIT model, decentralized editors shall have the authority to approve publications, but their decisions must be justified by the peer-review process and not be arbitrary. A centralized editorial board shall vet and establish editorial policies and will have the authority to overrule arbitrary or unjustified decisions and retract papers after due process. This structure aims to preserve academic integrity while addressing key issues in peer review.

Under the MERIT model, only submissions that meet the defined criteria for publicons—advancing the field and having undergone rigorous peer review (as explained in the next section)—will be published. This ensures that while not all submissions will be accepted, those that qualify as publicons will be disseminated efficiently, fairly, and promptly.

This table provides a concise overview of the risk-reward comparison between the traditional peer review model and the MERIT-based peer review model, highlighting the key differences and potential benefits of the proposed approach.

Table 1. Risk-reward comparison between the traditional peer review model and the MERIT-based peer review model

Criteria	Traditional Peer Review	MERIT-Based Peer Review
Risk	» Multiple iterations and rejections can lead to frustration and delays. » Potential bias and favoritism in reviewer selection. » Overemphasis on impact factor.	» Initial skepticism and resistance to change from the academic community » Need for significant adjustments in publishing infrastructure. » Risk of undervaluing established norms.
Reward	» Rigorous filtering process ensures high-quality publications. » Prestige associated with high-impact journals.	» Streamlined process with focus on intrinsic manuscript quality. » Increased inclusivity and equity in academic publishing. » Faster publication times and reduced delays.
Consistency	» Consistent formatting and style across high-impact journals. » Stringent adherence to journal-specific guidelines.	» Flexibility in manuscript presentation and structure. » Emphasis on coherence and logical flow rather than strict formatting.
Novelty	» Focus on groundbreaking discoveries and novel methodologies.	» Broader definition of novelty, including incremental advancements and interdisciplinary work.
Academic Rigor	» High standards for methodological thoroughness and data quality.	» Encouragement of rigorous peer review with structured guidelines (Main Result Justification Sheet).
Ethical Considerations	» Established ethical standards and guidelines for human and animal studies.	» Continued emphasis on ethical integrity with detailed checks for IRB/IACUC approval and data integrity.
Review Process Efficiency	» Time-consuming with multiple rounds of review and revisions.	» More efficient with a single, cooperative review process focused on improvement and merit.
Reviewer Training	» Minimal formal training; reviewers learn through experience and mentorship.	» Structured training modules and guidelines to enhance reviewer skills and objectivity.

Author Experience	» Potentially frustrating due to multiple rejections and long wait times.	» More positive experience with clear, constructive feedback and faster decision-making.
Impact on Careers	» High-impact publications can significantly boost academic careers.	» Fairer recognition of scholarly contributions, reducing bias and favoritism.
Innovation and Reform	» Slow to adopt changes; gradual shift from traditional to digital platforms.	» Embraces modern trends, including digital platforms and author-centric approaches.
Inclusivity and Equity	» Potential biases in reviewer selection and publication opportunities.	» Promotes diversity and inclusivity by focusing on merit and reducing systemic biases.
Publicon Concept	» No specific concept akin to “publicon.”	» Introduces the “publicon” as the minimum quantum of information necessary to advance a field, ensuring quality and relevance.

Open-ended questions

» How does MERIT’s decentralized approach to peer review alter the role of editors and reviewers compared to traditional models?
» Can you discuss the potential benefits and drawbacks of decoupling the quality assessment from content distribution in academic publishing?
» How does transforming the peer-review process from a competitive to a cooperative game change the incentives for authors?
» Consider the impact of delayed recognition on authors’ motivation and the quality of submissions to a publisher using MERIT-based publishing.
» How does the concept of a single, cooperative interaction in the peer-review process promote or hinder academic progress, in your view?

Multiple choice questions

What authority do editors and reviewers have in MERIT’s publishing model?
A) Limited to recommending revisions only.
B) Full authority to approve manuscripts for publication.
C) No authority; decisions are made by a central committee.
D) Authority to reject manuscripts outright without feedback.

In MERIT’s model, the peer-review process is conceptualized as:
A) A competitive game with limited spots for publication.
B) A cooperative game focusing on manuscript enhancement.

C) A zero-sum game where one party's success necessitates another's failure.
D) An iterative submission process with immediate rewards.

Which statement best describes the traditional competitive model in academic publishing?
A) It involves a single round of submission and acceptance.
B) It involves multiple rounds of submissions and rejections.
C) It relies on post-publication assessment for article distribution.
D) It uses a cooperative game theory approach.

From a game theory perspective, the traditional model of publishing is akin to:
A) A repeated prisoner's dilemma.
B) A single-shot game.
C) A cooperative strategy game.
D) A dominance strategy game.

MERIT's model reduces the "game" of publishing to:
A) Multiple iterations with immediate rewards.
B) A single iteration with delayed but potentially greater rewards.
C) A continuous loop of competitive submissions.
D) A series of cooperative interactions with guaranteed publication.

Advocating for more flexible manuscript presentation: Bridging traditional and diverse formats in academic publishing

Historically, academic journals have evolved from platforms where authors could present manuscripts in a variety of formats to entities with stringent formatting and stylistic guidelines. Prestigious journals, such as Cell or the New England Journal of Medicine, exemplify this trend. A cursory examination of papers in these journals reveals a high degree of uniformity in style and content type, contributing to a distinct journal character. This uniformity, while beneficial in maintaining consistency, can inadvertently limit the diversity of scientific exploration, particularly for interdisciplinary work that may straddle different stylistic conventions.

Academic publishers may evolve towards operating with a broader perspective beyond the traditional perspective of current journals, thus allowing for a wider range of styles and disciplines in submitted manuscripts. This openness demands a flexibility not typically found in peer-reviewed journals, necessitating a clear articulation of manuscript essentials. This course provides authors and publishers with precise guidelines, defining expectations and streamlining the review process.

At its core, an article must include two fundamental sections: the abstract and the body. The abstract is essential for indexing and is generally accessible for free, serving as a synopsis of the work. In contrast, the body of the article, containing the main content, may be freely available or behind a paywall, depending on the journal's access model.

Suggested guidelines for submissions and peer review in a MERIT's-based publishing model

In reshaping the guidelines for MERIT's submissions and peer review, this course aims to ignite a transformative shift in academic publishing. The current system, driven by journal impact factors, often skews reviews towards perceived prestige, overshadowing the intrinsic value of research. Editors and reviewers, constrained by this paradigm, may inadvertently perpetuate biases and favoritism. The MERIT's model challenges this status quo. MERIT's focus is on the genuine quality, relevance, and scientific integrity of submissions. MERIT strives to create an equitable model of publishing platforms where merit is recognized purely on the basis of scholarly contribution, regardless of external influences or resources.

MERIT-based peer review model aims to achieve **a fairer, more inclusive academic landscape where every researcher has a voice.**

In a MERIT's based peer review, reviewers are encouraged to concentrate on the academic rigor of submissions, assessing them purely on scholarly merit. Once a work is approved, a publisher or platform commits to ensuring its distribution to the most fitting audience, whether specialized or broad, based on the work's merits and appeal. This approach may aid the publisher to deliver on fostering a more inclusive and unbiased academic publishing environment.

For MERIT's-based submissions, it is imperative that reviewers and editors recognize their pivotal role in shaping academic discourse and exercise their judgment with due care. Below are detailed considerations for addressing common issues encountered during the review process:

- **Overstatement of results:** When authors present sound methodologies but overreach in their conclusions, reviewers should guide them to temper their claims, ensuring the interpretations align more closely with the data.
- **Misinterpretation of data:** Reviewers should be constructive when suggesting reinterpretations or clarifications of data, especially considering their limited access to the full dataset. Authors might be asked to provide additional information to resolve these concerns.
- **Insufficiency of evidence:** Standards for evidential sufficiency vary across disciplines. Reviewers should consider whether repetitive experiments or diverse methodologies better demonstrate a finding. Elite institutions often have access to multiple cutting-edge methodologies, which might not be feasible for all authors. Reviewers should be mindful of these disparities.
- **Methodological issues:** In cases where methods do not align with the study's aims, reviewers should assess the feasibility of any proposed changes. They should consider alternatives, like removing certain results or further qualifying interpretations, if methods are deemed inappropriate.
- **Ethical concerns and plagiarism:** Reviewers should be vigilant about ethical concerns, including potential plagiarism, data fabrication, and conflicts of interest. This is crucial for maintaining the integrity of academic publishing.

These guidelines are designed to cultivate a fair and inclusive review process, acknowledging the diverse academic environments and resource disparities. Reviewers are encouraged to categorize

their feedback based on the outlined criteria, aiding editors in their decision-making. This structured approach is key to enhancing the efficiency and effectiveness of the peer-review process in any publisher adopting the MERIT's based model.

These considerations represent a significant shift from the prevalent standard in peer review, where reviewers typically just list strengths and weaknesses, classifying issues as either major or minor. We find this conventional method overly simplistic and not particularly effective or objective in steering the peer-review process.

It is quite remarkable that such a loosely structured approach for peer review, with minimal guidance, is the norm for a process of great consequence. The outcomes of peer reviews can delay publications for years, significantly impact careers, and influence decisions on grants and promotions.

Open-ended questions for reviewers

- Interpretation of results: How would you approach a situation where you believe an author has overstated their findings?
- Dealing with misinterpretation: How would you guide an author who has misinterpreted their results, especially when you have limited access to their data?
- Assessing evidence sufficiency: In cases of insufficient evidence, how would you determine if the issue is due to a lack of resources or a gap in the research methodology?
- Methodological appropriateness: How do you identify and address issues where the methodology does not align with the study's objectives?
- Ethical concerns: What steps would you take if you suspect ethical issues, such as plagiarism or data fabrication, in a manuscript?

Multiple choice questions for reviewers

Handling overstatements:
A) Suggest toning down conclusions.
B) Recommend additional experiments.
C) Reject the manuscript outright.
D) Request a reanalysis of the data.

Dealing with misinterpretation:
A) Advise on alternative interpretations.
B) Suggest additional supporting data.
C) Recommend consulting with an expert.
D) Encourage a complete rewrite.

Evaluating insufficient evidence:
A) Ask for more experiments.
B) Suggest different methodologies.
C) Consider the resource limitations.
D) Recommend collaboration for better resources.

Methodology issues:
A) Insist on changing the methodology.
B) Suggest removing results.
C) Advise further qualification of results.
D) Recommend consulting a methodological expert.

Abstract requirements for authors

Earlier, abstracts were limited to 250-400 words or less than 10,000 characters. Post-2016, these constraints were removed, offering more flexibility. The abstract is crucial for visibility; it often influences a reader's decision to delve into the full article. Effective abstracts should concisely present the main result, the method employed, and its implications. Avoid extensive introductions or background; instead, focus on the knowledge gap or hypothesis. While some authors prefer structured abstracts with subtitles, a logical flow of information is key.

Reviewing abstracts for MERIT's-based publishing

A good abstract aligns with the mentioned criteria and accurately reflects the paper's content. Reviewers should ensure that the claims in the abstract are supported by the data in the main article. Overstated or understated findings should be flagged for revision. The goal is to ensure that the abstract provides a true and concise overview of the study's findings and significance.

When considering abstracts and their review, especially for specific fields, it is important to recognize that different disciplines may have varying norms and expectations. Technical fields like engineering or computer science might emphasize methodology and results more heavily, while humanities might focus more on theoretical implications. It is crucial for reviewers to be familiar with the standards and expectations of the specific field to ensure a fair and effective review. Additionally, clarity and accessibility to a broader audience can be important, especially for publishers with multidisciplinary platforms.

Types of manuscripts relevant to MERIT's-based publishing

In evaluating what constitutes a publishable academic article, it is crucial to recognize that our perspectives have evolved. We must consider the substance of each manuscript, assessing its contribution to the field, whether it is through groundbreaking discoveries, insightful syntheses of existing knowledge, critical analyses, or evaluations of research rigor and reproducibility. This evolution in criteria reflects a broader understanding of what valuable academic work entails.

- **Discovery and innovation:** Manuscripts that present new discoveries or observations advancing the field.
- **Synthesis of knowledge:** Articles compiling or reviewing existing knowledge in a way that offers insightful synthesis.
- **Critical analysis:** Submissions presenting original opinions or critiques of others' work.

- **Rigor and reproducibility:** Increasing focus on evaluating the rigor and reproducibility of previously published research, addressing concerns about replication in scientific studies.
- **Methodological papers:** Focused on developing new methods or substantially improving existing ones.
- **Case studies:** Detailed analysis of a single or a small number of cases, offering unique insights.
- **Data papers:** Centered around datasets, offering valuable data for the field without extensive hypothesis testing.
- **Technical reports:** Providing details of technical or scientific research, often preliminary in nature.
- **Commentaries and perspectives:** Offering personal views or opinions on research topics, not necessarily based on new research.

As relevant to each category, the body of the manuscript should present the research in a coherent and logical manner, including necessary sections like introduction, methods, results, discussion, and conclusion. Authors are encouraged to use a format that best suits their discipline and style and to include subtitles or not for specific sections according to their preferences and standards in the field. The only mandatory section would be methods that are more efficiently assessed as separate sections from introduction, results and discussion.

By allowing submissions in any chosen format, as long as they include an abstract and a manuscript body, MERIT's-based publishing embraces the diversity of academic thought and expression. This approach seeks to bridge the gap between traditional publishing norms and the dynamic, interdisciplinary nature of modern scientific inquiry.

How to write a manuscript for MERIT's-based publishing

While journals and platforms may allow flexibility in the form in which a manuscript is submitted, it is most effective to provide guidelines regarding content according to traditional categories found in manuscripts. The following guidelines may be useful for MERIT's-based peer review and standard peer review.

Introduction or background

The introduction of a manuscript serves a critical function, providing the reader with essential context for the research undertaken. It should succinctly delineate what is currently known in the field, identify the existing knowledge gaps, and articulate the specific issue that the manuscript intends to address. A common pitfall is the inclusion of excessive information more suitable for a review article, or conversely, the omission of vital background necessary for comprehending the manuscript and interpreting its results. Properly citing existing literature is essential. Authors are advised to reference both original research articles and contemporary reviews on the subject, offering readers resources for further exploration. It is vital for the introduction to clearly state the study's objectives, which can be done by formulating a hypothesis or stating the aims. Though traditionally placed first, writing the introduction after the results section can be beneficial. This approach allows authors to ensure that all relevant elements are included in the introduction, based on the findings, and helps avoid introducing

concepts or issues that were ultimately not part of the study.

The tip about writing the introduction after completing the results section can be quite helpful for several reasons:

- **Focused content:** Writing the introduction after the results allows authors to tailor the introduction more closely to the actual findings of the study. This ensures that the introduction is directly relevant to what is subsequently presented.
- **Clarity of objectives:** Knowing the outcomes makes it easier to articulate the study's objectives and hypotheses in a way that directly aligns with the results, providing a clear and coherent narrative.
- **Avoiding irrelevant information:** This approach helps in eliminating the mention of concepts or methodologies that, although initially considered, were not included in the final study. It keeps the introduction concise and focused on what is actually discussed in the paper.
- **Better flow and consistency:** Writing the introduction with a clear understanding of the results ensures a smoother transition between what is being introduced and what is presented later. It helps in maintaining consistency throughout the paper.
- **Reflective writing:** Often, the process of analyzing and interpreting results can lead to a deeper understanding of the topic. Writing the introduction afterwards allows the author to incorporate these insights, potentially leading to a more comprehensive and insightful introduction.

However, this approach may not suit all authors or all types of research. Some may prefer to write the introduction first as a way of setting out their research goals and questions more clearly from the outset. It ultimately depends on the author's workflow and the nature of the research.

Results

MERIT's-based publishing may grant authors considerable flexibility in how they present their results, allowing for sections with or without subtitles. Authors can opt to discuss and interpret their findings concurrently with the presentation of the data, or they can choose to have a distinct discussion section for this purpose. Additionally, there is no restriction on the number of images, figures, or tables included. However, MERIT's-based publishing should discourage the use of supplemental figures, tables, or videos. The preference is for most, if not all, data to be integrated into the main manuscript. Exceptions could be made for repository or dataset links that are unwieldy and thus may be placed in a supplementary appendix. The current trend of including supplementary figures has often led to a fragmented presentation of results and the inclusion of less rigorously vetted findings.

A key innovation in MERIT's-based peer review is the implementation of a "Main Result Justification Sheet." This tool is designed to streamline the review process and enhance transparency for readers. Authors are required to succinctly articulate three crucial aspects of their study:

- **Identification of the main result:** Clearly state the primary finding or outcome of the research.
- **Novelty assessment:** Provide an evaluation of how novel or groundbreaking this finding is within the context of existing literature.
- **Evidence strength:** Describe the robustness of the evidence supporting the conclusion, including methodology and data quality.

To facilitate this, authors are requested to complete the following template, which aids reviewers in assessing the work and also provides readers with a clear understanding of the study's core contributions:

Main Result Justification Sheet

Title of Manuscript:
Manuscript Title

Authors:
Author names

1. Main Result of the Study:
Clearly describe the primary finding or outcome of the research.

2. Novelty of the Finding:
Provide an assessment of the originality and innovation of this finding. Compare with existing research and highlight the new contributions made.

3. Strength of the Evidence:
Describe the methods, data quality, and any analytical techniques used to support the conclusion. Address the reliability and validity of the findings.

Additional Comments:
Any other relevant information that authors wish to convey regarding the result justification.

This format encourages authors to be direct and specific about their work's contributions and the evidentiary basis for their conclusions. It also serves as a valuable resource for reviewers and readers to quickly understand the significance and reliability of the research presented.

The concept of a "Main Result Justification Sheet" in the context of MERIT's-based peer review is significantly advantageous for several reasons:

- **Clarity and focus:** It encourages authors to clearly articulate the core findings of their research. This focus on the main result can help both authors and readers concentrate on the most significant aspects of the study.
- **Enhanced review process:** By providing structured information about the main result, novelty, and evidence strength, reviewers can more efficiently assess the quality and significance of the research. This structured approach can streamline the review process and improve its overall effectiveness.
- **Increased transparency**: Making this sheet available to readers increases transparency, allowing them to quickly grasp the fundamental aspects of the research, understand the author's perspective on the novelty of their work, and assess the strength of the evidence presented.

- **Novelty assessment:** Asking authors to explicitly discuss the novelty of their findings can help in highlighting the contribution of the research to the existing body of knowledge. This is particularly useful in fields where incremental advancements are common.
- **Quality of evidence:** By requiring authors to describe the strength of their evidence, this approach can promote rigorous scientific methods and data analysis, potentially leading to higher quality submissions.
- **Discourages overstatement:** This format might discourage authors from overstating their findings, as they have to explicitly justify the strength of their evidence and the novelty of their results.

While engaging with the Main Results Justification Sheet, authors might discern that their work is not yet sufficiently developed for publication. In such instances, we encourage further advancement of the work prior to submission. This step is crucial, particularly in the context of an ongoing academic debate about what constitutes a significant contribution worthy of publication.

Referred to as the “publicon” this concept represents the minimum amount of information required to advance a field and justify publication in a peer-reviewed journal.

To assist authors in deciding whether their work qualifies for publication, and to guide reviewers in evaluating its merit, MERIT-based peer review defines a publicon as a piece of work that, at the very least, presents one main result. This result should not only advance an academic field but also be underpinned by robust evidence. We emphasize that fragmentary work is not encouraged under a MERIT-based approach. Authors are urged to submit comprehensive articles that may encompass multiple main results, for which several Main Results Justification Sheets can be completed as needed. This may be unnecessary as it may be more helpful for reviewers if the authors clearly identify the main result among the many findings. However, it is also important to acknowledge that some groundbreaking manuscripts may pivot around a single, well-validated point.

The Main Results Justification Sheet is designed to aid reviewers and editors in their decision-making process. If a manuscript lacks this sheet, it may be a signal for revision or rejection. Conversely, if a manuscript presents a well-justified main result, reviewers and editors are prompted to consider why they might hold it back. It is anticipated that this structured approach will spark interest and discussion in academic circles.

The Main Results Justification Sheet could indeed play a significant role in clarifying and defining main authorship in academic publications. By requiring authors to detail the main result of their study, its novelty, and the strength of evidence, this sheet can help in delineating the contributions of each author, particularly the one who played a key role in achieving the primary outcome of the research. This approach could enhance transparency in authorship attribution and ensure that main authors receive appropriate recognition for their central contributions to the research. This could be especially beneficial in multi-author studies, where the specific contributions of each collaborator can sometimes be less clear.

It is essential to note that MERIT-based publishing should actively support and encourage the inclusion of a section dedicated to “Negative or Divergent Results” in articles. This is in response to a prevalent issue in academic research where publications predominantly feature positive data

or results affirming the initial hypothesis. Despite ongoing efforts to address this bias, it remains common for articles to present only supportive data, which does not reflect the typical experience of researchers. Most experiments yield mixed outcomes, often producing data both for and against a hypothesis. It's the non-conforming data, frequently omitted from publications, that can sometimes lead to groundbreaking discoveries. MERIT-based publishing advocates for the inclusion and discussion of such nuanced results in manuscripts. This approach not only offers educational benefits to trainees but also enhances academic rigor, deterring data manipulation and fabrication. We emphasize that data doesn't need to be flawless for publication; the goal of MERIT's-based publishing is quality, not perfection.

Open-ended questions

» How does the flexibility in presenting results with or without subtitles may influence your approach to structuring your research findings?
» In what ways do you think the inclusion of a Negative or Divergent Results section could impact the perception and reception of research in academic circles?
» How do you believe the Main Result Justification Sheet will aid in enhancing the transparency and quality of published research?
» Can you discuss the potential advantages and challenges of integrating all data into the main manuscript, as opposed to using supplemental materials?

Multiple choice questions

What does MERIT's-based publishing encourage authors to include in their results section?
A) Only positive results
B) A mix of positive and negative results
C) Only images and tables
D) Only negative results

How is MERIT-based publishing's view the use of supplemental figures, tables, or videos?
A) Strongly encouraged
B) Discouraged but allowed
C) Mandatory
D) Strictly prohibited

What is the purpose of the Main Result Justification Sheet?
A) To outline the research methodology
B) To justify the main result, assess its novelty, and describe the evidence strength
C) To provide a biography of the authors
D) To summarize the entire manuscript

In the context of MERIT's-based publishing, what defines a "publicon"?
A) A manuscript with multiple main results
B) Any published scientific article
C) A piece of work with at least one main result that advances the field
D) A publication with perfect data

Discussion or conclusions

In MERIT's-based publishing, authors have the flexibility to integrate the discussion or conclusions with the results section or to create a separate section. This section's aim is to interpret the findings within the broader context of existing research, forming a cohesive or contrasting narrative. Authors should primarily focus on discussing the main results, but they are also encouraged to explore other aspects of their research. Additionally, a "limitations of the study" section is recommended, where authors can address methodological constraints and potential improvements. Discussions should be pertinent and focused, centering on the results—be they positive, negative, divergent, or convergent—without straying into irrelevant details.

Authors are encouraged to not only interpret their results but also to place them in the context of broader field developments or trends. This contextualization of findings helps in understanding the significance of the work.

Authors may compare their findings with similar studies, discussing any discrepancies and possible reasons for them.

Authors are encouraged to suggest future research avenues based on their findings, which can be particularly helpful for early-career researchers reading the paper.

Methods

In the Methods section, MERIT-based publishing advocates for detailed descriptions using specific subtitles for each method, focusing on reproducibility. Authors should ask themselves: "Is there enough detail for someone else to replicate this experiment?"

It is often helpful to remember that you, as the author, might be the one referring back to these details in the future. We advise against simply referring to methods with a citation and a note such as "performed as described in…". This is particularly important if the cited reference is behind a paywall, potentially restricting access to crucial information. In line with new standards for rigor and reproducibility, specifying providers and catalog numbers for specific products is recommended. For studies involving humans or animals, ethical approvals and institutional affiliations must be clearly listed. We discourage the separation of main and supplementary methods; all methods pertinent to the manuscript should be comprehensively included in the main text.

Authors are encouraged to include specific settings or parameters used in their experiments, which can be crucial for reproducibility.

It is critical to emphasize the importance of detailing statistical analysis methods, including software and version used, which is often a gap in methods sections.

For studies involving human or animal subjects, beyond just listing institutional approvals, encourage authors to briefly describe the ethical considerations involved in their study design. Authors must state whether informed consent was obtained from subjects or if not provide justification for this.

Authors must include a data availability statement. include a section on data availability, especially for studies that generate large datasets, to facilitate open science practices.

How to review the body of manuscripts content for MERIT's-based publishing

In reviewing manuscripts for MERIT's-based assessment, emphasis is placed on the following key areas that we define as the four key pillars of academic peer review:

Consistency: Reviewers should assess whether the manuscript maintains consistency throughout. In MERIT's-based assessment we understand consistency in terms of completeness. Consistency also involves external aspects with regard to appropriate contextualization of the work novelty and impact in the field. This includes:

- A well-explained context in the introduction that presents all relevant concepts and terms that will be addressed in the manuscript.
- Clear articulation of the knowledge gap or hypothesis.
- Detailed and justified methods for all the results.
- Results that directly address and align with the knowledge gap.
- A comprehensive interpretation of all relevant results in the discussion with fair description of the knowledge gap.
- A Main Result Justification Sheet that fully aligns with the data presented in the manuscript.
- A Main Result Justification Sheet that faithfully reflects the perception of novelty of the work with respect to what is already known in the field.
- Check if the manuscript appropriately cites previous work. References should be current, relevant, and from credible and trackable sources. Ensure that the manuscript acknowledges prior research adequately and does not overlook significant work in the field.

Any inconsistencies, such as results stemming from unexplained methods, missing interpretations, a mismatch between the Main Result Justification Sheet and the manuscript content, or missing seminal references should be noted as areas for critique. Consistency does not mean all data presented has to support the hypothesis as we explained earlier.

Novelty: Novelty is defined as making a significant advancement in the field. This could include new discoveries, novel methodologies confirming previous findings, or new insights through the synthesis of existing work. Reviewers should:

- Evaluate the manuscript against a broad definition of novelty in the field.
- Ensure correct classification of the article, distinguishing between original contributions and review-type syntheses.
- Assess the manuscript against the "publicon" standard: at least one main result that significantly advances the field, supported by strong evidence.
- Compare the Main Result Justification Sheet with the manuscript to ensure consistency.

Academic Rigor: Rigor pertains to the robustness of evidence supporting the findings, which is distinct from novelty. Reviewers should:

- Determine if the evidence presented adequately supports the findings, especially for articles with significant claims.
- Assess whether the methods used are properly and sufficiently tailored for the intended task.

» Examine the proper use of statistical methods to ensure rigor and reproducibility.
» Recognize that extensive work might not delve deeply into all aspects or might employ single methodologies for broad studies. While this might seem superficial, it can be a stylistic choice.
» Consider that if at least one main result is well-supported, the paper may meet MERIT's-based publication criteria.

Ethical considerations: Ensuring the ethical integrity of research is of paramount importance in the peer review process. Ethical considerations encompass various aspects, including the treatment of research participants, data integrity, conflicts of interest, and adherence to ethical standards in research and writing. It is essential to assess whether the research has been conducted in a morally responsible and ethical manner. The following simplified checklist will assist in evaluating key ethical aspects of the research submission:

» Check if human subjects were involved in the research.
» Confirm whether ethical standards approved by the Institutional Review Board (IRB) were followed for research involving human subjects.
» If animals were used, confirm adherence to ethical standards approved by the Institutional Animal Care and Use Committee (IACUC).
» Assess the availability of information and source materials to verify data integrity.
» If you see any indications of data fabrication or falsification report them directly to the publisher's contact.
» Verify whether the authors have disclosed any potential conflicts of interest.
» Confirm if the authors have explicitly stated that they have no conflicts of interest.
» Adherence to Ethical Standards: Ensure that the research adheres to ethical standards not only in its conduct but also in the presentation and reporting of results.

Table 2. Rubric for MERIT's-based peer review of manuscripts.

Criteria	Description	Evaluation Points
Consistency	Alignment of introduction, methods, results, and discussion.	Are all parts of the manuscript logically connected and comprehensive?
Novelty	Contribution to the field's advancement.	Does the work present new discoveries, methodologies, or syntheses? Is the classification appropriate? Does it meet the 'publicon' standard?
Academic rigor	Justification and robustness of the evidence.	Is the main result(s) supported by strong evidence? Is the depth of analysis appropriate for the scope of the study?
Ethical considerations	Research conducted with ethical integrity	Was the research conducted and presented following ethical standards appropriate for the field?

This rubric is designed to guide reviewers in conducting comprehensive and structured evaluations of manuscripts. This approach emphasizes four fundamental pillars of peer review:

- **Ethical standards:** Foremost is the adherence to ethical standards. Academic publishing has a zero-tolerance policy for research that compromises ethical integrity. Any breaches in this respect will lead to rejection or withdrawal of the publication, as enforced by central editorial boards.
- **Academic rigor:** Next in importance is the academic rigor of the research. We prioritize studies demonstrating methodological thoroughness and contributing meaningfully to their respective fields. Manuscripts that show carelessness, or use inappropriate methods or statistical standards, are subject to revision or rejection.
- **Novelty:** We value the generation of new knowledge and insights as a critical component of academic research. Novelty, understood in its broadest sense, can encompass breakthroughs, incremental knowledge, syntheses, or validations of existing theories. The goal is to ensure that both groundbreaking and niche contributions reach their appropriate audiences.
- **Consistency:** Consistency, both in form and substance, is crucial for the integrity of research. Articles should accurately reflect their scope and impact. We encourage clear and honest representation of the study's scope and findings, whether they represent major breakthroughs or more incremental contributions.

This course introduces a decision tree guide to assist reviewers in this process. Given the lack of precedent for such a guide in our field, we anticipate it will stimulate substantial discussion and contribute to a more structured and transparent review process. This guide begins with an assessment of ethical standards, followed by an evaluation of academic rigor. If these standards are met, the manuscript's novelty is then considered in light of its consistency. Our aim with this decision tree is to enhance the fairness and clarity of the review process, ultimately benefiting the academic community.

Addressing integrity and bias in peer review

In acknowledging the critical nature of integrity and bias in peer review, the author deems these topics deserving of dedicated training modules. Nevertheless, we offer an initial overview in this general peer review course for clarity and completeness.

The importance of integrity in peer review

Integrity is paramount in peer review, hinging on the trust that authors place in the publisher and its reviewers. Authors invest significant effort and time in their research, expecting an honest and good-faith review. Perceptions of compromised integrity can lead to a trust crisis, evidenced by criticisms in personal discussions, scientific conferences, and publications.

Guiding principle for integrity

The guiding principle for integrity in peer review is reciprocity: reviewers should provide the kind of honest, good-faith feedback they would expect for their submissions.

Key aspects of integrity in peer review

- **Confidentiality:** Confidentiality is a foundational expectation. Reviewers must not share or use the information from manuscripts for personal benefit or others' gain. This approach aligns with the principle of beneficence—prioritizing the authors' benefit. Confidentiality is also a safeguard for maintaining high academic standards and public trust.
- **Expert review:** Reviewers and editors should ascertain their expertise before accepting assignments. If a lack of qualification becomes apparent, withdrawing and suggesting alternative reviewers to the publisher is advisable. This ensures that manuscripts are reviewed by peer experts.
- **Fairness and MERIT-based review:** Fairness is essential. Reviewers need to self-assess their ability to provide an impartial review, considering potential conflicts of interest. While affiliations with authors might not necessarily impede fairness, less obvious biases, such as prejudices or discrimination on the basis of gender, sexual orientation, religion, ethnicity and place of origin, should be conscientiously managed. Most publishers are now committed to addressing underrepresentation in academia and urge reviewers to assess manuscripts solely on merit.
- **Quality and timeliness:** Quality and timeliness in peer review are integral to its integrity. A low-quality or protracted review process can be detrimental, hindering academic progress, wasting resources, and unfairly disadvantaging authors. Efficient, high-quality reviews are crucial for the academic community's advancement.
- **Diversity and Inclusivity:** Addressing bias is crucial, but it is equally important to emphasize the significance of diversity and inclusivity in the peer-review process. Consider the fairness of a situation where the majority of academic research from developing countries is reviewed predominantly by individuals from affluent, developed nations. It is essential to ensure a diverse group of reviewers, encompassing various geographies, genders, races, and academic backgrounds. This approach not only offers a more balanced and comprehensive review but also ensures the local relevance and contextual understanding of the work
- **Transparency in the review process:** Reviewers also have the expectation that the review process will be transparent and that they will be informed at each step of the way about the status of their submission. This includes whether the reviews are double-blind, single-blind, or open, and how this impacts the perception and reality of bias and integrity.

Reviewer training and support: Is it fair to expect so much from reviewers and editors without offering them meaningful training? Highlighting the training and support provided to reviewers, particularly in identifying and managing their biases, is essential. This encompasses the resources or guidelines that should be provided by publishers to assist reviewers in conducting fair and thorough reviews.

Bibliography

- Open Access Book Publishing and the Prisoner's Dilemma. A Theoretical Approach to a Description of the Slow Scalability of Open Access Book Publishing. Marcel Knöchelmann.

The concept of comparing academic publishing to a prisoner's dilemma has indeed been explored. An article on UCL Digital Press discusses the academic book publishing market through the lens of the Prisoner's Dilemma. This analysis is used to offer insights into the scalability of open access

in academic book publishing, suggesting that similar game-theoretic concepts might be applied to understand dynamics in academic publishing. However, the article specifically focuses on the book publishing market and its challenges in the context of open access, rather than journal publishing or the peer review process specifically.

References

1. Burnham JC. The Evolution of Editorial Peer Review. JAMA. 1990;263:1323-1329. DOI: 10.1001/jama.1990.03440100023003
   Relevant excerpt: *"The peer review process has been essential to science and medicine for at least two generations. Peer review in publishing has created standards in biomedical and other scientific communities, and peer review of grant applications—or merit review, as the National Science Foundation now refers to it has determined the allocation of billions of dollars devoted to research. It is a scandal that substantial histories of either kind of peer review do not exist."*
2. Craig A, Lee C, Bala N & Taswell C. Motivating and Maintaining Ethics, Equity, Effectiveness, Efficiency, and Expertise in Peer Review. Brainiacs Journal 3 (1):I5B147D9D (2022). DOI: 10.48085/I5B147D9D
3. Garcia JA, Rodriguez-Sanchez R, Fdez-Valdivia J. Fraud, specialization, and efficiency in peer review. Research Evaluation, Volume 31, Issue 1, January 2022, Pages 15–23, DOI: 10.1093/reseval/rvab021
4. Haffar S, Bazerbachi F, Murad MH. Peer review bias: a critical review. Mayo Clinic Proceedings, 2019. DOI: 10.1016/j.mayocp.2018.09.004
5. Horbach SPJM. No time for that now! Qualitative changes in manuscript peer review during the Covid-19 pandemic. Research Evaluation, Volume 30, Issue 3, July 2021, Pages 231–239, DOI: 10.1093/reseval/rvaa037
6. Jefferson T, Alderson P, Wager E, Davidoff F. Effects of Editorial Peer Review. A Systematic Review. JAMA. 2002;287(21):2784-2786. DOI: 10.1001/jama.287.21.2784
7. Lee CJ, Sugimoto CR, Zhang G, Cronin B. Bias in peer review. Journal of the American Society for Information Science and Technology. ADVANCES IN INFORMATION SCIENCE. 10 December 2012 DOI: 10.1002/asi.22784
8. Tennant JP. The state of the art in peer review. FEMS Microbiology Letters, Volume 365, Issue 19, October 2018, fny204, DOI: 10.1093/femsle/fny204
9. Wingen T, Berkessel JB, and Dohle S. Caution, Preprint! Brief Explanations Allow Nonscientists to Differentiate Between Preprints and Peer-Reviewed Journal Articles. Advances in Methods and Practices in Psychological Science. 2022. DOI: 10.1177/25152459211070559

Useful links

1. https://mitcommlab.mit.edu/broad/commkit/peer-review-a-historical-perspective/
2. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1420798/
3. https://www.wired.co.uk/article/science-academic-papers-review
4. https://asapbio.org/digital-age
5. https://jbiol.biomedcentral.com/articles/10.1186/jbiol125

6. https://ucldigitalpress.co.uk/BOOC/Article/1/19/
7. https://www.elsevier.com/reviewer/what-is-peer-review
8. https://researcheracademy.elsevier.com/

Methodology

This work is the culmination of insights gathered from the author's role as an author, reviewer, and guest editor, complemented by extensive discussions with colleagues spanning several years. Hence, the use of "we" in some statements reflects these collaborative insights and shared perspectives. Literature searches were conducted using PubMed and Google Scholar. For drafting and revisions, Google Docs was utilized, taking advantage of its auto-correct and editing features. Additionally, ChatGPT 4.0 was employed for text editing and research assistance.

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