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An Issue with Peer Review: Can it be Resolved?

Academic research is often regarded as the foundation for the advancement of scientific knowledge. As scientific knowledge has advanced, the publication process of scientific research has also advanced. However, one aspect of scientific publication has remained the same for almost a century: peer review. University faculty who are experts in their respective field are obligated to maintain the quality of scientific research through peer review, no matter the cost to their own mental health . However, these experts who have dedicated most of their lives to science remain uncompensated for their efforts as peer reviewers. The responsibility for compensating these experts, whether by monetary or career-advancing means, lies with those who benefit the most from their efforts. Scientific journals and research universities need to create a change that benefits those who are the backbone of scientific advancement.

The Problem with Peer Review

Over the past few decades, the amount of research manuscripts being submitted for publication has massively increased. With an increase of manuscripts flowing in, researchers are being asked to review more often than in the past. Maintaining the quality of manuscripts being published relies almost solely on researchers' peer reviewing. However, peer review is done on a voluntary basis, with relatively little incentive being offered to those who do it.

When asked if the quality of peer review is declining due to there not being incentive to peer review, Dr. Gerardo Gold Bouchot, a tenured professor of oceanography at Texas A&M University, said, "Yes. Because it's not a priority for reviewers."

Unfortunately, this is the opinion of only one person. Other researchers, both at Texas A&M and elsewhere, were reached out to for interviews, but all declined. Additionally, a careful

review of the literature did not disclose any studies looking into peer review quality and compensation. However, recent studies have shown that there is a decline in researchers accepting peer review invitations. Although there are limited reports on why researchers are declining to peer review, those who do report reasons for declining mention that the number of reviews they are asked to do, and their already busy schedules do not allow for them to take on extra work.

The History of Peer Review

One of the first documented cases of peer review was in the ninth century, when Syrian medical ethics author Ali Al Rahwi wrote the book *Ethics of the Physician*. The book stated that physicians should make two copies of their patient notes: one for themselves and one for a local council of physicians. The notes were to be reviewed by the council, which would decide if the physician had maintained good medical practice. If the physician was found to have committed malpractice, the physician was approved to be sued by the patient.

No form of peer review was documented for centuries after Rahwi's work; however, the standardization of scientific research started to take shape in the seventeenth century. In 1620, Francis Bacon published the philosophical writing *Novum Organum*, which is considered as the foundation of the scientific method. The writing sparked a revolution in scientists, motivating them to meet and discuss the future of scientific research.

One group of scientists inspired by Bacon created the Royal Charter of Incorporation, now known as The Royal Society, in 1662. The society created the first scientific journal, *Philosophical Transactions*, in 1665. Up until 1752, submitted scientific papers were reviewed only by the editor of the journal. As more manuscripts were submitted for publication, the

responsibility of reviewing scientific papers switched from a job of the editor to that of a specialized group of society members.

The practice of sending a scientific paper to a specialized group was done only for *Philosophical Transactions* and did not catch on with other scientific journals until the beginning of the twentieth century. For that 200-year period, scientific journals did not receive many article submissions, typically leaving the editors of journals in need of papers to publish. Generally, the lack of manuscripts led editors to neglect the quality of paper, therefore allowing any paper submitted to the journal to be published. During the early twentieth century scientific research started to boom, and editors were then faced with deciding which papers were of high enough quality to publish.

As journal editors were becoming increasingly overwhelmed with the rising number of submissions, journals created small internal review boards to determine quality of submitted articles. Meanwhile, science continued to become more specialized, and so it became difficult for internal reviewers to determine quality. Therefore, journal editors began calling on external reviewers. Science was quickly evolving, and to maintain publication standards, journals, too, had to evolve.

Peer review as we know it today had a sporadic beginning, with there being no true time that the process was standardized. The necessity of external reviewers became most apparent in the mid-twentieth century, after World War II. Although external reviewers were needed, most journals did not want to make this shift. Prominent journals of today, such as the *Journal of the American Medical Association* and *Science*, adopted the current peer review process after 1940. Within the next few decades, scientific journals followed *JAMA* and *Science*'s example.

Now, the peer review process is standard across the globe. It is now expected for journals to send specialized researchers, typically university faculty, scientific manuscripts for their expert opinion. Much as during the research boom in the twentieth century, there is now more scientific research coming into the world than ever before, and although science itself is constantly changing, the peer review process has remained stagnant for many years.

The Prevalence of Faculty Burnout

The duties of a tenured professor at a research university vary somewhat by university, department, and individual. However, a commonality is that faculty must commit time to three responsibilities: teaching, research, and service. Evaluations are performed annually to assess faculty performance. To reach the goal of tenure, faculty are given a tremendous workload, but at what cost?

Miguel Padilla, a professor of health qualitative psychology at Old Dominion University, surveyed over 1400 faculty, both tenured and untenured, about their lives. It was found that 27% experienced burnout, with the high number of hours worked and pressure to perform service being reported as the biggest factors.

A similar study performed at the Mayo Clinic found that 40% of healthcare research faculty experienced burnout. Although the sample was smaller, 54 participants, the study gave valuable insight into the factors affecting burnout. Those that experienced burnout reported that finishing their work was more important than quality and overall had lower job satisfaction. Perhaps most startling is that over half of those experiencing burnout reported quality of life levels indicative of needing clinical intervention.

Peer review is an added task on an already overextended faculty's plate. Although not necessarily required for tenure, there is an obligation to perform peer review to maintain quality

of scientific publications. There are benefits for researchers to perform peer review, such as a review being an addition to the service section of an annual report and contributing to scientific advancements. However, the hours it takes to peer review a manuscript and the pressure it puts on a researcher can take a negative toll on a researcher's mental health, which in turn can reduce the quality of peer review.

Benefits of Compensation and Possible Incentives

Minimal research exists on the correlation between compensation and burnout. However, some studies have looked at the relationship between compensation, job satisfaction, and employee productivity. In a study conducted on research faculty in Nevada, a lack in pay increases was correlated with lower job satisfaction in both tenured and untenured faculty. Studies in Indonesia have also shown that increased compensation can lead to an increase in motivation and productivity.

Outside of personal satisfaction due to increased compensation, incentivizing peer review can have other benefits. The research publication process is slow, with the time between submitting a manuscript and that manuscript being published averaging between 79 and 323 days. With peer review being compensated monetarily, journals could require quicker turnaround times. Journals already have deadlines for reviewers to submit their input; however, with compensation there would be an added incentive to review quickly.

Universities also have the ability to incentivize peer review. Service is one of the responsibilities required of faculty, but service generally is not as highly regarded as research or teaching in regard to tenure and promotion. Rather, universities hold service that is done internally, such as being on graduate student committees, in higher regard than peer review.

“I can write that I reviewed these many papers for these journals,” said Gold. “But to tell you the truth, internal service counts more…So I think we should increase the value [of peer review], which will increase the visibility of the importance of reviewing papers and proposals.”

Is Change Plausible?

Whether the responsibility of incentivizing peer review lies with the university or the journal is not something that I can comment on. However, there are opportunities to incentivize peer review.

The top three publishers of scientific articles are Elsevier, SAGE, and Springer Nature. Combined, these publishers brought in over 11 billion dollars in revenue in 2021. Profit margins of these companies are growing, with Elsevier boasting the highest profit margin, 20.3%. Elsevier’s profit in 2021 alone was 1.8 billion dollars. The profit that these large companies see does not trickle down to their own employees, let alone the people who provide their sources of revenue–the researchers who give them science to publish and maintain the quality of their journals by peer reviewing.

A single scientific article can bring in an average revenue of around $5000. Using average salaries of both tenured and untenured professors in the United States, it can be determined that the average hourly wage is around $43. The average time it takes a professor to peer review a paper is between two to six hours. Using four hours as a standard for how long it takes to peer review, an adequate compensation for a single reviewer would be $172. Typically, journals require two researchers to peer review an article before acceptance, making total compensation amount to $344–a mere 7% of the revenue brought in per article.

Compensation, however, is not always plausible. Non-profit journals, such as those run by small organizations, do not always have the financial resources to provide compensation for

peer review. Requiring such journals to provide compensation could potentially increase subscription costs, which would negate the increase in reviewer compensation. This is where universities need to take responsibility for incentivizing peer review.

Universities can incentivize peer review without money being a factor. By increasing the weight that peer review contributes to researcher's service requirements, peer review would become more incentivized. Although incentivization by the university would not contribute to negative aspects of scientific publication, such as slow turnaround times, it could potentially increase researcher's satisfaction and boost the quality of peer reviews.

Peer Review Should be Incentivized

Science itself continues to grow, but researchers are held to the same standards that have been around for nearly a century. Change should not be opposed because "that is how it always has been," but rather it should be embraced. Today's scientists have become incredibly overextended, leading to burnout and a decrease in peer review quality. However, these scientists are still willing to contribute to the advancement of science, even with limited incentive to do so. Scientific journals and universities have benefitted from undercompensated labor for far too long, and the responsibility for change lies with these institutions. Scientific researchers work hard to produce new knowledge, and for that they should be rewarded and, at the very least, compensated.

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