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Key points

- 170 early career researchers interviewed three times over 2 years, have uniquely contributed towards a stress test of scholarly communications and cracks have been identified.
- The perfect storm created by the convergence of millennial values and the pandemic appears to have fast-forwarded the cracking process, perhaps, for the good.
- The cracks in question are: (1) peer review; (2) reputational assessment; (3) unethical/questionable practices; (4) collaboration; (5) networking.

Keywords: early career researchers, pandemic, scholarly communications

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TESTING TIMES

While commentators frequently talk about the transport, political, health or educational systems as being ‘broken’, this is much less so in the case of scholarly communications. If the term is mentioned at all, it is usually by open access (OA) advocates, pointing to the paywalls which, shutting researchers off from the published literature as they do, threaten to pave the way to pirate libraries taking over the provision of access to scientific information (Suber, 2012; Tennant, 2018). In fact, even in this context the term is less often cited now that the ‘traditional’ system appears to be absorbing OA as a default in an acceptable business construct. This, however, cannot be taken to indicate that the scholarly communication stratagems form a system that is not wanting or faulty in any way; it is simply a system that has rarely been tested fully and comprehensively. However, the pandemic, coupled with the millennial generation’s values of openness and social consciousness—creating, perhaps, the perfect storm—are stress-testing the scholarly communications system on a scale not seen before. Thus, the time seems ripe to take a good look at the system in its entirety to establish whether and how it is bearing up.

There can be little doubt that the pandemic has been providing a powerful and timely lens to examine scholarly communications. Indeed, the pandemic serves us in much the same way a powerful magnifying glass would: problems that have long been lurking in the system, whether ignored or not, are brought to the fore in all their magnitude and severity, with the stark reality that they represent revealed in minute detail. Never before has the scholarly landscape been laid so bare as now, when the pandemic sheds light on its darkest corners. This, however, also means that never before has there been a comparable opportunity to examine the rules and actions of the academic game in such depth and nuance. The Sloan-funded Harbingers-2 study¹ has been in a perfect position to do so, having inspected every conceivable aspect of the scholarly communications system during two demanding years of the pandemic from the perspective of the research community that is shaping the future of the scholarly undertaking, the millennial-generation early career researchers (ECRs).

STRESS TESTERS

ECRs are undoubtedly best placed to undertake the stress test:

¹<http://ciber-research.com/harbingers-2/>

- They are the largest cohort in today’s research community, who, as the next generation of great professors and Noble prize winners, will determine what the future of science will look like.
- They are the veritable ‘workhorses’ of research, dedicated and prolific, who spend twice as much time on research as their older counterparts. Indeed, they are heavily involved in the various aspects of scholarly work, undertaking the full range of research functions, as well as teaching and doing their share of administrative duties.
- Primed by their millennial beliefs² that render them open to change, global in their perspective, intent upon making a difference in the world, community-minded and keenly conscious of the public good, they are likely to scrutinize traditional ways of doing things and bring about change.
- They are very much in the pandemic front line in that they are the most vulnerable. As aspiring newcomers to the highly competitive scholarly world, which has become even more so, they are faced with considerable challenges in their quest for employment. As novice researchers, who have to build up a fast and impressive track record to enter academe, with the pandemic putting the brakes on productivity, collaboration and cooperation, they have been challenged.

IDENTIFYING THE SYSTEM’S VULNERABILITIES

The Harbingers study has for a period of 2 years been taking regular performance ‘readings’ of more than 50 scholarly communication aspects in interviews with around 170 ECRs from eight countries (China, France, Malaysia, Poland, Russia, Spain, United Kingdom and United States). It covered the entire range of scholarly communications, inclusive of reputation, assessment, integrity, publishing, peer review, dissemination, outreach, searching/finding information, networking, collaboration, social media, smartphones and open science.

²According to the generational cohort theory (Howe & Strauss, 2000), changes in the macro environment influence the profile of people born during a specific time period, so that groups of individuals who experience the same social, economic, political and cultural events during early adulthood share similar values. It is even more so for millennials, living in today’s connectivity-governed global village (Burststein, 2013). Feeling that they are united because they exist in the same world, both as individuals and as a collective they share values (Global Shapers Annual Survey, 2017; Schewe *et al.*, 2013).

According to our findings, the system is indeed functioning under pressure in places, but this is very much because ECRs, the scholarly heavy lifters, have stepped up to the plate to ensure that it does function. They are, if nothing else, resilient. However, ECRs have pointed to big cracks in the system, which are opening out and may pose potential problems for researchers down the line. There are chiefly five of them, which, in order of the seriousness of the 'crack' are: (1) peer review; (2) reputational assessment; (3) unethical/questionable practices; (4) collaboration; (5) networking. These cracks, of course, strike at the very heart of the system, so are not easily dismissed or overlooked.

Peer review

Nearly half the ECRs thought there was a little or a lot of weakness with the peer review process and an even higher proportion (two-thirds) said it needed improving. Largely, it was thought that this could be done by improving the quality and appropriateness of reviewers, which could be best accomplished by providing payments or reputational rewards.

Reputational assessment

The way that quality of research and the reputation it affords were judged, came next. One quarter of ECRs said they would not judge a person's reputation, or in fact their own, by the traditional citation measures and a similar proportion said that they only partly would. True, it was clear from volunteered comments that they largely did judge reputation in that manner, but they would not choose to be judged (or judge) in that way. This, largely because citation measures were felt to be too easily manipulated and, anyway, many other important scholarly aspects needed to be taken into consideration, such as openness and transparency.

Unethical/questionable practices

Questionable practices were ranked third, but, in some ways, they could be considered to be the biggest overall threat because they undermine trust in the whole system. Nearly two-thirds of ECRs said they were aware of questionable practices, which is, in itself, concerning for the good working of the system, and a third thought the pandemic had fanned the flames. Free-text responses, additionally, showed the widespread nature of questionable practices, as this long list shows: multiple submissions, fake papers, fraudulent peer reviewing, plagiarism (including self-plagiarism), duplicate submissions, bogus authorship, lack of reproducibility or verification, paper factories and paying for papers, same data published a number of times and selective reporting (p-hacking).

It is not so much that these practices are growing, but, rather, the awareness of them has increased because of the social media publicity around them. Interestingly, nobody really mentioned predatory journals as an issue, largely because ECRs knew too well the reputational risks involved—they seek prestige and

legitimacy above all else. Also, many ECRs were governed in their journal choices by various institutionally approved journal lists and their own scholarly code of honour.

Collaboration

Collaboration came next in order of magnitude, with a quarter of ECRs saying it was more difficult to build collaborations in pandemic times. The problem was not so much with national collaborations, but with international ones, where problems with travel and the lack of face-to-face conferences/meetings were seriously obstacles. Asked specifically about how different the situation was from pre-pandemic times, the main difference was said to be the move to the virtual world, which, at the same time, was both beneficial and problematic.

Networking

There is a similar story when it comes to networking, a term interpreted as how ECRs formed and maintained ties with fellow researchers. It might be thought to be easier to network in a virtual world, given the wealth of social media platforms available, but, as it turned out, email topped the list for forming and maintaining ties. Half of all the ECRs said things were different now from pre-pandemic times and the difference was, again, the wholesale shift to the virtual world, which brought with it Zoom and a raft of social media platforms, including WhatsApp, Telegram, Instagram, WeChat and YouTube. Who would have ever thought that these platforms would be so prominent? However, it is not all plain sailing, with a third of ECRs saying that networking was less effective than before. Restoring the element of personal discussion was what they really wanted most.

Spotlight on the French

On most counts/readings of the data, French ECRs are at odds with the attitudes and behaviours of their international counterparts. Thus, none of them thought that peer review did not deliver quality/trustworthiness or that the pandemic had changed peer review in anyway. As to reputational assessment, they were much more likely to say that they did not judge research success in paper/citation terms. Perhaps most interestingly, hardly any of the French ECRs said they were aware of questionable practices, although this was said to be because of the widely held belief that the whole system favours questionable practices, so what is new... With regard to collaboration and networking, they said that they did not generally use social media platforms for scholarly purposes because of the lack of opportunity for personal discussion, although they did use them increasingly for outreach purposes. The reason for the French contrariness may very well be that the country is going through big academic reforms at the moment that make ECRs think differently: they are critical of the whole system and busy trying to find suitable reconfigurations.

Not so much cracks here, more like a demolition job; we shall watch this space.

BROADER SIGNIFICANCE OF THE CRACKS

Obviously, a whole system seldom breaks or collapses at once (even in France); it cracks first and we have identified the big ones, with the questionable practices crack particularly concerning. However, rather than signalling disaster to come, the cracks chart a path to future improvements: that is how the system transforms itself, adapts to the new realities. In the words of Leonard Cohen, 'There is a crack in everything, that's how the light gets in' (Cohen, 2019). The idea is that everything is flawed. So, cracks are to be expected, indeed, they point to healthy developments and just need to be identified and actioned ahead of time. The perfect storm created by the convergence of millennial values and the pandemic have just fast-forwarded the cracking process, heralding changes for the better yet to come.

WHERE TO FROM HERE?

While this is an opinion piece, the opinions are firmly based upon an analysis of a substantial and robust dataset of a scale rarely seen before—in fact, 2 years' worth of data culled from repeat interviewing more than 170 ECRs from eight countries. What we are doing here, is sharing, in an accessible way, our early ideas as to what this all means for the scholarly communication community and what are the priorities. The more detailed data are being released over the next few months, especially on the 'cracks' identified here, although a useful overarching paper is already available which provides detailed comment (Jamali et al., 2023).

AUTHOR CONTRIBUTIONS

All the authors participated in the design of the study and contributed data/ideas and DN and EH wrote much of the paper.

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