The Hong Kong Manifesto for Assessing Researchers: Fostering Research Integrity

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The current academic reward system and research integrity

Research integrity and responsible conduct of research concern the behaviours of researchers that influence the validity of research findings or the trust in science. The factors driving detrimental research practices (1) are multifactorial and likely fall into one of three clusters: researchers, their local research culture and the system of science. The Hong Kong Manifesto (HKM) is focused on one of the most important factors in the system of science that influence the way researchers behave, namely, how they are assessed. It is a global problem, globally which we believe requires action.

Yet some researchers have seen their careers advanced partly due to adopting detrimental research practices. Several scholars have noted the moral and ethical perils of this situation (2,3). Promotion and tenure occur because researchers have been able to satisfy the current criteria needed to advance their careers. Current university promotion and tenure schemes may well have been useful when initially developed decades ago. Most of these criteria are narrow, potentially flawed, not evidence-based, and mainly concern counts of publications and citations. They are out of step today and may be partly responsible for the current problems the research enterprise is struggling with. There is a growing awareness that current reward criteria are of limited value, do not foster research integrity, and might even function as a set of perverse incentives (4,5). We propose 5 principles, including a rationale for each one along with how each principle can be implemented, to improve the assessment of researchers. They are a call to action aimed at academic institutions, national policymakers (e.g., the UK's Research Excellence Framework; the Canadian Academy of Health Sciences framework for impact assessment), and funders, primarily. The principles are based on previous efforts (6) and greatly benefitted from feedback from participants of the 6th World Conference on Research Integrity. While we consider the principles important, their usefulness will depend on how they are implemented (7).

Promoting the importance of trustworthy research responding to societal needs

There is tremendous value in scholarship and how it is used to acquire new knowledge, particularly for societal benefit. Such contributions to society can take many forms. Most directly when researchers conduct experiments the results of which identify effective interventions to combat diseases or improve social well-being. Less tangible but responding to society's curiosity

about its very existence include contributions such as the recent first picture of a black hole. Arguably societal benefit will more likely occur when a participatory approach, preferably including public engagement, is integrated into the research process. Practically, this is easier and most valuable when there is a direct participatory approach with researchers, such as helping decide on outcomes of relevance in clinical research (8). A participatory approach may be less comfortable when engaging in setting research priorities, such as astrophysical exploration. Transparent, truthful, open science, including open access publications, following recommendations, such as the FAIR Guiding Principles for scientific data management and stewardship (9) and public communication are ways to optimize value to society and enhance research integrity. This move towards open science is starting to happen, globally (10-13), and will likely gain momentum when these activities are imbedded into trainee programs (14) and taken into account when assessing researchers.

More appropriate reward criteria may help improve the impact of research, and researchers, including its societal value and enhance research integrity within academic organizations and beyond. For example, Kings College's Strategic Vision 2029 takes societal needs into consideration when assessing researchers for promotion (15). How researchers are evaluated reflects what we value most in the research enterprise and powerfully influences researchers' behavior, including research integrity. Societal benefit is difficult to measure but universities, other research institutions, and funders should not shy away from reflecting on what it means to them (16). There is evidence that researchers tailor their publication practices to evaluation criteria applied in their institution (17). This evidence implies that modifying current incentives and rewards is an important next step to optimize societal value and strengthen research integrity. The HKM five principles aim to guide the desired improvements.

***Principle 1*: Assess researchers based on responsible practices in all aspects of the research enterprise**

Rationale

The quantity of publications and total volume of grants are still dominant metrics used by universities and other research institutions for rewarding their researchers (6). Along with 'simple' citation counts these metrics should be downgraded in any revised promotion and tenure

scheme. This is also the same for the Journal Impact Factor (JIF) and the Hirsch-index. The quantitative criteria are key incentives to current career advancement as is providing fiscal rewards to academics for publishing in certain journals (i.e., merit pay) which is common in many parts of the world (18-20). These are not responsible metrics and tell assessors little about their researchers and the quality of their work. These metrics can be gamed and provide little information about a publication's contributions to science and society. Other criteria may be better markers of best practices. Registration of research is associated with increased publication quality (21); sharing data is associated with increased citations (22); patients support sharing of their data (23). Incentivizing and rewarding these, and similar behaviors, will ensure promotion and tenure is a step towards robust research integrity.

Implementation

Transparency is not only essential for the ability to detect biases when they occur (24) but may also prevent them from occurring and restrict other questionable research practices (25), such as p-hacking or HARKing (Hypothesizing After Results are Known) and can effectively be prevented by registration (26), including registered reports, of study protocols and data-analysis plans (27). All research involving hypothesis testing should be registered regardless of the discipline (at least 2000 registries exist - 28). Promotion and Tenure Committees (PTCs) should mandate this as a minimum expectation and modify their assessment criteria to include responsible practices, particularly for where there is a strong evidence base. Universities should also promote experimentation with CVs such that researchers can more easily document responsible research practices that are aligned with research integrity. This is beginning to happen (29). Modified CVs will also facilitate (PTCs) being able to document this information for career advancement decisions.

Funders can help by allowing grant applicants to include responsible research practice expenses as allowable costs in their budget requests. Funders can also implement policies such that responsible research practices, such as data sharing, is mandatory in all grant applications. Academic institutions and funders should explicitly endorse efforts to reduce the importance of JIFs and other similar metrics when assessing researchers (e.g., 30,31) or allocate funds for research on research that help build the evidence base of responsible incentives and rewards.

PTCs should be explicit about giving less weight to citation metrics when considering career advancement. To assess the effects of implementing this principle universities can audit a (random) sample of CVs for data sharing statements, prior study registration and other responsible indicators; this is beginning to happen (32).

***Principle 2*: Value the reporting of all research, regardless of the results and reward honest and transparent reporting**

Rationale

In an update of their previous systematic review of journal publication following initial presentation as conference abstracts, Scherer and colleagues report on data collected from 425 studies (33). Publication bias (i.e., not publishing study findings based on whether their statistical results are positive or negative) is on the rise: 37% of conference abstracts were published as completed papers in 2018 compared to 44% in 2007. Furthermore, the frequency of other reporting biases (e.g., switched primary outcomes without attribution, and spin) at about 30% is unacceptably high (34). Such behaviors diminish the trustworthiness and research integrity of research (20). Even though reporting guidelines improve the transparency of reporting (35,36) they are not being used sufficiently. For example, editors do not consistently recommend their use to peer reviewers (37). PTCs generally seem to ignore the importance of registering protocols and data analysis plans, publishing completed studies and their associated data, code, and materials (38).

Implementation

Researchers need to be rewarded for all completed research that is reported regardless of whether the results are statistically significant; examples of this are starting to appear in university appraisal committees (39). PTCs can reward researchers for making these studies publicly available as preprints (40) or in repositories (e.g., university repositories). When submitting CVs to their PTCs, researchers can ensure that each report or publication includes optimal best practices information (e.g., reporting guideline used, where they exist (e.g., 41)). Some journals in the social sciences, particularly psychology, use registered reports to help ensure that research is published regardless of whether it is statistically significant (42,43). Some disciplines will have different mechanisms to ensure transparency and truthfulness (44), which are pillars of

research integrity; these should also be incorporated into promotion and tenure guidance. Some funders, such as the Wellcome Trust, have policies in place to foster transparency in research (e.g., 45). Funders could sanction grantees who do not report the results of completed research by not allowing them to apply for new grants without making publicly available previous research funded by them. To assess the effects of this principle, PTCs can use (or adapt) automated tools to provide data about reporting completed studies (46) and quality of reporting (47). While these tools are limited to specific areas of research (i.e., clinical trials) they could be adapted for other research domains.

***Principle 3*: Value the practice of open science**

Rationale

Openness brings equality to the research process. Access to research should not be about who has the resources to pay for it. A participatory approach with professionals should be able to make healthcare or social policy decisions based on access to all research knowledge rather than only a part of it (48). A considerable amount of public funds is used for research; its results can have profound societal consequences. Openness is critical in these circumstances. Basic scientists are committing to openly share their laboratory notebooks (49) in an effort to foster collaborations and reduce unnecessary duplication. In an effort to deter questionable authorship (e.g., ghost or gift authorship) CASRAI developed the CRediT taxonomy (50) as a way for research authors to more openly document a broad range of activities they participated in during a research project. Data sharing is another example of openness. It barely exists in clinical research (with some exceptions, such as genetics) (51) although patients seem supportive of sharing their data, at least in randomized trials they have participated in (23). Data sharing is also not part of the research norm in many other disciplines. Without data sharing it will be difficult to check the selectively of reports and reduce the reproducibility crisis (52,53). There are varying estimates as to which proportion of research that is made available through open access mediums, such as open access journals; it is far from 100% (54). Open peer review is another emerging example of openness in the research ecosystem. It is too early to say what the best arrangements are for open research across disciplines. What is clear is that researchers should be incentivized and rewarded for research openness; this is in keeping with robust research integrity.

Implementation

Universities and other research institutions can support a culture of open science, such as in publication and data sharing. Being open is not without costs and some funders, such as in The Netherlands are enabling this to happen (55). Research institutions will need to prepare the landscape to ease the implementation of rewarding responsible practices. For example, to facilitate data sharing, it is likely that the FAIR (Findability, Accessibility, Interoperability and Reusability) principles will need to be in place (9). Similarly, implementation of data sharing as a career advancement item will be enhanced if universities and other research institutions, perhaps through their library system, include educational outreach about FAIR and other data sharing issues. There are expenses associated to enabling data sharing and universities may need to make funds available to help researchers prepare for data sharing. PTCs could ask researchers to add openness information, such as data sharing associated with specific research publications, in their CVs. Some openness best practices can be easily captured; ORCID and F1000 are two examples, the latter providing DOIs for reviews of manuscript which can also be included in a CV. It is important that the assessment of researchers also contains criteria and indicators that reflect the way the candidate contributes to the culture of open research. It seems possible to base this judgement on the approach used by the Transparency and Openness Promotion (TOP) guidelines (56). These guidelines were designed to reflect the level to which scientific journals have adopted or wish to adopt the culture of open research. With some minor adjustments TOP guidelines can probably be used for the analysis of the CV and the list of publications of individual researchers. Finally, any assessments of a researcher's openness need to acknowledge and account for the complexities of intellectual property. To assess the effects of openness universities can calculate the fraction of reports and publications available through open access against the total number of reports/publications from that institution, annually.

***Principle 4*: Value a broad range of research activities, such as innovation, replication, synthesis, and meta-research**

Rationale

When deciding on research priorities and societal value of research, it is not always immediately clear whether an idea or hypothesis will lead to the desired outcome. So-called blue-sky research

building on accidental findings or curiosity-driven research based on out-of-the-box thinking should be possible and encouraged as well in an academic reward system that values societal progress (57). For example, the discovery of graphene at the University of Manchester, UK, was the result of Friday afternoon discussions outside the normal research activities (58). Examples from a broad range of disciplines exist (59). Commercial entities, such as Google and Deepmind, are investing in this kind of research by employing researchers with the understanding that not all efforts will immediately lead to important outcomes. The short-term nature of academic research assessment exercises and reward cycles make this kind of research less attractive for funders, institutions and individual researchers. Equally, replication studies or research synthesis efforts are often not regarded as innovative enough in research activity assessments despite their importance for the trustworthiness of research or for a balanced and robust systematic presentation of all available evidence, respectively (53,60); this is not universally appreciated by PTCs. Meta-research as practiced, for example, at METRICS (Stanford, USA) (61), QUEST (Berlin, Germany) (62) whose focus is on clinical and preclinical meta-research and Tilburg University (63) (Tilburg, The Netherlands) whose focus is on the social sciences, is important to inform and improve research practices and therefore contribute to make research more reliable and relevant.

Implementation

Meta-research is gaining momentum and now has some outlets. For example, PLOS Biology has a meta-research section in the journal. The Wellcome Trust recently held a call for replication research (64); The Netherlands Organization for Scientific Research is in its third call for replication studies (65). A reward system for the benefit of society and one that encourages trustworthy and important research needs to take the different types of research into account. Different indicators and criteria need to be developed that are relevant to these different types of research. This includes different timeframes of assessment for different types of research. For example, the importance and relevance of blue-sky research could be assessed based on its potential, such as the development the New Horizons project to flyby the object MU69 in the Kuiper Belt (66). This initiative took more than one career cycle to develop and implement.

***Principle 5*: Value a range of other contributions to research, such as peer review for grants and publications, and mentoring**

Rationale

Research assessments frequently focus on publications, citations and funding income (6, 67). For the research ecosystem to function optimally other research activities are also essential. For instance, peer review remains the cornerstone of quality assessment of grants and articles. Peer review contributions to journals and funders, should also be part of assessments for promotion and tenure as should contributions to research infrastructure, oversight, or regulations. Equally, contributions to an overall improvement that goes beyond an individual-centered approach for assessment, should be taken into account. These activities are currently largely missing from PTCs (67). Similarly, mentoring research trainees and researchers at all stages of their research career is a critical aspect of helping to ensure the next generation of researchers are trained adequately about the importance of the trustworthiness of research. Membership on various committees directly related to research (e.g., assuming the role of an editor) is another important activity fulfilled by researchers but not always incentivized and rewarded. How best to do this without creating further barriers and tick-box exercises, however, has long been debated (68). Any reward system that has the whole research enterprise at heart and aims to foster a climate conducive to trustworthy and useful research with the highest regard to integrity, needs to find ways to incorporate these vital roles into its overall assessment structure.

Implementation

Give credit and develop best practices for peer review activities and timely, constructive comments on research by other authors (69). Funders, research institutions and journals can develop policies to meaningfully recognize researchers for contributing to a broad range of activities that enhance the activities of these organizations and by default research and society (70). It is important to create an open culture of education, mentoring, and learning about research planning, conduct, and reporting with particular attention to research integrity. Activities that benefit the institutional research culture beyond an individual's research efforts need to be part of any reward system. To assess the effects of this principle, PTCs could for instance assess how many PhDs researchers mentor remaining in academia achieved full

professorship. Endorsed peer reviews completed by researchers (e.g., Publons) is another way to assess this principle.

Comment

There is an emerging view that this is a crucial time in the movement of research assessment reform. This movement is crossing disciplinary and national borders. There is a window of opportunity now to make changes that were previously thought impossible. There are also risks to modifying the current system of promotion and tenure. For researchers at universities implementing the HKM who seek opportunities where the HKM is not implemented, they may be perceived as less competitive, and vice-versa. Like almost all change there will be costs associated with implementing these 5 principles. Such costs are likely to be more easily absorbed by resource rich institutions. Some institutions may favor a stepwise approach to introducing and implementing the principles enabling the entire university ecosystem to become familiar with modifications to the current system. For example, implementing principle 2 may be an easier starting point compared with implementing principle 5. The benefits of implementing these principles most likely outweigh the risks when using the evidence proposed by the HKM in the assessment of career advancement and enhancing research integrity across universities. Whatever changes are made need to include researchers in their formulation and implementation and need to be done with the same care and scrupulous standards we apply to research itself.

The HKM focuses on the issues of research assessment that strengthen research integrity. Similarly, the HKM concentrates primarily on what universities and other research institutions can do to modify the criteria used by PTCs for career assessments. The HKM is grounded on the idea that implementation of the 5 principles plays a critical role in any change to how researchers are assessed for career advancement. Finally, the HKM integrates evaluation as a key feature in assessing the usefulness of the 5 principles. The HKM initiative is not the first; others exist, such as the Declaration on Research Assessment (DORA) (30) and the Leiden Manifesto (31). DORA is an explicit drive away from JIFs towards a more inclusive qualitative examination of research, namely its contents, when assessing researchers. The Leiden Manifesto is similarly positioned focusing on “best practice in metrics-based research assessment so that researchers can hold evaluators to account, and evaluators can hold their indicators to account.” (31). We hope the

HKM will complement these and other efforts and highlight the importance of research integrity in any reconfiguration of incentives and rewards for career advancement. Having more than one group call for change will perhaps reinforce the message of the various initiatives and speak to complementary audiences.

Dissemination

Beyond journal publication we are developing adjuvant dissemination outputs. The World Conferences on Research Integrity Foundation (71) and the REWARD Alliance (72) will make available the HKM on their websites. This includes the manifesto, the signatories, some infographics about the manifesto for dissemination purposes, a place to endorse it, translations into several languages (ongoing) and future implementation plans (ongoing).

Endorsement and implementation

Universities and other research institutions are prime agents to endorse and implement the HKM. They are the home of current and future researchers where promotion and tenure assessments are carried out. University PTCs could adapt the TOP approach (56; implemented in over 5000 journals) to these 5 principles making this information publicly available on university websites. For example, for principle 2, one extreme (level 0) would be that an institution acknowledges doing nothing; no incentives or rewards for making all research results publicly available or signing a declaration of transparency, namely, that the results are an accurate and honest account of what the researchers did and found (44). At the other extreme (level 3) the university would explicitly state that they require their researchers to share the results of all of research regardless of the statistical direction of the results. Universities can decide the time interval as to when to complete audits to monitor the commitment to full reporting of all research results. Researchers failing to meet this level of commitment will not be allowed to pursue promotion and tenure or apply for new funding for a period of time. Levels 1 and 2 would be a commitment somewhere between level 0 and level 3. The advantage of universities adopting such an approach is that that it provides a meaningful comparison of research integrity across universities, globally. To fully implement such an adaption across the 5 principles and levels will require funding and input from others.

We are inviting individuals and/or organizations to deliver brief (2-3 minutes) YouTube testimonials as to how they have implemented the HKM (categorized by stakeholder group). This approach can serve as a pragmatic way for individuals and organizations to disseminate how they are endorsing and implementing the HKM and as a nudge to others about implementation. We would like to develop tool kits for any organization interested in ways to implement good research integrity practices related to the 5 principles. Developing and populating the tool kits will require funding and time. We envision the tool kits including: examples of successful implementation approaches; standard operating procedures to implement modifications to PTC criteria; examples of CV modifications to include items proposed in our five principles; successful ways universities and other research organizations have engaged their researchers to help implement change; and designs and evaluations of the effectiveness of any implement strategies of the 5 principles. Such efforts constitute a 'bottoms up' approach to implementation. Whether implemented at the local or national level, changes in researcher assessment criteria should be fully documented and made openly available. Institutions making changes to their promotion and tenure criteria should implement an evaluation component as part of the process. Evaluations that provide the most internally valid results and greatest generalizability should be used.

To help facilitate implementation of the HKM key opinion leaders should be included in any plan. We invite individuals and organizations to endorse and implement the HKM. We would like to provide audit and feedback on dissemination, endorsement and implementation data of the principles. This will also require funding. The ultimate assessment of the HKM is whether there is an improvement in the scientific enterprise. We will report any progress at the forthcoming QUEST/REWARD/EQUATOR conference in Berlin in February 2020 and at the 7th WCRI in 2021. Finally, we anticipate this formulation of the HKM will be endorsed by the Governing Board of the World Conferences on Research Integrity Foundation and the Steering Committee of the Reduce research Waste And Review Diligence. We invite universities, funders, other groups and individuals to do likewise on the WCRI's website. We envision later updates and welcome suggestions of other best practices, particularly if there is a strong conceptual rationale and an evidence base for them. We think the HKM is unique because the principles are driven by

evidence, whenever possible, and reflects a commitment to research integrity when advancing the careers of faculty.

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