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Campbell's Law: Implication in Medical Publications and Clinical Sciences

***Abstract* —** Publication has always been seen as one of the success metrics in the academic world. Throughout the last decade, we have seen a steep rise in the number of academic journal articles being published. Many are overwhelmed by this phenomenon of "publication explosion". Campbell's Law states that once a target has been identified as a main indicator for success in a system, its ability to accurately evaluate success will be compromised. This article discusses the Campbell's Law and its implication in medical publications and clinical sciences, and the mitigation strategies.

***Keywords* — Campbell's Law; Scientific Merits; Publications; Clinical Sciences**

1. INTRODUCTION

Throughout the last decade, we have seen a steep rise in the number of academic journal articles being published. Many are overwhelmed by this phenomenon of "publication explosion". [1] In 2009, it is estimated that some 50 million papers have been published, cumulatively since the first scholarly publication by Le Journal des Sçavans in 1665. [2] Five years later, this cumulative number of scientific papers has exceeded 110 million in 2014. [3]

With this exponential surge, Fire et. Al. has pointed out that publication of scholarly articles is becoming a less convincing measurement of scientific merit as evident by the longer author lists, shorter papers, inflated publication numbers (e.g. the "Salami" publication culture), extreme self-citing, and lengthy reference lists. [4]

Publication explosion is multifactorial

Publication has always been seen as one of the success metrics in the academic world. It has always been a criteria for career progression, university graduation and even employment. [5] It is used as one of the important research outputs and reference in deciding billions of funding allocation. [6]

The intention of publication-based, merit-driven incentives and resource allocations is with the good purpose to motivate. However, this good intention may very well be side-lined in the mad rush to publish and publish.

2. CAMPBELL'S LAW

Campbell's law states that the more a measuring indicator becomes a target of achievement for players in a system, the more the indicator will be subjected to corruption pressures, distortion and will finally disrupt the processes it intends to monitor. (Fig. 1)

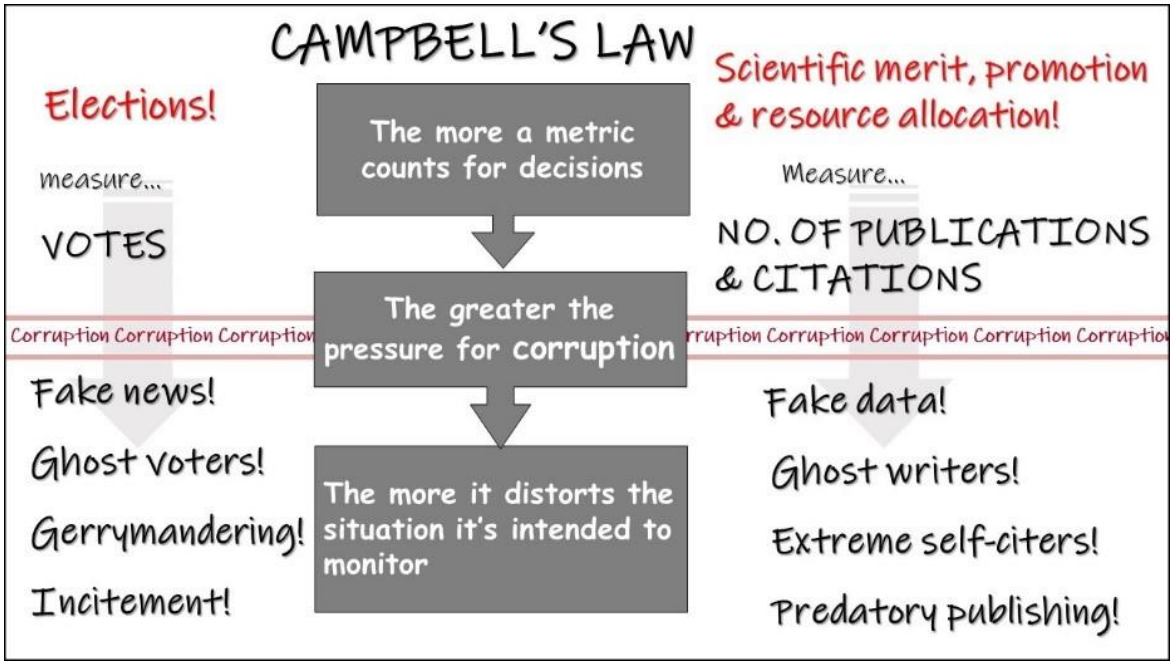

Figure 1 Implications of Campbell's law in scientific publications

Over-emphasized citation metrics

The first worrying trend is the over-emphasis on citations. Citable publication is one of the most important key performance indicators set by almost all universities and colleges. Both the number of publications and citations are regarded as good research output. More research output naturally attracts more funding. These criteria are often set as standards in deciding on university rankings and resource allocations. As a consequence, scientific works tend to become target oriented. Meta-analysis and review papers are highly regarded due to the high citation frequency. There has been a saying that writing review articles are "low cost, high profit" because a review paper requires low financial support and can be completed by "just sitting in the office" – akin to a reporter who is able to report international news by working from home and browsing the internet.

On the other hand, clinical publications such as case reports are given relatively lower credit due to the lower citation potential. According to van Eck et. al., citation analysis may severely overestimate the impact of fundamental research as compared to clinical research. Fundamental and diagnostic research papers usually have a high citation impact compared to clinically oriented scholarly articles. [7]

This is a wrong concept because in order to identify important rare cases to be reported, the load of patient being treated must be high. In reality, even though the level of evidence of a case report or case series is relatively low, they may be used as a life-saving tool in managing crisis, or as an alarm to raise a red flag in medicine. Thus, the scientific merit of a genuine interesting case report published in the "battlefield" of clinical setting should be seen as equally valuable, at least on par with other type of articles.

As a consequence of this imbalance in the merit system, clinicians who are enthusiastic in treating patients and teaching (but do not publish high-citation publications) will be left behind in their promotion tracks. They will be demotivated in their career paths. Clinical lecturers will become less interested in disseminating knowledge and treating patients. If they wish for a promotion, their focus will be merely on writing citable articles such as systematic reviews and conducting fundamental research. The whole system becomes distorted because papers being published is not based on real clinical expert opinion - thus the content may not be clinically appropriate and practical. This will further hinder many enthusiastic clinicians from joining the academic world due to the obstacles faced by their seniors and peers.

Additionally, over-emphasis on citation frequency also occurs among medical journals. Journal indexing and ranking is much affected by the number of citations. Some journal editors subconsciously conduct editorial work based on publication bias. Papers with positive results are easier to be accepted for publication. Certain types of articles with higher chance of citation are more welcomed. This explains why many high impact medical journals are no longer accepting case reports.

3. Pressure Leading To Unreliable Data Input

When publication become a compulsory criterion for graduation, students tend to conduct a study and publish a paper just for the sake of graduation, sometimes without any real intention to fill up a scientific gap. There are countless of workshops targeting the techniques in writing scientific papers, techniques in conquering top ranking high impact journals. What is worse, these students may modify the methodology or even result data in order to publish.

Lately, there are numerous infamous research conducts in the scientific fraternity. There are manipulations of research data and methodology just for the sake of publication, especially among healthcare publication.[8] There are academicians who consciously or subconsciously involve in extreme self-citation.[9] Extreme self-citation is not an easy task and does not occur by chance. Some of these researchers are even highly regarded scientists in their own university and country. It is high time to consider that are they still allowed to lead the fraternity?

More and more predatory journals have invaded universities and research institutes, targeting young blood in the scientific world. They promote poor-quality scholars and waste resources.[10] Trust is eroded when major manipulation and biases increase in the research design, reporting and analysis.[11] They increase false information in the Big Data leading to confusion and even wrong conclusions. Based on the wrong conclusions, wrong decisions may be made, leading to massive losses to the human world, for example issues regarding vaccination, treatment protocol, etc.

The academic system encourages mass publication – this should be seen as good. More publications of data are important for sharing of knowledge and sharing of information which is essential for deep learning that may subsequently be translated into artificial intelligence. Advancement in technology and improvement in human life go hand in hand.

Problems arise when materials being published are unreliable. It should be clear to every scholar that only genuine data must be used. Much more effort should be put in maintaining the integrity of scholar articles. Untrue, modified and distorted data should be totally filtered away from the big database.

4. Mitigation Strategy

Keep our goal separated

The first strategy entails measuring the relevant outcome, process, structural and quality metrics but not directly tying these to any form or system of reward.

The practice of current assessment heavily based on counting publications and their impact factors, citations, and h-index should be lightened. In fact, these approaches have been severely criticized. For example, the main focus of our children is education. Performing well in exams is one of the main goals. However, we should not overemphasise on exam marks. An education system which is too exam-oriented will only hinder the development of a child's personality. An overall balanced development should be the priority, e.g. emphasis on good attitude, kindness, empathy, civic awareness, accountability, communication, mutual respect, problem solving and community service etc. [6]

It is time for us to develop a more appropriate assessment system in academia where objectives are separated from the superficial metric used to track success. For example, assessment according to ability to work as part of a diverse team, altruism, creativity in complex problem-solving and work-related ethics. Nevertheless, role model on integrity should be shown by senior academicians, leaders and administrative personnel.

Ensuring proper safeguarding system

Overexpansion of the current publication system should be followed by reliable and strict control. Authenticity and integrity should be of upmost importance in scientific writing. Unethical publication practices should be totally eradicated.[12] Stern action should be taken on extreme self-citers and predatory publishers,

especially if it involves administrative personnel. Leaders in the scientific fraternity should take the lead in role modelling ethical publications.

A holistic approach in evaluating the value of scholarly articles is needed. The scientific fraternity as a whole should recognize the real relevance and quality of a research paper. As the saying goes, “Never forget why you started, and your mission can be accomplished”

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