

More knowledge, less numbers

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“Do you know your *h-index*?” was one of the introductory questions by Oliver Renn, Head of the ETH Chemistry | Biology | Pharmacy Information Center in his fall semester course entitled “Scientific information retrieval and management in chemistry and life sciences”. I did not know mine even though I was already familiar with the famous Hirsch index (*h-index*), which was introduced in 2005. This index is one of the modern tools to enable an evaluation of the total number of publications versus the number of citations received by each publication. To give an example, if I have five publications and all are all cited at least five times then I have an *h-index* of five. But is it true that a high *h-index* correlates with the relevance or importance of your research?

The need to measure scientific output and its relevance to a field may not be new. Certainly the online availability of scientific contributions opened new possibilities to have search engines and scripts going through databases to easily come up with a number like the *h-index*. But what is the effect and the message of those developments for doctoral students like myself? Well, the message is quite clear: Choose a field which is en vogue, and publish as much as you can in high-impact factor journals to increase the chances of getting cited. One could argue that this is not new and that the pressure to publish in prestigious journals has always been there – which is true. What clearly changed from 30 years ago is the instantaneous visibility and evaluation of scientific output fueled by the fast paced publishing industry.

I remember stories from my dad, who also is a chemist, and how he regularly spent time in the library during his PhD whenever new issues of certain journals were available. This happened on weekly, biweekly or

monthly basis. Times have certainly changed! I receive email alerts by Sci-Finder whenever a publication appears that fits my search criteria. Furthermore, I get daily updates by e-mail of “just-accepted” publications in journals that I enjoy reading or have to read for my own research. Consequently, this results in dozens of daily e-mails illustrating nicely the change in the publishing industry. It is therefore not very surprising that there was and is a need for new ways to evaluate and rank the scientific output.

What is to conclude from the current state we are in? It seems more and more necessary to have bibliometric tools in order to sort and evaluate a scientist’s work. From the pre-selection of candidates during academic and industrial job interviews, one hears stories of how the sheer numbers are more and more important. Can we decide, by looking at the number of publications, impact factors and *h-indices* who is the better scientist and whom to hire? To me the question is clearly to be answered with “No”. Just looking at numbers may give you an impression of how productive (with respect to publishing) a researcher has been, but won’t tell anything about an individual’s actual skills. And, neither spoken language, social and soft skills nor hard skills can be extracted with bibliometric tools.

I do not want to come across as overly negative but to me the (amazing) new tools that are available to us are often misused or misinterpreted. To illustrate what I mean, take for instance statistics, a tool used in numerous areas of research and society. It is a powerful instrument, which can equally be misinterpreted. Famously, a study published in 2012 in the *New England Journal of Medicine* looked at the chocolate consumption per inhabitant and year versus number of the Nobel

prize winners of a country [1]. There is a clear correlation between chocolate and the Nobel Prize (Switzerland being at the top of this chart). No one with some intelligence would conclude that starting to eat chocolate or move to a country with a high chocolate consumption will increase your chances for a Nobel prize. It would be a misinterpretation of correlation and causality. The interpretation of the numbers produced by bibliometric tools sometimes mirror this flaw.

As Plato stated “a good decision is based on knowledge and not on numbers”. It is up to all of us to stay open-minded about new bibliometric tools, but be critical at the same time about their meaning and usage. In my opinion, one of the core purposes of science is research and the communication thereof for the betterment of society, not the number of publications you have, the impact-factors of the journals you published in, or your *h-index*.

References

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