Boosting the ranking of a university using self-citations

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The unreal growth of some universities in the Times Higher Education World University Rankings is questioned. We show that the universities and individuals can exploit a weakness of ranking tables by engaging in excessive self-citations. The genuine efforts by the academic community to work towards high-quality research are put to shame, and unethical conduct and behaviour become acceptable. The credibility of global university ranking tables is under question.

Veltech University, Chennai, India, is ranked 43rd in Asia according to the 2017 *Times Higher Education* (*THE*) World University Ranking and ranked 74th in *THE* Young University Ranking 2017 (both rankings were diffused in 2016).

Citations are weighted 30% of the overall score, and it appears that Veltech reaches the maximum score on this criterion (100). It is ranked 1st in Asia on this criterion (the 2nd, King Abdulaziz University, Saudi Arabia, scored 93.3).

Although Veltech is not ranked in the *THE* World Rankings, we notice that King Abdulaziz University has the same score in this ranking in Asia and worldwide. It can be extrapolated that Veltech is, according to this ranking, 1st or 2nd in the world considering the citations criterion (together with St George's University of London), followed by Stanford and MIT, USA at 99.9.

Knowing the grades and weighting for the other parameters of Veltech's ranking, the citation score contributes 74% of the overall performance of the University according to *THE* rankings[1].

On further inspection of the data on SciVal[2], from 2012 to 2017, the Veltech University received 15,058 citations, with a field-weighted citation impact (FWCI) of 3.18. For comparison, the FWCI of Caltech is 2.33, 2.41 for Harvard and 2.50 for MIT.

Interestingly, by analysing the SciVal profile of Sundarapandian Vaidyanathan, the top-listed professor at Veltech, we observed 12,933 citations (July 2017). Only 1% of his papers has been published in top 10% journals by SNIP. However, 59.3% of his publications are in the top 10% most cited worldwide. He has been writing under the Veltech affiliation since 2010. Close to 86% of the citations of this University since 2012 are coming from the work of Vaidyanathan. Scopus lists more citations (15,485), due to a slight difference in methodology. Of these citations, 14,555 are self-citations,

and 930 are from other researchers. Notice that his *h*-index is 86, but it drops down to 14 once the self-citations are removed. According to these data, about 94% of his citations are self-citations.

By considering only articles from 2012 to 2016, 13,018 citations remain (close to the SciVal data), out of which 12,487 are self-citations; so a ratio close to 96%. By assuming the same ratio for the data from SciVal, and assuming steady ratios for the last months, we can summarize that (±1%):

- 74% of the weight of the overall score of Veltech University comes from its citations score.
- 86% of these citations come from Vaidyanathan.
- 96% of his citations are self-citations.

By simply multiplying these factors, we estimate that about 83% of the citations of this university are self-citations from Vaidyanathan. As we do not have access to the detailed methodology of the ranking, it is hard to find the formula relating citations and citations score. By assuming linearity, roughly 61% of the overall score of Veltech would be due to these self-citations. Regardless of the specific formula, the self-citations of Vaidyanathan seem to have a tremendous influence on the ranking of the university.

This is not the first time that the *THE* Rankings are being questioned. In 2010, the ranking of Alexandria University, Egypt was strongly influenced by the self-citations of a single author, El Naschie[3]. The same author was previously involved in serious academic misconduct issues[4]. Following this scandal, the *THE* ranking was not substantially modified and the weakness of this parameter remains and it can be exploited.

Without questioning the quality of the work of Vaidyanathan, this example shows that it is now possible for a single academic to drastically increase the ranking of his/her university by abusing one of the weaknesses of a given ranking sys-

tem. Due to the importance of these rankings nowadays in the media or public opinion, it is time to design a resilient and reliable system which can annihilate future potential manipulations and pressures from university administrations or governments. Indeed, we can easily imagine a university pushing professors to self-cite their work to increase its global ranking, and thus affecting universities and academics trying to do their job honestly. Other parameters may be open to abuse to artificially and significantly boost the ranking of a university (for example, parameters involving ratio of staff and/or students). Such manipulations would be detrimental to the quality of research and teaching worldwide in the future.

It is time for the university ranking organizations to undertake a serious self-critique of their weaknesses and work closely with academics to develop a refined ranking system which could be robust enough to destroy such manipulations. Ideally, ranking systems should encourage universities to increase the quality of their research and teaching, instead of encouraging academic misconduct. The credibility and the reputation of the academic world are now on the line.

1. *Times Higher Education*, 2017; https://www.timeshighereducation.com/world-university-rankings/veltech-university#ranking-dataset/608682 (accessed on 25 July 2017).
2. *SciVal*, 2017; http://www.scival.com/overview/summary?uri=Institution/706989 (accessed on 25 July 2017).
3. Aspenia online; https://www.aspeninstitute.it/aspenia-online/article/international-university-rankings-science-or-quackery (accessed on 25 July 2017).
4. Schiermeier, Q., *Nature*, 2008, **456**(7221), 432.

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