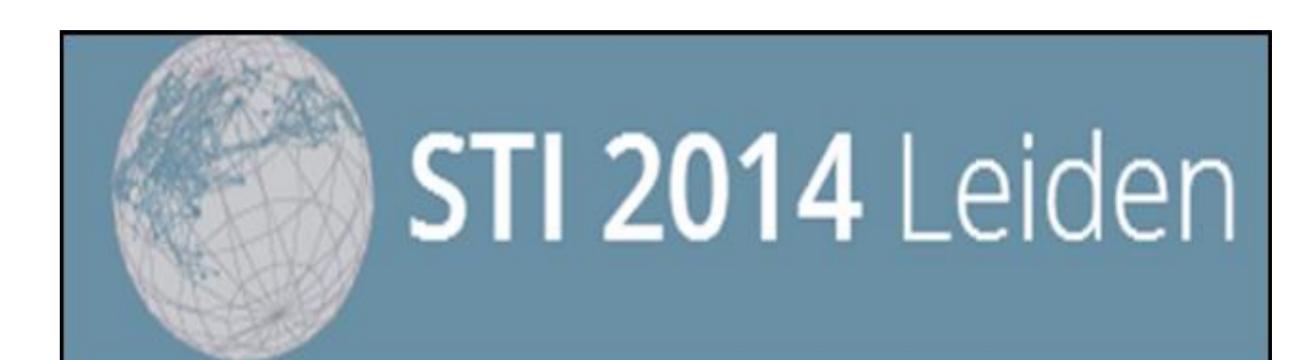


Beyond traditional metrics at the University of São Paulo: scientific production in the PLOS journals

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INTRODUCTION

In the evolution of the Open Access Movement, there have been pioneering initiatives to provide free and open access to published scientific content, such as the creation of the BioMed Central (BMC) and the Public Library of Science (PLOS) in early 2000. These set out a new funding model for journals where the liability for publishing costs is transferred from the readers to the authors. The PLOS was also innovative since it led to the creation of Article-Level Metrics - ALM (Fenner & Lin, 2013) and expanded by issuing a series of new titles - PLOS Biology in 2003; PLOS Medicine in 2004, PLOS Computational Biology, PLOS Genetics and PLOS Pathogens in 2005, PLOS ONE in 2006 and more recently PLOS Currents. As a result, today the set of PLOS journals is widely recognized and prestigious.

Recently (on June 18, 2013), PLOS introduced a new search engine - PLOS-ALM Reports (<http://almreports.plos.org/>) (Allen, 2013) which allows more detailed investigations to be carried out in all the PLOS journals showing consolidated alternative measures of visibility and impact earned by published articles. Since the University of São Paulo is considered to be "Brazil's leading academic institution in research and graduate education" (Schwartzman, 2006), this study is an attempt to find evidence of the USP performance that goes beyond traditional metrics, by using the alternative indicators provided by PLOS-ALM and making a comparison with other articles in the PLOS journals that come from Brazil.

METHODS

We carried out a search in PLOS-ALM Reports for [Author affiliation country: Brazil; Period: January 01, 2005 to December 31, 2012; Journal: All Journals]. The data were downloaded in a CSV file, so that a comparison of the PLOS-ALM indicators could be made between the USP and non-USP articles from Brazil.

(The PLOS-ALM set of relevant indicators for the impact made by the articles is described in: <http://www.plosone.org/static/almInfo/#static-content-wrap>).

RESULTS AND DISCUSSION

A total number of 481 articles from USP are represented within the analyzed date range in the PLOS journals, which is 0.69% of the overall number of PLOS publications (n=69,306) and 30.1% of the publications where Brazil is the authorship country (n=1,598) in the same period. The PLOS ONE journal has published almost all the items where Brazil features as the "author affiliation country" (n=1,303), followed by PLOS Neglected Tropical Diseases (n=213), PLOS Pathogens (n=27), PLOS Medicine (n=18), PLOS Genetics (n=17), PLOS Biology and PLOS Computational Biology (10 items each). With regard to ALM, Table 1 shows articles from Brazil with the four best PLOS-ALM indicators (viewed, cited, saved and discussed), and makes clear that USP has the most "saved" items with 438 bookmarks in the Mendeley reference management service.

Table 2 shows the set of PLOS-ALM indicators that compare the reach of articles from Brazil of USP and non-USP origin, where the Total is the sum of all the ALM indicators and the Average per Article is the mean of each indicator for the USP and non-USP articles. The Table is arranged in descending order for the ALM Classification, to show the respective indicators.

It is clear that the number of views and downloads is the most significant PLOS-ALM indicator, in absolute numbers, and USP represents about 30% of the total figure for Brazil. When account is taken of the average figure per article, USP stands out in virtually all the "Viewed" ALM indicators, but especially in Figshare.

When all the "Citations" are analyzed, the overall percentage of USP is 43.6% compared with the rest of Brazil (data not shown), with the citations in PMC Europe Citations Database being highlighted. As well as representing 50.7% of the citations made for Brazilian articles, this also has 2.39 times the average number of citations for articles by authors from other national institutions.

With regard to the indicators that show how many times articles were "Saved" through bookmark, Mendeley is most prominent with 27.1% for USP. Finally, with regard to the "Discussion" of the articles in social media outlets, those from USP stand out particularly in Facebook and Twitter. Although to a lesser extent, there is a significant difference in favour of USP in blogs (Nature Blogs and Research Blogging).

Table 2: ALM indicators for the USP and non-USP articles from Brazil

Table 1: PLOS articles from Brazil with the four best ALM indicators

ALM indicator	Brazil origin	DOI	Title	Total reach
most viewed	Non-USP	10.1371/journal.pone.0019881	What Is New for an Old Molecule? Systematic Review and Recommendations on the Use of Resveratrol	PMC: 7,869
most cited	Non-USP	10.1371/journal.pmed.0020059	A Space-time Permutation Scan Statistic for Disease Outbreak Detection	Scopus: 270
most saved	USP	10.1371/journal.pone.0013665	Beyond the Fragmentation Threshold Hypothesis: Regime Shifts in Biodiversity Across Fragmented Landscapes	Mendeley: 438
most discussed	Non-USP	10.1371/journal.pone.0043007	Glass Shape Influences Consumption Rate for Alcoholic Beverages	Facebook: 947

ALM-Metrics Classification	Indicator	Total			Average per article	
		USP	non-USP	% USP	USP	non-USP
Viewed	PMC Total	353.351	818.945	30.1%	734.62	733.16
	PMC views	235.661	551.442	29.9%	489.94	493.68
	PLOS PDF downloads	214.778	518.595	29.3%	446.52	464.27
	PMC PDF Downloads	117.690	267.728	30.5%	244.68	239.68
	PLOS XML downloads	19.753	48.228	29.1%	41.07	43.18
	Figshare	3.713	7.679	32.6%	7.72	6.87
Cited	PMC Europe Database Citations	68.406	66.515	50.7%	142.22	59.55
	Scopus	4.567	12.511	26.7%	9.49	11.20
	PMC Europe Citations	3.264	8.844	27.0%	6.79	7.92
	CrossRef	3.222	8.807	26.8%	6.70	7.88
	Web of Science	2.436	6.132	28.4%	5.06	5.49
	PubMed Central	2.045	5.725	26.3%	4.25	5.13
Saved	Mendeley	9.133	24.600	27.1%	18.99	22.02
	CiteULike	169	407	29.3%	0.35	0.36
	DataCite	-	5	-	0.00	-
	Reddit	-	2	-	0.00	-
Discussed	Facebook	4.172	10.278	28.9%	8.67	9.20
	Twitter	615	1.669	26.9%	128	1.49
	Wikipedia	80	132	37.7%	0.17	0.12
	Wordpress.com	15	64	19.0%	0.03	0.06
	Research Blogging	19	23	45.2%	0.04	0.02
	Nature Blogs	2	3	40.0%	0.00	0.00
	Science Seeker	-	-	-	-	-
	Recommended	F1000Prime	14	52	21.2%	0.03
						0.63

CONCLUSIONS

The presence of USP in the PLOS journals collection, as measured by its share of publications, reflects the considerable size of its physical structure and personnel, in comparison with that of other Brazilian institutions. Our results show how far this is the case, when the range of indicators is analyzed (although there are a couple of exceptions). ALM provides a wider range of indicators related to published articles that goes beyond the traditional citations, with analytical methods that involve alternative metrics for determining article usage and dissemination.

This initial investigation in the PLOS-ALM Reports is now under way with this case study based on the production by USP published in the PLOS journals which seeks to determine the different types of analysis that can be conducted with the data obtained by the tool.

REFERENCES