
ALTERNATIVE AND TRADITIONAL INDICATORS OF THE BRAZILIAN FEMINIST STUDIES JOURNAL

Indicadores alternativos e tradicionais da Revista Estudos Feministas Brasileira

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Abstract

The connection between traditional and alternative indicators of academic impact has been recommended by scholars in the field of metric studies as they are considered complementary and offer a more complete picture of the evaluation of research results. From this perspective, the present descriptive exploratory study aimed to analyze the correlation coefficient between traditional and alternative impact of Revista Estudos Feministas. The sample included the period from 2001 to 2018. Analysis data were obtained from the Dimensions database via API. 1,296 texts with 2,609 citations and 4,984 altmetrics data were analyzed. The results showed that Mendeley obtained a positive evaluation in the correlation of Pearson's coefficient when compared with the quantity of published articles and with the citation and visibility indicators. The study found that altmetrics data is 4.6 times larger than traditional data, although fluctuating is important for indicating the tools and networks in which readers and users share scientific content.

Keywords: Alternative Metrics; Traditional Metrics; Open Access Publishing; Dimensions database; Pearson's coefficient.

Resumo

A conexão de indicadores tradicionais e alternativos de impacto acadêmico tem sido recomendada por estudiosos do campo dos estudos métricos por serem considerados complementares e oferecerem um quadro mais completo da avaliação de resultados de pesquisa. A partir dessa perspectiva o presente estudo de cunho exploratório descritivo, teve o objetivo de analisar o coeficiente de correlação entre o impacto tradicional e alternativo da Revista Estudos Feministas. A amostra constituiu o período de 2001 a 2018. Os dados de análise foram obtidos na base Dimensions via API. Foram analisados 1.296 textos que contaram com 2.609 citações e 4.984 dados altmétricos. Os resultados apontaram que o Mendeley obteve uma avaliação positiva na correlação do coeficiente de Pearson ao ser comparado com o quantitativo de artigos publicados e com os indicadores de citação e visibilidade. O estudo detectou que os dados altmétricos são 4,6 vezes maiores que o tradicional, apesar de flutuantes eles são importantes para a indicação das ferramentas e redes onde estão os leitores e usuários que compartilham conteúdo científico.

Fachin, Juliana; Araújo, Ronaldo Ferreira, and Blattmann, Ursula. Alternative and traditional indicators of the Brazilian Feminist Studies Journal. *Brazilian Journal of Information Science: Research trends*. vol. 14 no. 1 jan.-mar. 2020 pp. 112-129.

Palavras-Chave: Métricas Alternativas; Métricas Tradicionais; Publicação de Acesso Aberto; Base de dados Dimensions; Coeficiente de Pearson.

1 Introduction

Scientific communication follows the trend of open science, envisions new applications and uses for scientific content: visibility, online attention and citation are resources that did not exist with print publishing and without the internet, social and academic networks allow a broad look on the use of scientific content globally which is no longer local and fragmented. Scientific publication still exists, the parameterization methods too, the change happens in how the scientific communication is made and analyzed (Anglada and Abadal 2018).

Although citation analysis is one of the most recurring themes of traditional bibliometric studies and one of national Information Science researchers' favorite approaches (Vanz 2003), it covers only the part of the so-called formal communication. Visibility studies, online attention, scientific and alternative measurement of publications enable to analyze the scenario of communication, circulation and scientific evaluation, permeate the space of quantification and get into the uses given by the society connected to the Internet network when accessing, reading, enjoying, sharing and eventually citing the results of a search.

Measurement systems are evolving as well as the molds of scientific achievement too, as scientific publication is thought as a service, it is possible to think of the reader, user of this information as the key element, in this case the user is no longer just a scientist, as they stop using only formal channels of communication, scientific dissemination is being studied from the perspective of marketing, precisely to meet new needs that were not previously presented. Araújo (2018) makes this observation, in which indicates that "social web resources and social media" modify the idea of impact of what is considered standard, and that the use made of this type of content in the digital environment can provide both the citation regarding the indication of interest for certain content demanded by the readers.

Scientific communication becomes the object of use in a complex information service, which fits new parameters, to which it is still adapting.

Therefore, this research aimed to analyze the performance of publications and the relationship between traditional and alternative indicators, in a Brazilian open access scientific journal. Answering the following question: do alternative metrics correlate with

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citations? In this search, the research recognizes these metrics complementarity relationship and considers that they need to be used together, as they measure distinct impacts.

2 Scientific Measurement in Times of Social Network on the Web

With the vastness of communication systems available on the web and accessible via mobile devices, it is difficult to measure the amount of information being generated and consumed every day, but not everything that circulates is true, verifiable or scientific. Selecting the information that is true and relevant can become a daunting task.

In science it is not different, the peer review system developed by the first scientific journals around 1660 (Belcher 2009) is still the method to verify the credibility of texts published in a journal, a practice that has not changed, but if adapted from handwritten letters, later typed to typed and sent by e-mail or editorial management systems, published in paper form and now accessed online.

Due to the growing number of publications, the scientific community has developed a quality measurement system called the “impact factor” created by Garfield (1972) in 1955, which presents the idea of citation index and its impacts on the scientific community. As well as the citation indicators metrics, impact factor, the traditional metrics are derived from Bibliometrics and Scientometrics, which use scientific publication as an object of study, analysing the habits and actions of scientific publications that are measured by and for the scientific community. The uses made of scientific publication by society in general, especially to what is being published on the social web, was not a reality at the time the author developed the impact index. Scientific publications with web presence, such as Blogs, Twitter, Facebook, ResearchGates, among others, brought researchers closer to society, providing dialogue and information exchange between the author and any reader who has an interest in scientific content.

As scientific communication uses structures and standards, such as Open Researcher and Contributor ID (ORCID) for author identification, Digital object identifier (DOI) for articles and metadata for publications, interactions around research items leave readers with clues, and can be mapped across the various social web tools.

Altmetrics is dedicated to investigate these tracks and employs indicators to measure impacts and measure society's reaction to a scientific publication. Alternative metrics are

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intended to complement traditional metrics, such as the impact factor, from scientific publication. (Priem et al. 2010).

Scientific journals that have no data access and use restrictions facilitate altimeter applications and results can be measured immediately after online dissemination. Koon-Kiu and Mark (2011 p. 03) identified that the peak of scientific publication views has a “lifetime”, on average two months, decay occurs soon after the first month until stagnant. This is why widespread dissemination after publication becomes crucial, and interaction with the public becomes vital for the spread of scientific achievement, in which everyone can be content producers, broadcasters and receivers, allowing visibility to the produced content (Priem, Groth and Taraborelli 2012).

The document read, downloaded, shared, liked, that is, the different manifestations of information users become an important indicator, as they indicate the amount of items (texts, images, graphics and photographs) published regarding the different manifestations of the community. Iamarino (2013) comments the relationship between publications and the uses given to them,

If people with an interest close to mine have expressed interest in that content, I'm much more likely to find something interesting there. And of course, if you find something interesting, I'll pass the recommendation on. Be "re-tweeting" the link, liking the comment, forwarding the email or adding the article to Mendeley (Iamarino 2013 p. 01).

This behavior demonstrates the spontaneity in which scientific information circulates on the web and impacts on society. The path that scientific information goes beyond the walls of academia becomes a way of identifying whether the published document impacts society immediately after its publication, highlighting the scope and influence of each article inside and outside the academy.

It is noteworthy that the author's goal is to be read, and that his research is useful, so the assessment and especially measurement systems need to consider the various uses of scientific information applied today, expanded by the influence of social and academic networks on the web.

3 Methodology

The descriptive exploratory study, with the application of the quantitative method of data analysis. A descriptive exploratory research aims, according to Cervo, Bervian and Silva (2007, p. 63) to perform “precise descriptions of the situation and wants to discover the relationships between its component elements” so that it can ascertain the scenario from which the object of analysis constitutes itself.

According to Mukaka (2012 p. 69), the statistical method is “used to evaluate a possible linear association between two continuous variables.” Regarding the use of correlation, the author emphasizes that, “the term correlation is used to refer to an association. connection or any form of relationship, bond or correspondence [...] ranges from -1 (perfect negative correlation) to 0 (no correlation) to +1 (perfect positive correlation)” (Mukaka 2012 p. 69). This method has been applied in altmetrics studies in several areas, mainly in health.

Due to the characteristics of the sample and the object of the study, Pearson Correlation Coefficient (r) was applied to the altmetric attention and citation scores. Following the trend of studies such as Zahedi, Costas and Wouters (2014), Bornmann (2015), Bornmann and Marx (2015), Erdt, Nagarajan, Sin and Theng (2016), Araújo, Caran and Souza (2016), Silva Filho and Vanz (2018), who applied the coefficient analysis in their studies. To perform the calculation of the coefficient and the scatter diagram Python language was used in the application of both.⁽¹⁾

As the object of study, a single journal was used, the Feminist Studies Journal (REF) from the Institute of Gender Studies of the Federal University of Santa Catarina (UFSC), Brazil.

Data were collected from Dimensions on June 24, 2019 using API access - informational access key. The REF publications survey consists of a population of 1,339 articles dated 1994 to 2019, 39 of the 2019 articles and 4 other texts of 1994 and 1995 were excluded. It must be pointed out that the years between 1994 and 2000 did not present indexed publications in the researched base, so they were out of the sample. Thus, the sample was cut out with 1,296 articles between 2001 to 2018, an eighteen years range.

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The reason for choosing the journal as the object of the study is due to some characteristics: open access Latin American publication with international representation, indexed in SciELO⁽²⁾ and with established impact factor¹. For the choice of the base, one that was free to access the texts and metric data of the publications was chosen, which is the reason for choosing Dimensions.

3.1 Feminist Studies Journal

The Brazilian Feminist Studies Magazine (REF) is a four-monthly publication of international circulation and scientific body that meets the principles of open access. The focus and scope of the journal is on issues related to gender and feminism, which may come from various areas such as: “sociology, anthropology, history, literature, cultural studies, political science, medicine, psychology, feminist theory, semiotics, demography, communication, psychoanalysis, among others” (REF, 2019). Published through the Open Journal System (OJS) of the Public Knowledge Project (PKP), a free tool, it is hosted on the Federal University of Santa Catarina (UFSC) Journals Portal, with 70 issues published by June 2019.

Created in 1992, the journal was initially edited by the Interdisciplinary Coordination of Contemporary Studies and until 1998 it was maintained by the Graduate Program in Social Sciences and the Institute of Philosophy and Social Sciences of the Federal University of Rio de Janeiro (UFRJ). From 1999 on it becomes the responsibility of the Center for Philosophy and Human Sciences and the Center for Communication and Expression of the Federal University of Santa Catarina. Currently, it has joined the UFSC Institute for Gender Studies (REF 2018).

REF (2018) is maintained by the Federal University of Santa Catarina and the Foundation for Research Support and University Extension, being supported by the agency of the National Council for Scientific and Technological Development (CNPq) and the Coordination for the Improvement of Higher Education Personnel (CAPES).

The journal is indexed in the following bases: CLASE - Latin American Cites in Social Sciences and Humanities, EBSCO - Information Services, MLA - Modern Language Association International Bibliographic, Portal of Periodicals - CAPES, REDALYC - Journal of Latin American and Caribbean Scientific Journals, España y Portugal, RIB - Inter-

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American Bibliography of the Organization of American States, SciELO - Scientific Electronic Library Online, SCOPUS and Sumarios.org - Abstracts of Brazilian Journals (REF 2018).

The journal has published 933 research articles, 282 book reviews, 98 editorials, 21 commentary articles, 16 undefined, 9 quick reports, 8 short reports, 6 errata (Analytics SciELO, 2019) and features publications by Brazilian, Argentinian, Spanish, American, Chilean, Portuguese, Mexican, Uruguayan, Colombian, French, Canadian, Cuban, Cape Verdean, German, Italian, Austrian, British, New Zealander and Angolan authors.

The texts are mostly written in Portuguese (1,191), Spanish (174) and English (21), and the relationship between author and co-authors in the publications indicate 960 publications with a single author, 271 have two authors, 80 with three authors, 28 with four authors, 4 with five authors, 3 with six authors, 1 with eight authors (Analytics SciELO 2019).

3.2 Dimensions

According to Digital Science (2019), Dimensions was released in January 2018, “Developed in collaboration with over 100 research organizations, gathering over 128 million publications, grants, policies, data and metrics, over 4 billion connections among them.”

According to Digital Science, the base creator platform, the data used by Dimensions comes from Digital Science's ReadCube, Altmetric, Figshare, Symplectic, Digital Science Consultancy and ÜberResearch services. It is an integrated bank for capturing, crossing, analyzing and disseminating science (Digital Science 2019).

In Dimensions presentation video (2018) the creators and collaborators indicate that the idea was to bring together different data sources, publications, data, citations and metrics in one place, in order to provide the user with an analytical view of the Publication. Breaking with the current data platforms, offering an integrative, cost-free and innovative service, they call it a 'digital research ecosystem', with continuous flow of information and connections that benefit everyone.

It is an accessible service, although not all indexed collections in the database are open access. In a brief consultation made at the base, with a temporary key provided, it has been identified that there are 1,159,313 Brazilian publications, 621,968 out of these are open

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access (observed on 22 July 2019). “Institutions need clear data from sources they can rely on to make the right decisions about funding, collaboration, and organizational structures. Our tools will help make these decisions easier.” (Digital Science 2019)

Dimensions is one of Digital Science's database reference services, which indexes bibliographic data from publications and crosses altimetric data for possible sources in which content may have been mentioned.

The good thing about this bank is that it is open, meaning that anyone can access and search all its content. Another issue is the crossing of data from various academic and social sources, facilitating the researcher to obtain the scenario of Scientometric, bibliometric and altmetrics analysis, as with this research. One negative aspect is that accessing and downloading advanced search reports requires requesting an API key.

4 Data Presentation and Analysis

According to the research data, which can be seen in table 1, in the analyzed period, 1,296 articles published between 2001 and 2018 were identified, with an average of 72 texts per year.

The articles have a total of 2,609 citations and 4,984 altmetrics data. For the altmetrics values the indicators for 5 blogs, 2 Google+ and 1 CiteULike were found in the data obtained from Dimensions, which were not considered in the total sum because they had low representativeness.

In general, the REF publications in the period analyzed received on average 2 citations of traditional impact per article, while the alternative impact got 3.8 when compared with the number of publications and 1.9 times larger than traditional citations. However, in order to understand better these indicators and their correlations, Pearson's coefficient (r) has been applied to assess if there is linearity in this sample.

Chart 1 presents the correlation coefficient data among the analyzed variables. According to Araújo, Caran and Souza (2016 p. 189) the analysis based on this type of coefficient identifies “how much influence or similarity in behavior between two variables. In short, Pearson's calculation indicates whether, as one variable changes, the other variable will have linear and predictable behavior.”

Table 1- Traditional and alternative impacts of REF

Year	Articles Published	Citation	Mendeley	Twitter	Facebook	Wikipedia	Video	Altmetrics
2001	49	308	399	18	8	0	0	425
2002	49	279	379	7	3	0	0	389
2003	60	137	61	12	6	0	0	79
2004	67	338	192	8	5	3	0	208
2005	64	232	315	21	7	3	0	346
2006	65	221	291	17	9	6	0	323
2007	68	165	236	13	3	0	0	252
2008	95	214	378	29	7	0	0	414
2009	66	151	159	17	3	0	0	179
2010	64	100	208	19	7	3	1	238
2011	76	80	221	27	13	0	0	261
2012	72	123	321	28	12	0	3	364
2013	75	103	308	36	15	0	0	359
2014	79	50	337	20	8	0	2	367
2015	74	47	147	147	2	0	0	296
2016	81	30	137	15	4	0	0	156
2017	89	27	188	51	9	0	0	248
2018	103	4	48	29	2	1	0	80
Total	1.296	2.609	4.325	14	123	16	6	4.984

Source: made by the authors, table based on the model used by Silva Filho and Vanz (2018, p. 205).
Research data obtained from the Dimensions (2019).

According to Mukaka (2012) some data may have linearity or not, this depends on the correlation indicator r , if it is positive and the closest to 1 it means that there is a strong approximation of linearity, however, if the indicator r is negative and distant From 1, this means that there is a linearity gap between the analyzed variables.

Chart 1 - Correlation of Variables.

Correlation	Linearity
Year (18) x Published Articles (1.296)	= r 0.79
Year (18) x citation (2.609)	= r -0.90
Year (18) x Altmetrics (4.984)	= r -0.27
Year (18) x Mendeley (4.325)	= r -0.41
Published Articles (1.296) x citation (2.609)	= r -0.64
Published Articles (1.296) x Mendeley (4.325)	= r -0.33
Published Articles (1.296) x Altmetrics (4.984)	= r -0.26
Citation (2.609) x Altmetrics (4.984)	= r 0.42
Citation (2.609) x Mendeley (4.325)	= r 0.53

Source: the author

By observing the data in chart 1, it is possible to identify that three variables have a positive linear approximation, namely: Year x Articles published with correlation indicator 0.79 which is closer to 1, and, the citation x Mendeley variable with the positive ratio of 0.53, and when analyzing Citation x Altmetrics with the correlation indication 0.42, it is not as positive as the comparison made with Mendeley data, but it is not negative either, which would indicate linearity distance.

For the journal, the values of the positive coefficient r indicate that there is linearity in the three elements mentioned, and that this factor may be directly related to a constant frequency of publications, with the visibility of publications in channels such as Mendeley and that the visibility reflects in altmetrics data since it shows indicative of views, likes, sharing and engagement almost twice as much as the traditional quote.

The negative correlation indicators that most closely approximated a perfect correlation were: Year x Citation with -0.90, and Published Article x Citation with -0.64, and shyly Year x Mendeley with -0.41, which is not so close to a perfect negative linear indicator, but which has good proximity.

The data from: Published Article x Altmetrics -0.26, Year x Altmetrics -0.27, Published Article x Mendeley -0.33, show nonlinear indicators, as they exhibit a negative correlation that deviates from 1. The values of the coefficient r of the elements that had imperfect negative linearity are the ones that most distanced themselves from the correlation between the variables, which means that their values are discrepant. These values are related

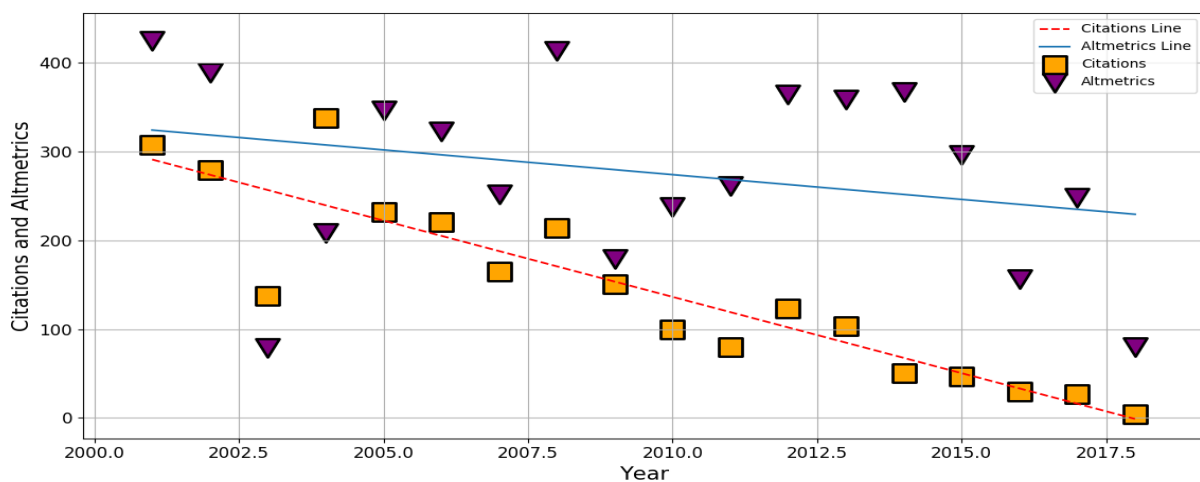
to Altmetrics and Mendeley data, which represents that these indicators impact the sample more than the other indicators.

For the journal, negative indicators may indicate that publications have had a significant visibility in social and academic networks, presenting numbers that are discrepant with the scenario of traditional metrics, so they did not obtain perfect linearity in the analyzed sample.

Another issue is that the altmetric analysis tools started to measure the publications from the creation of social and academic networks and the tool itself, it is not a retroactive analysis, it aims to ascertain the current scenario using relationship indicators to try to draw a profile impact (traditional and alternative) in future publications.

For the analysis of data dispersion, the closest positive perfect correlation indicators were used, those approaching the 1+ and analyzed throughout the 18 years of publication (See graphs 1, 2 and 3).

Graph 1- dispersion between Citation x Altmetrics



Source: the author

Graph 1 shows the dispersion between the Altmetrics coefficient data and citation in the 18 years of the sample studied. It is noticed that the linear correlation happened within the years 2003, 2004, 2006, 2009 and 2018, these are the periods with the highest relation between the altmetrics and citation data. In 2001 and 2008 there was an aggressive leap in the altmetrics data, when observing what happened, it is verified that, as for the sample in 2001, the text “Meeting document of specialists on aspects of racial discrimination related to Fachin, Juliana; Araújo, Ronaldo Ferreira, and Blattmann, Ursula. Alternative and traditional indicators of the Brazilian Feminist Studies Journal. *Brazilian Journal of Information Science: Research trends*. vol. 14 no. 1 jan.-mar. 2020 pp. 112-129.

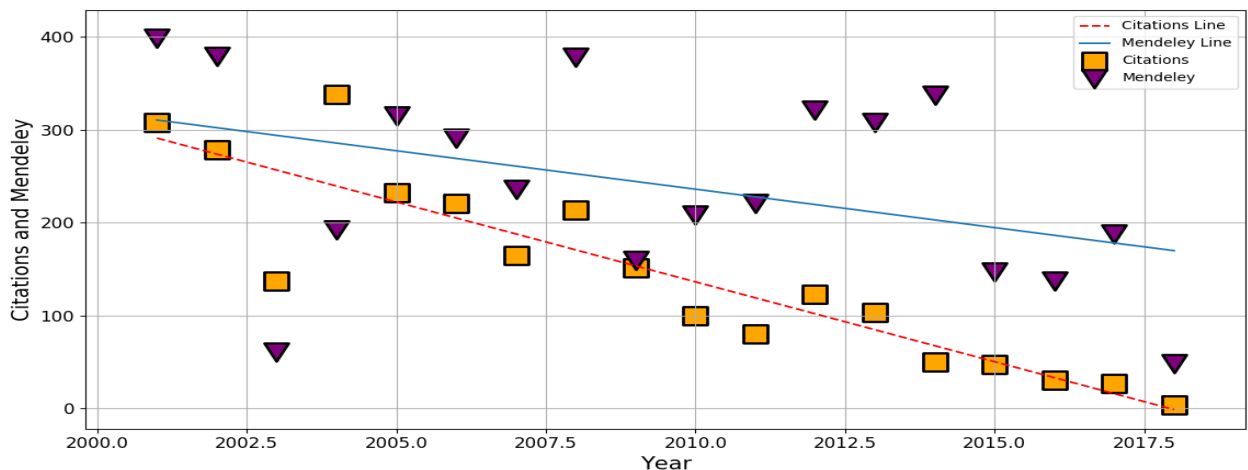
gender” alone received 189 alternative mention out of the 425 in the entire sample. If we compare with the total of citations (308) from this same period, we can see that this text alone obtained more than half of the mentions. You can see the data in table 1. In the 2008 sample, it was observed that some texts obtained a significant number of alternative mentions, helping to increase the alternative data, and thus measuring a negative linearity for the sample of the observed period.

Erdt et al. (2016) indicate that the negative or weak correlation between the altmetrics and citation indicators represents that altimetry does tend to measure and glimpse different indicators of the impact of scientific research, not citation. The traditional citation may be linked to altmetrics indicators, because it benefits from studies of visibility and uses made of scientific content, but the altmetrics focus is different, it seeks to understand the relation of tools and content uses by different stakeholders, and in this sense. It distances itself from traditional citation as a parameter, as it shows only academic uses, excluding social ones, which does not prevent comparing one indicator with another, but never associating it.

The same comparison was made with the dispersion of the Citation and Mendeley indicators, remembering that these data had a positive coefficient. See the data in graph 2.

In this case the indicators show that there is a linearity in certain periods, but there was also dispersion between the Citation and Mendeley data in other periods. Looking at graph 2, it is possible to see that the years 2009, 2015, 2016 and 2018 were the periods in which the data between the two indicators come closer, since the dispersion between the two is much greater between the period of: 2004, 2008, 2011, 2012, 2013, 2014 and 2017, in which Mendeley's data outperform the citation data, presenting a negative linearity, which means that the texts of this period had a higher visualization index than the citation, even thus, this coefficient presents a positive degree, since in 11 periods the data remained closer to a positive than negative linearity.

Graph 2 - dispersion between Citation x Mendeley



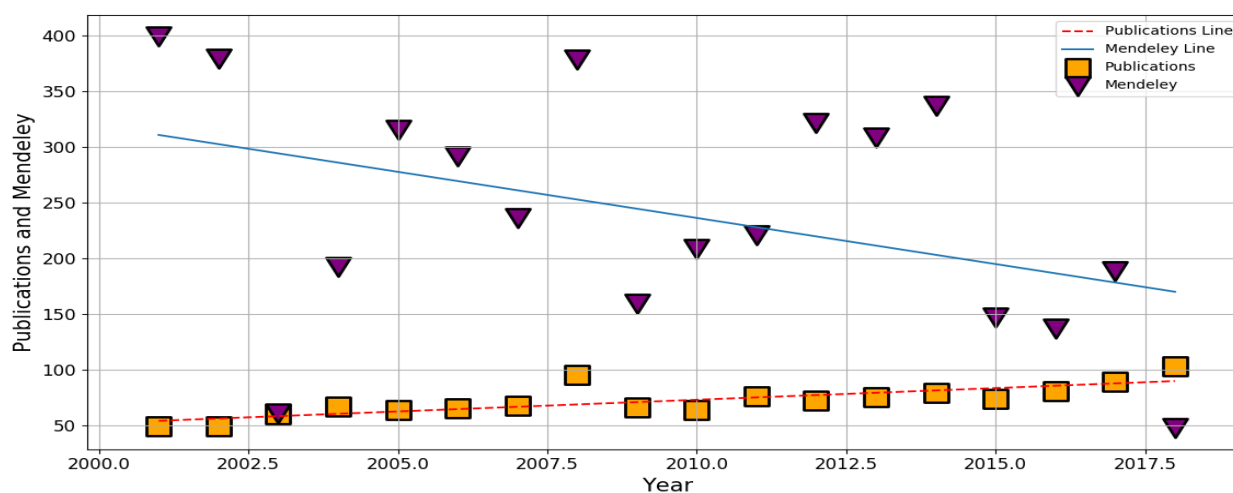
Source: the author

Regarding citations, Barros (2015 p. 02) emphasizes that “although they are useful for the evaluation of researchers and publications, citations reflect only a narrow segment of the spectrum of scientific impact [...].”

Zahedi, Costa and Wouter (2014) indicated in their studies that Mendeley is the altmetrics source that provides most of the alternative metrics, as it demonstrates a high level of visibility and attention measured by the community that uses this source, since over 60% of the Content that is available on Mendeley features reading metrics. The authors indicate that the tool has the best performance in measuring the visibility and attention of a scientific material under altmetrics parameters. Graph 3 shows the dispersion of data between Published Articles and Mendeley.

This diagram shows the dispersion between the publication number of the journal and the visibility indicators that Mendeley presented throughout the sample period, because the only years the data approached a linearity were: 2003, 2015, 2016 and 2018, the other years show negative linearity peaks, mainly in: 2001, 2002, 2005, 2006, 2008, 2012, 2013, 2014 and 2017, during this period Mendeley's visualization data stand out, much more than in periodic, this means that the texts had good visibility and readability.

Graph 3- dispersion between Published Articles x Mendeley



Source: the author

The studies by Erdt et al. (2016) indicate that Mendeley has a great coverage of altmetrics data, however, these data do not infer any relationship that Mendeley can leverage traditional citations, but the fact is that if the text is being viewed and read the chances for this material to be cited increase due to the high visibility index.

Silva Filho and Vanz (2018) collaborate with this view by emphasizing that social media helps to share and disseminate research, increasing the visibility capacity that this material will have. Moreover, they indicate that Mendeley proves to be a significant tool for scientific dissemination.

The analysis of the sample obtained from the REF, presented in table 1, indicates that the altmetrics data are representative and that the use of social and academic networks and media effectively contributes to the visibility of the scientific dissemination of the content produced by the analyzed journal.

5 Conclusions

The application of alternative metrics is also due to changes in scientific production and publication, from the high cost of scientific publication to open access, the restrictive visibility of publications in formal dissemination channels to informal web channels and social networks, and citation counting as the only indicator of the impact of a scientific production, ignoring the other uses of knowledge in electronic media.

This study identified that academic tools and social media present intriguing data about the uses made of scientific content and that altmetrics data, as for this sample, are 3,8 times larger than the traditional one. It was also apparent that the Mendeley tool, widely used by the journal, presented a high Pearson coefficient correlation index, indicating that the dispersion between publication and visibility by this tool is 1.9 times greater than any other.

The low use of other media such as Twitter, Facebook cannot be ignored, these elements may indicate the profile of readers of the journal and which the preference of access and use of the content offered by the journal is, here is a detailed mapping that enables to track where users are and who the potential influencers of this particular content are. This type of study helps to glimpse the uses and if they influence impact in any way, whether traditional or altmetric.

The coefficient analysis with all Altmetrics x Citation data showed low linearity, this issue is widely emphasized by Erdt et al. (2016), when they indicate that, although both indicators (altmetrics and citation) have a strong correlation, they follow different paths, while complementary, when one strengthens the other and present scenarios about scientific communication that was previously ignored by scientific society, serving as contributions for various purposes.

This is the relationship between negative and positive dispersion coefficients, it represents to the journal that traditional and altmetrics indicators are not aligned and that the peak of visibility and interaction in social and academic networks are higher than the traditional indicators of measurement. This is what altmetrics presents, how scientific publication performs on the internet, as well as its uses by indiscriminate subjects with access to the material.

Finally, survey studies need to be done in order to identify similarities, patterns or otherwise between indicators, formulas, methods or sample types to be researched and used for the purpose of dissemination and use of scientific publication and accessible to all.

Notes

(1) The calculations and diagram were made by Jean Carlo Gengnagel - Bachelor student in Scientific Mathematics at UFSC is GETMORE Brazil. email: jeangen00@gmail.com.

(2) See more at: http://www.scielo.br/scielo.php?script=sci_serial&pid=0104-026X&lng=en&nrm=iso

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See which texts in this journal are the most cited in <http://scholar.google.com.br/citations?user=PGYGy2IAAAAJ&hl=pt-BR>

Juliana Fachin is CAPES scholarship holder.

We are grateful to the National Council for Scientific and Technological Development - CNPq for aid to research (Process: 426777 / 2016-6).

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Received: 11/09/2019

Accepted: 15/10/2019

Fachin, Juliana; Araújo, Ronaldo Ferreira, and Blattmann, Ursula. Alternative and traditional indicators of the Brazilian Feminist Studies Journal. *Brazilian Journal of Information Science: Research trends*. vol. 14 no. 1 jan.-mar. 2020 pp. 112-129.