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Information reliability for academic research: review and recommendations

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Abstract

Purpose – The purpose of this paper is to provide to scientific researchers and academic students some subsidies related to information reliability that may be used during information search and retrieval for academic research based on the author's experience as a university librarian and interdisciplinary researcher.

Design/methodology/approach – The paper is composed of a brief conceptualization of the term information reliability, followed by a practical guide containing three processes for obtaining reliable information: knowledge of bibliometric indicators, evaluation of sources of information and analysis of the content of recovered publications.

Findings – Currently, there are few publications about information reliability that target the practical and effective learning of academic researchers and students, based on the experience of librarians who work directly with bibliographic search and training based on scientific literature.

Social implications – The great demand of questions submitted by academic users on how to obtain reliable information shows the need for a paper like this to clarify them.

Originality/value – This paper shares best practices for search and discovery of information reliability, which are based on experiences that are not commonly addressed in the literature, and presents processes covering the bibliometric indicators, information sources and publication contents.

Keywords Information sources, Research papers, Academic research, Bibliometric indicators, Information evaluate, Information reliability

Paper type General review

1. Introduction

Technological revolution brings democratic access to information (Barreto, 2008). However, the liberty that allows someone to freely access information is the same liberty that allows the selection of information that may cause confusion or misinformation (Arazy and Kopak, 2011). Information sharing has been transformed from the provision of expensive, rare information to that of excessive and indiscriminate information sharing, which are provided by technologies that develop in a geometrical progression (Mueller, 2000a; Wathen and Burkell, 2002). This situation requires profound and constant changes in the processes involved in the production and organization of information products and services, and particularly those changes that provide effective responses to complexity and volume (Mueller, 2000a).

As a consequence, academic researchers must be able to select information that is:

- suited to their objectives;
- credible and of high quality;



- appropriate and helps in meeting research development deadlines; and
- available in reasonable quantities.

For [Mai \(2013\)](#), the quality of information is coupled to its contextual meaning, with the establishment of a dialogue between the sender and the seeker. The evaluation of information must include a consideration of the intent and knowledge of the subject, contextual factors and seeker activities and interests. Thus, in every new search, the following attributes must be established to guarantee quality information: accuracy, authenticity, authority, balance, completeness, credibility, actuality, neutrality, relevance, reliability, objectivity, safeness, utility, usability and validity, among others ([Hilligoss and Rieh, 2008](#); [Mai, 2013](#)).

Many scholars agree that one of the main aspects of the evaluation of quality information is its credibility ([Hilligoss and Rieh, 2008](#); [Mai, 2013](#); [Wathen and Burkell, 2002](#)). Credibility has been defined in many ways, and it includes the use of criteria such as believability, reliability, accuracy and truthfulness, among others ([Kim, 2010](#); [Lim, 2013](#)). One of the key attributes of information quality and credibility is reliability. The goal of this paper is to review the ways in which reliability can best be used to evaluate publications in the academic process of information search and recovery. The research in this paper is based on the author's experience as a specialist librarian, responsible for training university students in access and online information use in several different areas of knowledge, and as an interdisciplinary researcher in bibliometrics and scientometrics, with a master's degree in Medical Informatics and a Doctorate in Psychology.

This paper consists of a set of articulated concepts that may help the development of information literacy, assisting academic and scientific users to obtain reliable information. The main topics covered include:

- the importance of information reliability;
- evaluation of the sources used to find information;
- reliability of sources;
- the use of bibliometric indicators to assess information; and
- the analysis of the contents of recovered publications.

Three processes are presented for obtaining reliable information:

- (1) knowing bibliometric indicators;
- (2) the evaluation of information sources; and
- (3) analyzing the contents of discovered publications.

2. Information reliability

According to [Pinto \(2010, pp. 86-87\)](#), information literacy:

[...] includes higher-order abilities such as: assessing search results regarding quality and relevance; evaluating the reliability, validity, authority, and timeliness of retrieved information; and applying new information to the planning and creation of scholarly and professional pursuits.

Therefore, it is important to teach users about information reliability.

The credibility of scientific and academic research information is an important quality factor (Mai, 2013), and it must be considered in undergraduate studies, teaching, research and especially in graduate studies (González, 2001; Smith, 2003). For Wathen and Burkell (2002), from Socratic writings onwards, there has been a preoccupation with message credibility, which was understood to be as a result of an interaction between the following characteristics: source (e.g. experience and credibility), message (e.g. plausibility, consistency and qualitative content) and receiver (e.g. culture and former beliefs). Many essays and dialogues in literature have discussed information credibility since the 1990s, though there is no general consensus on its exact meaning.

Based on the results of their experiments, Hilligoss and Rieh (2008; Mai, 2013) defined information credibility on three levels, depending on the context:

- (1) the construct level, which concerns how the user defines credibility, through criteria such as veracity, believability, trustworthiness, objectivity and reliability;
- (2) the heuristic level, which concerns general rules used for value judgment of information in diverse situations; and
- (3) the interaction level, referring to the judgment of credibility based on origin, content, clues and peripheral information.

Reliability is the key factor for credibility evaluation, which is defined as believability, trust, trustworthiness, accuracy, fairness and objectivity, among others (Hilligoss and Rieh, 2008; Metzger *et al.*, 2003). The reliability concept seems to be understood by many authors (Hilligoss and Rieh, 2008; Kim, 2010; Tomaél, 2000) as one of the criteria that is composed of quality and credibility. As such, the concept of reliability is the focus of this paper.

If information reliability depends on user evaluation (Hilligoss and Rieh, 2008; Mai, 2013), there is no way to guarantee that such information will be reliable outside its current context, especially when it is not utilized. However, there are indicators of information sources and publication contents that may help the researcher in the search and discovery processes. The indicators of scientific information reliability may include two elements:

- (1) the information sources that contain scientific publications; and
- (2) the content of each publication recovered.

An initial stage of bibliographic searching is the identification of those information sources that are found to be adequate publications for the research. Once the searching process is finalized, analysis and filtering of retrieved publications begin. In both of these stages, the reliability analysis is a criterion for the achievement of effective results, and the use of reliable sources during the search anticipates the quality of the publications retrieved.

Three processes are necessary to obtain reliable information:

- (1) comprehending and utilizing criteria to determine information quality – the bibliometric indicators;
- (2) carefully selecting and evaluating information sources to be searched; and
- (3) analyzing the publication contents before including them in the research.

These processes are detailed as follows.

3. Bibliometric indicators

The bibliometric indicators consist of the treatment and statistical analysis of sets of scientific publications, with the proposal to create production indicators that assist in management and decision-making in research (Mugnaini, 2006, p. 86; Silva and Bianchi, 2001). The first use of bibliometric indicators occurred in 1927 in the field of chemistry (Andrade and Jung, 2013). Based on Garfield's ideas (1955) and since the 1990s, citation indexes and their derivatives have been present in several databases.

For El-Maamiry and Ghauri (2013, p. 275), "the bibliometric indicator is a device based on bibliographic information used to measure and assess scientific intellectual activity of an individual, country and so on". Such an indicator allows the identification of research quality for new knowledge and discoveries, and they only have value if they are widespread in the scientific community through publication, the essential stage of the investigative process (Silva and Bianchi, 2001). Publication has an important role in scientific communication, allowing the diffusion and sharing of knowledge and experience, and it allows the recognition of the scientist's work and research (Galvão, 2010). In this context, bibliometric indicators attribute qualifiers to scientific publications based on use, attesting to their quality. The main bibliometric indicators include the impact factor, citation index, H index, Eigenfactor metrics, SCImago Journal Rank (SJR), as well as the bibliometric tools available on databases, such as Journal Citation Reports (JCR), Scopus and Google Scholar, among others. There are controversies related to the use of such indicators, but there is no denying their relevance as criteria for the evaluation of successful scientific research (Smith and Hazelton, 2011; Smith, 2012).

Costa *et al.* (2012) classify bibliometric indicators as follow:

- of scientific quality, based on the perception of the pairs (peer review) that evaluate publications by content;
- of scientific activity, which allows the identification of the author's productivity and the quantity and distribution of their published papers;
- of scientific impact, which measures the impact of the papers and the information resources; and
- of thematic association, such as citation analysis and reference analysis.

Next, a description of these types is presented.

3.1 Scientific quality indicators

The most commonly used scientific quality indicator is the peer review based on the assumption that the academic merit of a publication must be analyzed by members of the same community in an objective and, usually, anonymous manner. The reviewer does not normally work on the review for economic benefit, but for reasons such as the sense of allegiance to the scientific community, the exercising of academic authority, the enjoyment of a privileged access to debate and for reciprocity (Deslandes and Silva, 2013, p. 421). The process of peer review appears in several contexts, such as in the evaluation of a thesis by the examining board, in the process of paper submissions (Mueller, 2000b) and events (Mueller, 2000a) and in the approval of research projects by

funding agencies (FAPESP, 2014), among other contexts. The peer review process is an important reliability indicator of publications because it attests the quality of the content as evaluated by specialists.

3.2 Scientific activity indicators

Scientific activity indicators are indicative of the author's productivity to the number of published papers and to the distribution of references between papers and authors (Piro *et al.*, 2013; Yoshikane *et al.*, 2003). An author's productivity can be measured by assessing the paper's frequency, citation index or specific formulas. More and more sophisticated indexes have been developed to avoid the measuring of an author's productivity in a purely quantitative manner, because the fact that an author publishes frequently does not necessarily mean that their publications are of good quality. The citation index evaluates the quality of an author's paper, because the more often their publications are cited by others, the greater their impact and influence in that research field. The impact and influence of the author may then be considered as a possible reliability indicator.

A particularly important tool x , which is defined as the highest number of scientific articles that a researcher has at least the same number of citations in, or the largest number that coincides with the total number of, published articles. In other words, the H Index is an equalizer of the maximum number of cited articles to the value of published articles (Marques, 2013). This can be used as a reliability indicator.

3.3 Scientific impact indicators

A scientific impact indicator measures the influence of periodicals, authors and publications, with received citations acting as the basis for measurement. The best-known impact indicators in the scientific community are those contained in the JCR and Scopus databases. JCR works with an impact factor, which is calculated through a formula comparing the number of citations of a periodical over the total number of articles published in that periodical during a one-year time frame. The impact factor may be used either for periodicals or for authors (Garfield, 2006). The JCR data are derived from the Web of Science database. There are other indicators in JCR, such as the immediacy index and the Eigenfactor.

The Scopus database works with Source Normalized Impact per Paper (SNIP) and SJR. SNIP measures the impact of contextual citations, i.e. reviewing citations based on the total number of citations in a field (Elsevier, 2012a). SJR measures a journal's prestige based on the idea that the research field as well as the quality and reputation of a journal have a direct effect on the value of the citation (Elsevier, 2012b). These indicators may be used as reliability factors for periodicals, for the more the journal's articles are cited and measured by these indexes, the greater the acceptance of a journal by the scientific community.

3.4 Thematic association indicators

Thematic association indicators include studies carried out by citation analysis, reference analysis and other bibliometric and scientometric techniques. They are used as a way to analyze the set of publications within a given research field. Several scientific articles in journals such as the *Journal of Infometrics and Scientometrics* present this type of study, which may also be used as a reliability indicator. The classification model of bibliometric indicators proposed by Costa *et al.* (2012) provides a

good sense of their usefulness. However, these indicators do not exhaust the possibilities of analysis of scientific production. There are other models for classifying bibliometric indicators (El-Maamiry and Ghauri, 2013; Okubo, 1997), as well as other initiatives to produce indicators of scientific impact that seek to overcome the limitations of, and which complement the results obtained from, bibliometrics. Among these models is altimetry, which is defined as an alternative metric for measuring the impact of scientific research, including other sources of information beyond scientific articles such as downloads, view counts, Web citations, link analyses, references used by managers and social networks (Zahedi *et al.*, 2014).

This section aimed to list and describe the different types of bibliometric indicators that are considered as ways of determining information quality and which may offer evidence of scientific publications reliability. Once these indicators are understood, it is possible to discuss the process of evaluation and careful selection of information sources.

4. Reliability of the information sources

An information source may be any sort of resource that contains useful information. For Hjørland (2012, p. 258), “a source is not in itself good or bad, but just more or less fruitful or relevant in relation to a given question”. However, the evaluation of sources has been an arduous task in the past decades, becoming one of the main focuses in information science because “information specialists should consider themselves as a kind of consumer adviser, who provides guidance to information sources users” (Hjørland, 2012, p. 258). Tomaél (2000) conducted a pilot project about information resources on the internet and defined the criterion for the evaluation of such sources’ information reliability by referring to the producer’s responsibility, because producers are recognized as an authority on the subject.

Based on empirical studies, Rieh (2002) stated that the characteristics of resources are important criteria for evaluative and predictive judgments made by the user regarding information quality and are also important to what Wilson (1983) defined as cognitive authority, which refers to influences recognizable to a user as proper because the information is regarded as credible and believable. After all, users tend to rely on their previous knowledge of structure, functions and source content. In a survey regarding the use of academic information, it was revealed that one of the main problems for over 10 per cent of the interviewees was the quality, credibility or veracity of the sources (Marcum and George, 2005). These studies showed the growth of the importance of information source evaluation, especially in the academic environment.

Academic sources have their specific processes, as research goes through rigorous procedures, from the definition of a problem to finalizing the production and dissemination of the results. This rigor is reflected in the publications and sources of information that store them through a minimum set of reliability indicators. These indicators attest to source consistency; therefore, the publications can be considered reliable. In the academic context, we can consider the following source types that offer a degree of reliability:

- research institutes and university libraries;
- scientific portals; and
- databases and search mechanisms specializing in scientific publications.

4.1 University and research institute libraries

In research institutes and university libraries, we can find essential information products and services related to the progress of scientific or academic research. Such examples include publications acquisition policies applied to research, access to portals and databases, bibliographic searches and bibliographic exchanges. These resources assist researchers in the search for quality, reliable information.

4.2 Reference sources

To develop efficient information search strategies to construct good literature reviews, researchers can use reference books, such as dictionaries, encyclopedias and thesauri. These can be used to broaden comprehension from a single term to a more extensive subject. However, these are secondary sources; thus, they must be avoided as citation sources in papers because papers require primary sources such as articles and theses that present the results of original research.

The most relevant reliability factor for a reference source is its collective authority, which comes as a result of development and compilation by renowned institutions. There are many universities and institutes that publish dictionaries found in their libraries, and they also offer free online access to encyclopedias such as the Britannica and Oxford encyclopedias. The best-known example on the Web is Wikipedia, which, despite its questioned reliability, has proven its *modus operandi*: it is a multi-lingual encyclopedia collaboration, which may be written by anyone in a voluntary manner (Wikimedia Foundation, 2014). However, this voluntary publication characteristic can be an obstacle to its reliability. Empirical studies on Wikipedia's credibility (Chesney, 2006; Garfinkel, 2008) present arguments regarding the characteristics of verifiability and correction of contents, impartiality and shared points of view, among other issues. Thus, Wikipedia may be used for a broad understanding of a theme, serving as a general reference, but researchers must then consult the original sources cited.

4.3 Scientific literature databases and portals

Many editors have created mechanisms for the publication and diffusion of scientific literature online. Based on these mechanisms, scientific literature databases and portals have emerged, aiming to gather and evaluate the scientific collection of texts, sounds and images, both static and dynamic. These online databases follow the progress of science and technology with the immediate publication of diverse documents; to name a few, the Web of Science, Scopus, ScienceDirect and Cambridge Journals. There currently exists a movement for the free access of scientific information, and thus, a new series of these databases have been emerging, such as PubMed Central, Scientific Electronic Library Online and others.

Although there are innumerable online databases, the fact that a database is defined by its editor as scientific does not ensure its reliability. The databases' contents must be carefully analyzed because many of them present a profusion of contents without acceptance policies. Further, many databases present publications that are repeated in others. Therefore, the reliability will be more guaranteed when these are indexing databases that present acceptance criteria and that provide bibliometric indexes. Indexing databases are portals or platforms that evaluate publications utilizing rigorous criteria. These criteria may consist of: inclusion in international indexes, peer reviews, heterogeneous editorial boards, regular periodicity and a minimum time of

existence, to name but a few examples. Thus, a publication contained in portals gains positive reliability points.

4.4 Scientific publications evaluation systems

Currently, independent scientific publication database evaluation online systems are emerging. They are simple to consult for researchers who wish to evaluate the quality of a given periodical to be used in their academic papers. Examples of these systems include Eigenfactor, an initiative of [Washington University \(2012\)](#), Qualis (CAPES, 2009), a Brazilian government initiative, and Google Scholar ([Google, 2013](#)), a commercial initiative aimed at supplying free access to scientific content. These can be considered as reliability factors.

After analysis and careful selection of sources, the researcher may proceed to the search and discovery of publications in these sources. With a set of publications identified and selected, the third process or stage of research begins. This stage involves the critical analysis of the publication's contents before including it as a citation and reference source.

5. Reliability of the content of the scientific publication

Scientific publications are usually produced with some specific goals within the scope of the field in which they have been developed. They are typically produced according to a standard structure, which contributes to a standard evaluation. Consequently, these structures contribute to the quality and reliability analysis of these publications.

For [Adler et al. \(2009\)](#), an exclusive reliance on citation data may provide an incomplete and superficial comprehension of the research, only valid when reinforced by other judgments, because numbers are not superior to legitimate judgment. Thus, it is essential that researchers accurately judge the publication contents. The publication's reliability is linked with its attributes and contents. The attributes refer to metadata or peripheral elements of the publication (authorship, abstract, date, etc.), while the contents refer to the consistence and validity of the intellectual knowledge contained in the publication, which involves projects, goals, literature review, methodology, techniques, results and conclusions. The studies by [Rieh \(2002\)](#) and [Lim \(2013\)](#) indicate that users evaluate information based on publication characteristics, such as contents, attributes and presentation.

To evaluate publication attributes, the researcher may use several criteria, which are detailed as follows: authorship, institutional support, publishing, use of norms and standard instruments, analysis of the citations and reference use by the authors.

5.1 Authorship

Information is trustworthy when it seems to be reliable, unbiased and fair, and this involves the evaluation of the expertise of its producer, who must make an effort for his/her message to be understood ([Wathen and Burkell, 2002](#)). However, judging credibility by the people involved in production of research is subjective and implicit because they need to be able to recognize the producer experience ([Hilligoss and Rieh, 2008](#), p. 1468). The recognition of information producers is related to the concept of cognitive authorities, or those who can influence others by being recognized as proper, considered as credible and worthy of belief ([Hilligoss and Rieh, 2008](#); [Wilson, 1983](#)).

The verification of information provided by the producers must be done in the publication itself. In general, scientific books carry some presentation about their

authors, and articles also present the institutional allegiance of their authors. Information analysis related to the author may be a reliability indicator of the publication. It is possible to evaluate the author's institution, the quantity of publications, how long the author has been developing research in a particular thematic area and so forth. These analyses may be made available through the institutional Web site and on the databases that contain the author's publications.

5.2 Institutional support

Many scientific publications are developed within teaching and research institutions (Mueller, 2000a). Identifying partnerships in production can be a reliability factor because they go through a series of evaluation criteria established by institutions before being published. These include, for example, a thesis that is the source of scientific articles or a project that has been financed by an agency.

5.3 Publishing

Knowing the scientific publishers or the institutes that organize and publish academic works is also a positive reliability factor. Many publications are released only where strict criteria are adhered to by scientific publishers, teaching, researching and renowned extension institutes, in addition to development agencies that are popular in specific research fields. In such a way, publications score points on reliability.

5.4 Use of standards and standardization tools

There are some norms aimed at the activities of research and practice in science and technology that may act as reliability indicators, representing gains on research and on the production of goods and services (Allen and Sriram, 2000; Mattli and Bütke, 2003). For instance, in fields such as ecology, agronomy and engineering, in general, the usage of norms is highly recommended (Corbitt, 1990).

Many knowledge fields develop and validate information and dissemination instruments, such as scales and inventories, which become standards for use in research and applications (Streiner, 2013). The validated instruments offer a greater assurance of effective results. Therefore, research that uses such instruments could present guarantees regarding the quality of the methods used, and may be considered as reliability indicators.

5.5 Use of citations and references

Conscious researchers try to focus their work on previous literature according to the subject (Galvão, 2010; Vanz and Caregnato, 2003). With time, they may either confirm or refute their hypothesis based on publications from their predecessors, creating a scientific dialogue with upcoming future publications. This shows that the researchers have knowledge on the particular theme of their publication, and further proves that they may follow-up on papers without repeating already completed research, and they will not plagiarize works that preceded their own. Thus, the analysis of how many and which particular citations are present in a publication may give the researchers a good lead concerning reliability. However, there is no magic number that indicates how many citations of a paper must exist, because the number varies according to a wide range of factors. Further, there is no absolute set of criteria that guarantees the quality of the citations.

A study conducted by [Pendlebury \(1991\)](#) and analyzed by [Hamilton \(1991\)](#) showed great quantities of un-cited scientific articles in several areas. The habits and dynamics of citations differ across the areas and fields of knowledge ([Cameron, 2005](#); [Krell, 2002](#)). There are differences in the types of works cited by different academic groups ([Bollen et al., 2006](#)). Further, researchers have complex motives for citing, such as defending their arguments against attacks, defending their interests, persuading the reader and obtaining a position of prominence in the scientific community ([Bornmann and Daniel, 2008](#)). This is a factor of complication related to the quantitative and qualitative analysis of citations.

Despite such difficulties, there are favorable factors involved in the usage of citations and references in a publication that may be used by researchers as criteria. These factors include giving credit to previous publications; honoring the pioneers; sustaining arguments, basing concepts and theories; identifying or validating methods, techniques and equipments; exchanging information with other researchers; validating data and facts; analyzing, evaluating, or contesting previous works; and attesting results and conclusions ([Vanz and Caregnato, 2003](#); [Weinstock, 1971](#)). When a publication presents citations and references to these ends, it scores points on quality and reliability.

5.6 Analysis of the publication contents

After researchers have analyzed the elements that surround a publication, they can explore more deeply on the intrinsic analysis of a document. The structure and the content of the publication demand a careful reading and a critical observation. After that, researchers may focus on the analysis of the abstract and on the techniques of analysis of the research content.

The abstract presents a synthetic overview of the publication, which allows the researcher to conduct a critical analysis of its content. According to the norm Z39.14/1997 ([NISO, 1997](#)), a well-prepared summary enables the reader to quickly identify the basic contents of a document, determine its relevance and decide if it is necessary to read the full text. A well-structured abstract might be a reliability indicator, showing the seriousness of the research and the commitment of its authors in sharing their work with the scientific community. An obscure and confusing abstract may reflect a lack of peer review or a biased revision.

Researchers will only read the full text if it is related to the scope of their research. Even so, it is necessary that the researcher takes a critical look at what he or she is reading and knows well how to judge the quality and reliability of the research. For [Hernon and Schwartz \(2009\)](#), the information reliability is linked to processes of quantitative or qualitative research, be it in the project stage or in the methodology stage.

To evaluate reliability, it is possible to analyze, for example, whether or not the amount of data used is sufficient to produce consistent results, if the criteria for inclusion and exclusion of the sample are coherent with the goals and results produced and if the usage of control groups and placebo effect for comparison with effectively tested groups is valid. Each area presents its own methods to assure the reliability of the research; thus, it is indispensable that the researcher becomes aware of these and utilizes them to analyze publications.

Qualitative research focuses on elements of credibility, transferability, reliability and conformability. Credibility implicates the internal validity of the research or the efficacy

of the method, techniques and instruments. Transferability refers to external validity or to the ability of generalization of the research, meaning that the research could be reproduced in other contexts, scenarios or experiments. Reliability refers to the consistency and reproduction of the data. Finally, conformity refers to the objectivity of the observer during the research (Hernon and Schwartz, 2009).

The validity of the research is also an important criterion in providing credibility for a publication. External validity refers to the ability to generalize the research or the application of its research in other contexts (Nordenstrom, 2008). Internal validity is related to the effectiveness of the method, techniques, instruments and constructs used in the research for achieving results and for considering diverse factors, conditions and intervenient variables (Hernon and Schwartz, 2009). If the internal validity and reliability of the data are limited, the possibility of reproduction and generalization of the research is also limited.

Studies carried out by researchers and professional groups tend to be more consistent, offering stronger evidence than those produced by isolated researchers or professionals, and experimental studies tend to be more effective than observational studies (Nordenstrom, 2008). When a study is neither experimental nor observational, it could also have value, but must be carefully analyzed with a particular consideration of the border between philosophy and science, between pure opinion and empirical proof, between *dosha* (common sense) and *episteme* (wisdom).

6. Recommendations

Summarizing the contents of this article, we present some recommendations for research and the retrieval of reliable information in the academic context:

- (1) Careful evaluation and selection of the information resources that will be searched, such as through the use of university and research institute libraries, portals and indexing databases of scientific publications and specialized search engines in scientific publications.
- (2) Use of bibliometric indicators as criteria for determining the quality of information in science and technology through features such as impact factors, citation indexes, the H index, Eigenfactor metrics and SJR and through bibliometric tools available in databases that enable the evaluation of authors, journals, events and so on.
- (3) Analyzing the publication itself before including it in an academic paper, evaluating:
 - authorship of the item;
 - institutional support received by agencies or research institutes, etc.;
 - the publisher that produced the item;
 - use of instruments or standards to guide the publication; and
 - use of quotations and references.
- (4) Analyzing the contents of the publication by:
 - identifying the scope of work and reading the abstract;
 - evaluation of the reliability of the methods and techniques used by the research;

- assessment of the consistency of the data used in the research;
- evaluation of the credibility (internal validity of research);
- transferability (external validity and generalizability of the research);
- reliability (consistency and reproducibility of the data); and
- conformability (objectivity of the researcher).

7. Final considerations

This article intended to present recommendations to assist researchers in the search, selection and use of reliable sources of information for academic and scientific purposes. These include knowledge and use of bibliometric indicators, analysis and selection of information sources and evaluating the content of the publications. Through these recommendations, it is hoped that researchers can obtain reliable information to develop their research and academic articles.

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