THE USE OF EPISTEMOLOGISTS IN ARTICLES INDEXED BY THE SCIELO DATABASE

O USO DE EPISTEMÓLOGOS EM ARTIGOS INDEXADOS PELA BASE SCIELO

EL USO DE EPISTEMÓLOGOS EN ARTÍCULOS INDEXADOS POR LA BASE DE DATOS SCIELO

https://doi.org/10.56238/sevened2025.029-014

Guilherme Kunde Braunstein[1] and Maria Eduarda Camargo Vanin[2]

ABSTRACT

Reading different epistemologists reveals the lack of a single way of doing science, while a search of the literature in the field indicates that there is not always a strong link between the field of formation of epistemologists and the fields that use them, making science itself a system in constant construction. Given this context, this article initially seeks to contextualize the importance of understanding the processes of science construction itself in order to view it more critically. Secondly, through bibliometric research in the SciELO database combined with a content analysis methodology, it seeks to identify the uses given to the models of different epistemologists both within and outside their fields, as well as the journals, languages, years, and focus for which each of them has been most used. In conclusion, it is concluded that some philosophers of science end up receiving more attention even outside the fields for which their models were developed. It also highlights the importance of the SciELO database in offering accessible texts on the topic and the existence of a rigidity in these fields in engaging with less conventional epistemological views.

Keywords: Epistemology. Bibliometric Analysis. Philosophy of Science. Content Analysis.

RESUMO

A leitura de diferentes epistemólogos revela a inexistência de uma única forma de fazer ciência, enquanto que uma busca na literatura da área indica que nem sempre há um vínculo forte entre o campo de formação dos epistemólogos e as áreas que fazem uso deles, fazendo da própria ciência um sistema em constante construção. diante esse contexto o presente artigo busca inicialmente contextualizar a importância de se conhecer os próprios processos de construção da ciência para vê-la de modo mais crítico. Já em um segundo momento busca, por meio de uma pesquisa bibliométrica junto a base de dados SciELO associada a uma metodologia de análise de conteúdo, identificar os usos que estão sendo dados aos modelos de diferentes epistemólogos tanto dentro quanto fora das suas áreas, bem como os periódicos, idiomas, anos e enfoque para os quais cada um deles tem sido mais utilizado. Ao final conclui-se que alguns dos filósofos da ciência acabam por receber mais destaque mesmo fora das áreas para as quais seus modelos foram desenvolvidos, destaca-se também a importância da base SciELO na oferta de textos acessíveis sobre o

[1]Doctor of Science Education. State University of Rio Grande do Sul (UFRGS).
E-mail: guilherme-braunstein@uergs.edu.br
ORCID: https://orcid.org/0000-0002-1210-104X
[2]Undergraduate student in Agronomy. State University of Rio Grande do Sul (UFRGS).
E-mail: mari-vanin@uergs.edu.br

tema e a existência de um engessamento das áreas em dialogar com visões epistemológicas menos convencionais.

Palavras-chave: Epistemologia. Análise Bibliométrica. Filosofia da Ciência. Análise de Conteúdo.

RESUMEN

La lectura de diferentes epistemólogos revela la falta de una única manera de hacer ciencia, mientras que una búsqueda en la literatura en el área indica que no siempre existe un vínculo fuerte entre el campo de formación de los epistemólogos y las áreas que hacen uso de ellos, haciendo de la ciencia misma un sistema en constante construcción. En este contexto, este artículo busca inicialmente contextualizar la importancia de conocer los procesos de construcción de la ciencia misma para poder mirarla más críticamente. En un segundo paso, se busca, a través de una investigación bibliométrica en la base de datos SciELO asociada a una metodología de análisis de contenido, identificar los usos que se están dando a los modelos de diferentes epistemólogos tanto dentro como fuera de sus campos, así como las revistas, idiomas, años y enfoques en los que cada uno de ellos ha sido más utilizado. Al final, se concluye que algunos de los filósofos de la ciencia terminan recibiendo más protagonismo incluso fuera de las áreas para las que fueron desarrollados sus modelos. Se destaca también la importancia de la base de datos SciELO al ofrecer textos accesibles sobre el tema y la existencia de una rigidez de las áreas al dialogar con visiones epistemológicas menos convencionales.

Palabras clave: Epistemología. Análisis Bibliométrico. Filosofía de la Ciencia. Análisis de Contenido.

1 INTRODUCTION

By differentiating the concepts of "epistemology" and "theory of knowledge", the scientist and epistemologist Rolando Garcia clarifies when referring to the former that "the term is introduced in French to designate the critical study of the sciences, aimed at determining their value, their logical foundation and their field of action" (García, 2002, p. 15). In this way, epistemology seeks to understand the ways in which science itself develops within a field. Expanding this conception, Piaget states that "epistemological reflection arises more and more within the sciences" (1967, p. 51), qualifying this as a "new fact, and of incalculable consequences for the future" (1967, p. 51). As simple as the idea that it is up to each area to develop its own epistemology may seem (Le Moigne, 1995), this proposal faces important challenges, as it opposes the belief, sometimes current within academia, that "Honest scientific research produces identical results everywhere" (Lorenz, 1969). This is because it is possible to arrive at very different results by being honest, but using different references, and the history of science is rich in demonstrations of this, ranging from the phrenology of Cesare Lombroso, to the attempts of relating intelligence with races or sex in John Down and Paul Broca (Gould, 1999).

By deepening the reading of different epistemologists, explanations are found that justify the position of Piaget and Le Moigne, that it is up to each area to construct its epistemology, especially Kuhn (2006; 1982) and Feyerabend (2010, 2011b) dealing with the problem of incommensurability and indicating the tendency of researchers from different areas to attribute different meanings to the same terms. It is relevant at this point to highlight that the implications of incommensurability can be very different depending on the complexity of the systems and fields to be compared, for example, while for many areas the term "evolution" brings an idea of improvements, for evolutionary biology it refers merely to the unfolding of changes (Gould, 1992). When leaving the field of biology and entering the social sciences, the differences in meaning are usually even greater, just by checking the meaning attributed to the terms "capitalism" and "socialism" depending on the group that describes them.

In view of the particularities of each area, it would not be expected that a single epistemological model would be able to explain exactly the way in which each of the different areas of science carries out its investigations, but rather that each epistemological system would arouse greater or lesser affinity to those dependent on who uses it and what are the objects to be analyzed. Such an observation is important especially as a reader becomes familiar with the rhetorical structure of the main works of epistemologists, which are generally based on criticisms of competing systems, something well illustrated in the explanation that

Paul Feyerabend offers for the purposes behind the writing of his main work: "it was up to me to attack the rationalist position; Lakatos, in turn, would reformulate this position, to defend it and, in passing, reduce my arguments to nothing" (1977, p. 7). One can observe in Feyerabend's writing both the intention of his work to "attack the current epistemological position", and the naturalness with which he intended that his friend and researcher Imre Lakatos would later "reduce to nothing" his own arguments.

The awareness that science is a system under constant construction and that epistemological models often select in history exactly the reports and discoveries that justify it, while ignoring the existence of those that would contradict them (Feyerabend, 2010; Lakatos, 1978), is precisely what leads authors such as Ernst Mayr (2005, p. 29) to indicate their inapplicability to the biological sciences due to the fact that "some of the basic principles of the physical sciences are simply not applicable to biology".

In this context and with the purpose of identifying the existence of alignments between different scientific areas with epistemological models in particular, this article proposes, through the use of a bibliometric approach, to analyze in publicly accessible articles which journals throughout the historical series from 1979 to 2024 have given space to articles that take as a basis some of the main epistemologists of the twentieth century to carry out their discussions. In addition, through a content analysis approach, the applications to which such epistemologists are being directed were investigated.

2 IMPORTANCE OF EPISTEMOLOGY IN UNDERSTANDING THE SCIENCES

Thinking about the process of conducting research, the existence of an epistemological model to be followed can assume different functions. In this sense, considering that the emergence of science was "a broad reaction against pseudosciences, anti-sciences, subjective philosophies and against theological authoritarianism" (Simpson, 1974, p. 13) The search for an epistemological model could, in the first place, offer clear criteria for demarcating what can or cannot be considered scientific. On this point, Popper deserves to be highlighted when he proposes that everything that cannot be subjected to tests that seek to prove the falsity of statements cannot be considered scientific (Popper, 2013a). It happens, however, that it would not always be possible to find clear criteria for demarcation, since even Kuhn (2011, p. 290) casts doubt on its existence when he states that "if there is a criterion for demarcation (I believe that we should not look for one that is very clear or definitive), it may be precisely in the part of science that Sir Karl ignored", referring to solving riddles. Even more forceful is Laudan (1983) when he considers that there are no major differences between scientific and non-scientific knowledge.

Still on the subject of demarcation, as much as Kuhn, Laudan and other authors question it, this does not mean that they do not bring important elements to be taken into account when characterizing scientific practice. Starting with Kuhn, he characterizes the insertion of researchers in scientific paradigms as a process done through familiarization with textbooks and teachers' positions (1982, p. 111), as well as through experience in exemplary practices (2006, p. 224). Laudan (2011, p. 132) brings the notion of main audience, which is a group of people who, because they share the same beliefs, accept without prior questioning statements that fit into the respective research tradition. Thus, as much as it may be considered that for some fields of research the boundaries between scientific and non-scientific methods may be tenuous to the point that Feyerabend (2013, p. 13) states: "when I speak of theories, I also include myths, political ideas and religious systems", the discussions made by epistemologists continue to play an important role in understanding the functioning of different scientific fields.

Regarding the help offered by epistemological systems for the concomitant understanding of different areas, Larry Laudan (2011) offers a good starting point by proposing, as scientists' search for troubleshooting. According to the author (Laudan, 2011), to the extent that research traditions are able to solve problems, they end up bringing credit to themselves and generating anomalies for rival traditions. Throughout this process, in turn, researchers jointly use a series of theories that may or may not be compatible. In addition, for Laudan, in the face of the confrontation between traditions, there would essentially be two ways of making a rational choice, namely: the search for the general progressivity of tradition (a reflection of how many relevant problems are solved by it) or by the rate of progressivity (an indication of how many relevant problems were solved by tradition in a shorter period of time).

Other important contributions of Laudan (2011) are to take into account the existence of conceptual problems and to consider the existence of pre-analytical intuitions inherent to a main audience. As for conceptual problems, Laudan refers to the possibility that some theories disagree with others internal or external to the tradition (Laudan, 2011). Within this framework, external conceptual problems would be of less relevance, while the existence of internal theories that contradict each other would be more relevant.

As illustrative examples of conceptual problems, we could cite, in the case of internal problems, a situation in which it is claimed that hydroelectric energy is a clean source, while at the same time one is forced to recognize the enormous environmental data that its implementation requires. An example of an external conceptual problem can arise when it is verified that the indications of motivators of aggressiveness, proposed by Konrad Lorenz

(1969) based on animal models, at times do not fit well with the predictions of the death drive of Sigmund Freud's psychoanalysis. What happens in this second case is that, due to the distance between the areas, most of the time the contradictions do not bring visible damage.

Still on the issue of conceptual problems, its relevance becomes evident through other epistemologists, such as Paul Feyerabend, who illustrates the influence that political and economic issues can have on the direction of research (2011a). Yet another illustrative point on the issue can come from the analysis of criticisms that Laudan (2011) directs to incommensurability in Kuhn. This example is illustrative both for demonstrating what incommensurability is in Kuhn, and the damage that conceptual problems can generate. To begin this elucidation, one can start from the criticism formulated by Laudan in 1978 according to which for Kuhn "to accept a theory is to accept an almost private language, which someone who does not share it does not understand or comprehend" (Laudan, 2011, p. 198) in which "theories cannot be compared and rationally evaluated, because such a comparison would require a common language" (Laudan, 2011, p. 198). It so happens that such criticism completely loses its object when Kuhn (2006, p. 233) explains that "by applying the term 'incommensurability' to theories, I only intended to maintain that there was no common language in which these theories could be fully expressed and that would therefore lend themselves to a point-by-point comparison between them", thus not meaning the impossibility of making other types of comparison. In doing so, Kuhn manages both to illustrate the concept of incommensurability, to the extent that he and Laudan understand the same term in a very different way, when he demonstrates that this difference in interpretation can be a challenge for the concomitant use of two epistemological references depending on the object to be analyzed In this specific case, indicating the impossibility of working with Kuhn's original concept of incommensurability within a system that organize based on Laudan's conceptions.

With respect now to pre-analytical intuitions (PIs), for Laudan this is a concept that is linked to the existence of a main audience which accepts a set of knowledge pertinent to an area without further questioning, with PIs being the set of beliefs of rationality assumed from a given time (Laudan, 2011, p. 224), in such a way that "the degree of adequacy of any theory of scientific appreciation is proportional to the number of IPs to which it can do justice" (Laudan, 2011, p. 226). Within this context, the expectation is that each area can have its own set of IPs, which lead its practitioners to accept certain approaches without question while rejecting others. Since the process by which such appropriation occurs (if we consider PIs as part of a disciplinary matrix) is described in greater detail by Kuhn, when dealing with the role of exemplary practices, reading manuals and learning from teachers in the insertion

in a disciplinary matrix (Kuhn, 1982), the same is true for the construction of specific journals for the consolidation of an area.

Regarding the consolidation of the lines of research, as already indicated, a first element that helps them is the very existence of specific journals that serve as a space for sharing and evaluating existing proposals in an area. However, there are other factors that are equally important, but that may be more subjective. What happens is that when studying and researching within an area, it is possible to be inserted in a system that feeds back into which, as proposed by Kuhn's (1982) normal science, only what is published in journals in an area is accepted as scientific, but in which it is only accepted to publish what is within the expectations of results and within the scope of the journal itself. Allied to this condition, Bunge (1980) points out that not all countries have the same possibility of having their research of interest carried out or even accepted, a point with which Feyerabend (2011b, 2011a) agrees when he indicates the tendency for academia to sometimes be directed more by political and financial interests than by scientific demands.

Returning to the benefits offered by an epistemological system, Kuhn (1982), when dealing with the concept of normal science, indicates its function of determining what can or cannot be accepted within an area, leading researchers both to accept certain practices without questioning, and to reject others. A similar indication is made by Lakatos (1978), when he states that research programs offer both a positive heuristic with the indication of methodological paths to be followed during the investigation processes, and a negative heuristic that indicates what their fundamental and unquestionable concepts are. Finally, Laudan attributes to research traditions a role similar in nature (even if weaker in intensity) to that of Lakatos' positive heuristic, considering that "a research tradition, at best, specifies an ontology *general* About nature and a method *general* to solve natural problems in a given area" (Laudan, 2011, p. 120) (original italics).

Having presented some of the benefits offered for conducting research when adopting an epistemological system, one should not, however, believe that a particular area should have greater or lesser affinity for any of the specific systems, that the explanation for any event is exclusive to any of them, and that there is not even the possibility of adopting more than one system at the same time. Thus, the epistemological framework to be adopted preferentially may be something that varies from one area to another. In other words, the fact that a system, such as Kuhn's, for example, seems better suited to physics while Mayr's seems more suited to biology, does not mean at all that for practitioners in each area this preference will always be perceived, and it is easy to find works in which such constraints are

roken (Gorski, 2004; Nichols; Kendall; Boomer, 2019; Weinert, 2000). Despite this, it is possible to investigate trends in the use of each epistemologist.

Another fundamental point linked to epistemological knowledge concerns the construction of expectations directed to the realization of science in a free society. In this sense, Bunge (1980, p. 45) points out that "*Every science needs direct international collaboration to develop*", indicating, however, that (1980, p. 44) "this dependence usually leads them to neglect the links between researchers and local, national and regional scientific centers". In a similar vein, Feyerabend (2011a, p. 167) argues that the construction of a free society involves strengthening local discussions rather than questioning specialists who "have capital invested in their own playpens (...) [and] almost never examine the alternatives that may arise in the discussion with the care they presume is necessary when a problem, in their own area, is at stake." Within this context, conducting research that does not consider the particularities of each area and culture can easily lead to conclusions of little local value or difficult to apply (Descola, 2016), as well as to the strengthening of systems that do not make room for any type of individual choice (Popper, 2012).

3 DATABASE CHARACTERIZATION

Considering the purpose of verifying the existence of trends in the adoption of epistemological lines in articles, it is relevant to establish criteria for choosing the databases to be consulted, such as the objectives of the databases, scope, time interval, audience with the possibility of access to them and accessibility of the language of dissemination of the articles. Starting with the criteria of objectives and focus of the bases, it is possible to draw a fundamental difference between the bases in terms of source of funding, while bases such as Scopus (Elsevier, 2025) and Web of Science (WoS) (Clarivate, 2025) have private funding, respectively from the publisher Elsevier and the company Clarivate, other databases such as SciELO (SciELO, 2025) and PubMed (PubMed, 2025), rely on sources of public funding. Linked to this, there was a greater concern in the first two with the establishment of measures of productivity and return on their publications, which translate into impact factor metrics (Ruiz; Greco; Braile, 2009).

The consideration of the source of funding for the databases has direct implications for their potential users, because while the Scopus and WoS databases require the expenditure of financial resources or proof of institutional ties to offer full access to their contents, the other two offer free access. A direct consequence of this differentiation is reflected in the status that ends up being given to published themes, which are differentiated by Almeida and Grácio (2019), when they indicate the existence of a science *mainstrean*,

production linked to large bases, and a peripheral science, linked to smaller and local bases. What happens in the case of these two types of dissemination, however, is that at the local level the applicability of the studies of the so-called peripheral science can be easier to execute and contextualize.

In view of this situation and in view of the challenge of verifying the existence of preferential epistemological lines followed by articles that reach potential readers in Brazil, it was decided to adopt the SciELO database, to the detriment of the others. Its choice over Scopus and the Web of Science was due to the fact that SciELO is an open access database, which does not have institutional link requirements in order to make the items in its repository available (SciELO, 2025). In relation to PubMed, the focus of the latter is on the medical sciences, which would restrict the results to be found. Thus, even though the database is not institutionally used as a reference for measuring the level of impact of authors, institutions or articles in global terms, as is the case with indicators linked to the Scopus and Web of Science platforms (Avena; Barbosa, 2017), it allows for some more accurate evaluations locally because it does not present some of the restrictive limitations observed in the other platforms mentioned.

As for the advantages in terms of fidelity to reality that can be attributed to the SciELO database, it can be mentioned that as much as the Scopus and Web of Science platforms with their evaluation indexes actually measure the impact of authors, journals and articles, such measurements are restricted only to the impact of publications on those that comply with a series of requirements. such as having an institutional link that allows them access to the databases, having mastery of the language used predominantly by them and having their own publications made available in the journals indexed by the platforms themselves. Thus, it can be said that these are texts written within and for a specific niche, whose contexts of the places of production and dissemination can be very different.

It so happens that, because these are foreign databases linked to private institutions, the analysis criteria valued by them are not necessarily locally relevant, since "every professional has the tendency to see only one aspect of society, neglecting the others" (Bunge, 1980, p. 107). In addition, it must be considered that the direct relevance of a text to someone depends on their ability to understand what they read. In this regard, in addition to the ability to insert oneself into one's own disciplinary matrix through the familiarization of one's texts, one's own ability to understand the language can be an important challenge to be overcome, so that it cannot be considered that the impact of a publication in a foreign language will be the same as that of a publication in a native language. In this regard, in the case of SciELO, it predominantly relies on the collaboration of Latin countries, which leads to

the indexing of a larger number of publications in Portuguese or Spanish, rather than in English or other languages, thus facilitating the understanding of national researchers.

4 METHODOLOGICAL PROCESSES

Methodologically, the present research uses both quantitative and qualitative approaches. In quantitative terms, a bibliometric survey was carried out through the SciELO database with data collection in three moments: a preliminary analysis during April 2020; a resampling in September 2024 using the same search routine (Figure 1); and an analysis with the refinement of the search routine (Figure 2) in January 2025. Throughout the data collection, the strategy used in the first two searches was to search for articles in which the eight chosen epistemologists were presented in one of the main search fields (without the need for refinement, since the epistemologist's name and surname were used), while in the third moment of the search, the strategy was changed in order to initially include all possible references to the same epistemologists, with the exception of self-references and subsequent exclusion of articles that referred to other authors of the same surname.

Figure 1

Search routine used on April 14, 2020 and September 18, 2024 for all indexing indexes.

```
"larry laudan" OR "thomas kuhn" OR "karl popper" OR "imre lakatos" OR "paul feyerabend" OR "mario bunge" OR "gaston bachelard" OR "jean piaget"
```

Figure 2

Search routine used on January 28, 2025 for all indexing indexes.

```
((kuhn) AND NOT (au:(kuhn))) OR ((lakatos) AND NOT (au:(lakatos))) OR ((laudan) AND NOT (au:(laudan))) OR ((popper) AND NOT (au:(popper))) OR ((piaget) AND NOT (au:(piaget))) OR ((feyerabend) AND NOT (au:(feyerabend))) OR ((bachelard) AND NOT (au:(bachelard))) OR ((bunge) AND NOT (au:(bunge)))
```

Once the search for articles was carried out, they were categorized through the use of Microsoft Excel software developer tools regarding the titles of the article, title of the journal, year of publication and language of publication. In the next stage, the spreadsheets were complemented through a content analysis methodology (Bardin, 2016) of the abstracts in search of the indication of the epistemologists that were being used and the use that was

being made of them. Finally, quantifications were carried out and correlations were sought between the cataloged categories.

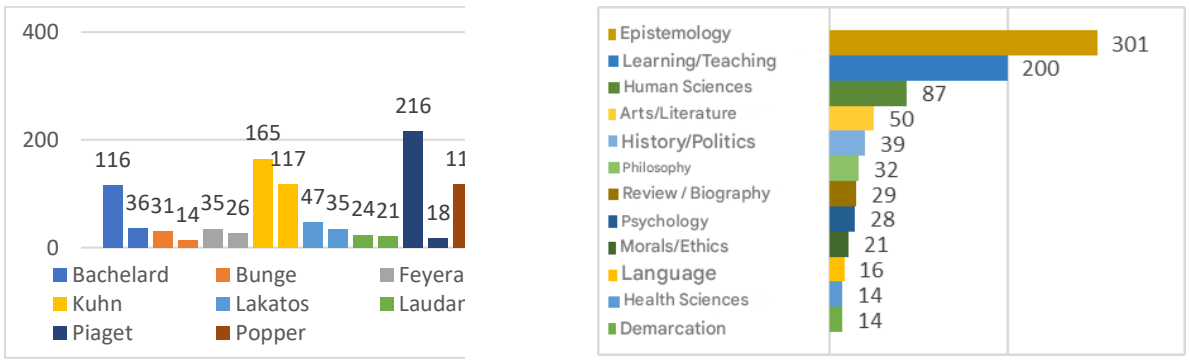
5 RESULTS AND DISCUSSION

As a result of the searches, 707 articles were retrieved, and their distribution by author is shown in figure 3a. The articles were classified through content analysis (Bardin, 2016) of their abstracts in 12 themes (with the possibility of the same article presenting more than one theme) (figure 3b).

By analyzing figure 3a, it is possible to identify that not all epistemologists receive the same prominence as a reference and that, although they all offer important contributions to the field, they are not always sought after in articles due to this. Some prominent examples in this sense are Piaget and Bachelard, who, although they are often taken as a reference, are generally taken as references for topics unrelated to epistemology (in the case of Piaget, of his 216 articles in which he is referenced, only 18 are in the field of epistemology, while in Bachelard, of the 116 articles, only 36 cover this topic).

Figure 3

Distribution of the 707 articles by epistemologist used, focusing on the total number of publications using the author (first column of each author) and, specifically, of articles focused on epistemology (second column of each author) (figure 3a); and by theme for which they were applied (Figure 3b).



(a) (b)

Source: Authors (2025).

In general, in terms of the number of articles in which they are taken as references, Jean Piaget (216 articles), Thomas Kuhn (165 articles), Karl Popper (118 articles) and Gaston Bachelard (116) are more prominent. While the others received a much smaller number of citations (47 or less). As for the application of the authors in the articles, figure 3b made it possible to identify 12 major areas (with the possibility of overlapping areas in the same

article), the most prominent being epistemology (301 articles), followed by the area of learning and teaching. In the latter, however, of the 200 occurrences, 142 occurred through the use of Piaget. Another field in which Piaget ended up standing out was that of morals and ethics (21 articles), having been the only author who was used on the subject. Another area prioritized by a single author was the arts and literature, a theme in which of the 50 references, 45 made use of Bachelard as a reference.

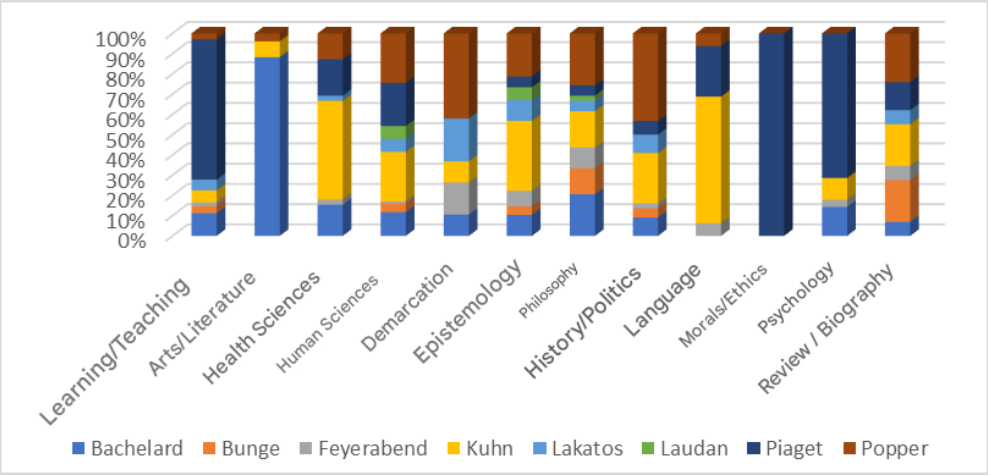
As for the articles focused on epistemology, it was noteworthy that of the 301 articles, only 31 mentioned the use of more than one model, indicating the existence of some kind of barrier between such models, and a plausible explanation for this was found in the proposal of incommensurability (Kuhn, 2006), according to which each area would attribute different meanings to similar terms, which makes it difficult to use more than one system concurrently unless one is fluent in both.

By relating the information on the number of articles with the themes for which they are used, it was possible to produce figure 4a, which presents within each of the 12 themes who are the authors used to discuss them, as well as figure 4b, which presents only the list of articles that addressed epistemological aspects, also some of the other themes.

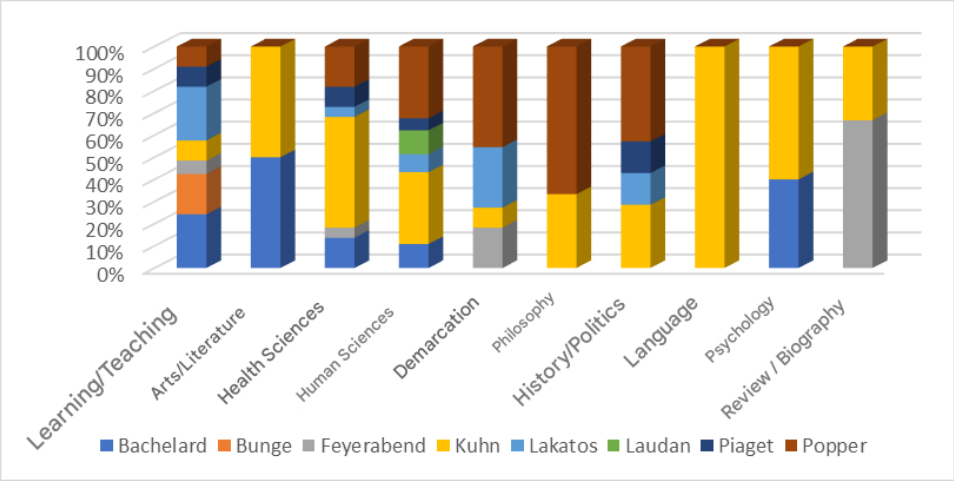
Starting with the distribution of areas in Piaget, the justification for his prominence in the fields of teaching and learning, psychology and morals and ethics, to the detriment of an emphasis on the construction of an epistemological model, is found in the scope of his writings, which, even though they have as a common axis the explanation of the processes of passage from a simple stage of development to a more complex one (Piaget, 1983) end up working with a wide range of aspects of development, making the author a reference in the psychology of learning for many of his books, in language for the book "The Language and the Thought of the Child" (1961) and in the field of morality for his work "The Moral Judgment in the Child" (Piaget, 1994). The low number of texts that use it as a basis for epistemological discussions, however, should not be seen as an indication of its little importance for the area, given that it is taken as a basis in many works in the human and information sciences (Le Moigne, 1995; Piaget, 1967) as a starting point for the construction of the epistemologies of their areas.

Figure 4

Proportion of use of each epistemologist within each theme worked on (figure 4a); and proportion of use of each epistemologist within each theme worked, considering only texts that also emphasized epistemological models (Figure 4b).



(a)



(b)

Source: Authors (2025)

Still on the articles that focused on teaching and learning relationships, the second most used author was Bachelard (23 articles out of 200, of which 8 were also related to epistemology). The explanation for this may lie in their contributions to the reflection not only of epistemological obstacles (Bachelard, 1996), but also of pedagogical ones (Pérez Mora., 2022; Saints; Nagashima, 2015), as well as in the great convergences that can be found between his writings and Piaget's conceptions of learning (Eichler, 2009).

Continuing the theme of teaching and learning relations, Kuhn, Lakatos, Feyerabend and Bunge were also used (in some cases even independently of the use of their epistemological models). Among the four, however, Lakatos and Bunge deserve greater mention, which, despite being used in fewer articles than Kuhn (47 and 31 articles

respectively, against Kuhn's 165), had a higher proportion of texts focused on this theme (11 in Lakatos and 7 in Bunge) than in others. Regarding the articles of these two epistemologists, what was observed was that most of the issues related to teaching and learning were addressed together with the application of their own epistemological models, because of the 11 articles of the first 8 also presented an epistemological bias, while of the 7 of the second, 6 did so. This preference can also be observed in figure 4b, which may point to the epistemological models of Bachelard, Lakatos and Bunge, as more accessible to the public when thinking about their application in the school environment.

Regarding the articles that had aspects of the arts or literature as their central theme, only 2 of the 50 articles also brought some relationship with the authors' epistemological models. Within the theme, Bachelard was again highlighted, being used in 45 of the 50 articles that addressed the theme in general (of which only 1 made use of his epistemological model). The explanation for this preponderance is found in the fact that Bachelard, in addition to his prominence as an epistemologist, also played an important role in the field of poetry (de Freitas, 2006).

As for the texts that sought to use epistemological models in the theme of the human sciences, the preference for the models of Kuhn (1982) and Popper (2013a) to the detriment of others such as those of Feyerabend (2011b), who attributes great weight to subjective issues (2010, 2011b, 2011a), or that of Laudan (2011), who does not identify a clear demarcation that separates scientific knowledge from other knowledge (1983, 2011). Regarding this preference, an explanation could lie in the fact that Popper and Kuhn precede and serve as the basis for many of the later models, and it is relevant that Kuhn himself expresses deep admiration for Popper's work (Kuhn, 2011), as does Lakatos when he states that "Popper's ideas constitute the most important philosophical development of the twentieth century (...). My personal debt to him is immense: he changed my life more than anyone else" (1978, p. 180). In addition, Kuhn himself, when dealing with the identification of legitimate problems when he states that "both History and my knowledge made [him] doubt that practitioners of the natural sciences have firmer or more permanent answers to such questions than their colleagues in the social sciences" (1982, p. 13) indicates the predisposition of his model to these areas as well.

Dealing now with the use of epistemologists and their models for the demarcation between the scientific and the non-scientific, the one who received the most prominence was Popper (with 8 articles in total, of which 5 indicated the use of other aspects of his epistemology). This indication confirms the preference discussed by other authors (Hirvonen; Karisto, 2022) by Popper when dealing with the theme. Still on the demarcation, the

occurrence of only 14 articles focused on the theme in a universe of 707 texts (or 11 in a universe of 301 if we consider only those that also deal with other aspects of epistemology) indicates that this has not been a main theme when discussing epistemology. Even if in practice we are faced with notes such as Bourdieu's that "one of the main tasks of a science of science consists in determining what the scientific field has in common with other fields" (2009, p. 82), or Lakatos' that "the demarcation between science and pseudoscience is not a mere problem of salon philosophy; having a social and political importance that are vital" (1978, p. 9).

As for the use of epistemologists to support discussions in the fields of history and politics, it is important to highlight that although all of them base their models on historical moments and contexts, some of them in their writings manifest more explicitly the concern with social aspects. This is the case of Bunge (1980) when describing the science carried out in developing countries; by Popper (2012, 2013b) and Feyerabend (2011a) when writing works specifically to understand society and science in this context; Laudan (2011) when he brings explanations about the application of his model within reality; and Piaget (1967) as the organizer of a compendium on epistemology in different areas, including some related to the human sciences.

Despite the expectations created regarding the use of epistemologies to support the understanding of history and politics, when checking the articles, it was Popper and Kuhn who received prominence, with 19 and 11 articles respectively. When considering only the texts that also brought a bias in the application or use of the models, the occurrences were even rarer, occurring 3 times for Popper, 2 for Kuhn, 1 for Piaget and 1 for Lakatos. The explanation for these low occurrences can be found in the writings of epistemologists themselves, as Laudan points out that something is only treated as a problem when a tradition shows interest in the issue (2011) and Kuhn links the potential for the propagation of science to the existence of journals that share specific scopes to each area (1982). Such indications lead us to believe that the segmentation of areas itself can be an obstacle to the acquisition of knowledge from other fields, causing the most prominent names in an area (in the case of Popper and Kuhn in epistemology) to end up being taken as the first option when seeking to carry out transdisciplinary research.

Following the analyses, the journals with the greatest prominence in terms of publications retrieved were identified. The 707 articles were distributed in a total of 313 journals (with a total of 416 journals in the database). In terms of the number of articles retrieved per journal, 188 journals had a single article, 293 had five or fewer and only 10 journals had ten or more articles retrieved (figure 5). When comparing the journals that

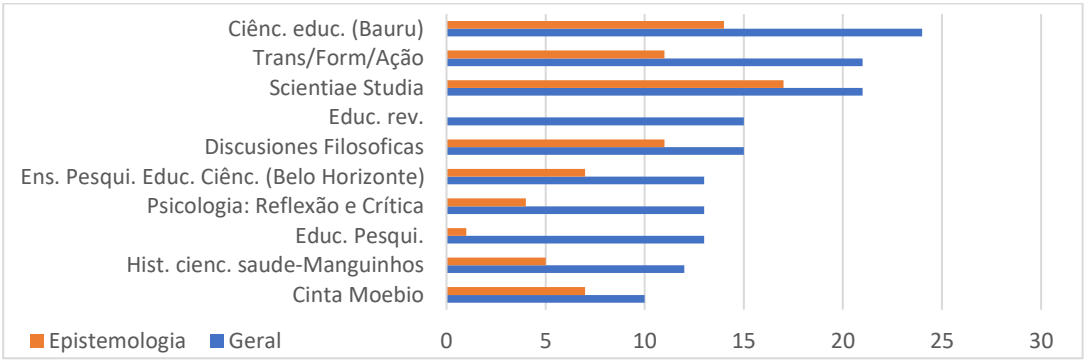
published the most articles in general and specifically using epistemological models, some journals ended up losing prominence, as they lost more than half of the references, as was the case of the journals Educar em Revista and Psicologia: Reflexão e Crítica, which were represented respectively by 15 and 9 articles focused on Piaget and with a bias in teaching relations. The journal Educação e Pesquisa went from 13 articles to only 1, and the eliminated articles used either Bachelard or Piaget and focused on the relations of teaching and learning or aspects of the human sciences. Finally, the journal História, Ciências, Saúde – Manguinhos also had a large decrease in the number of publications, but it was not possible to identify a single causative agent for this.

In terms of journals with the highest number of publications considering only articles with an epistemological bias, the journals Scientiae Studia (focusing on philosophy and history of science), Ciência e Educação – Bauru (focusing on the areas of science education, mathematics education and related areas), Trans/Form/Ação (focusing on philosophy and related areas) and Discusiones Filosoficas (focusing on philosophy and literature) stood out.

With regard to the temporal distribution of publications (Figure 6), the first publication in the area of epistemology found was in 1982, with a general upward trend observed in 1998 (a period close to the beginning of the circulation of some of the journals) and specifically in 2002. The year with the highest publication was 2007, in which 44 articles were published, of which 21 focused on epistemology, after which a stabilization in the number of publications is noticed.

Figure 5

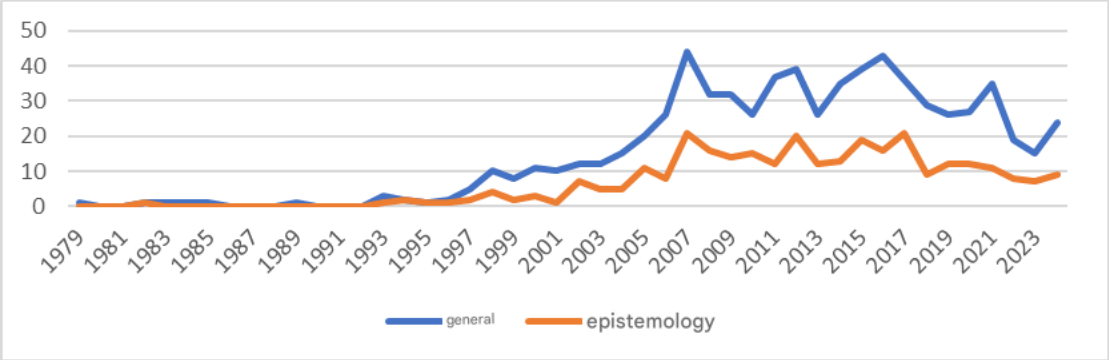
Number of articles published per journal considering only journals with 10 or more articles retrieved in the general search when applying the search terms.



Source: Authors (2025)

Figure 6

Number of articles published per journal when applying the search terms.



Source: Authors (2025)

As for the country of origin of the journals they published, articles from the following countries or regions were retrieved: Brazil (371), Colombia (98), Mexico (64), Argentina (41), Chile (39), Portugal (19), South Africa (16), Venezuela (8), Latin America and the Iberian Peninsula (7), Cuba (7), Spain (7), Bolivia (6), Peru (6), Ecuador (5), Costa Rica (4), United States of America (2), Paraguay (2), Russia (2), Uruguay (2), El Salvador (1). Through the analysis of the distribution of articles among countries, it is possible to denote the role that the SciELO database has for the dissemination of research and epistemological conceptions for Latin American countries, strengthening the focus given by Bunge to the development of research called developing countries (1980).

When checking the main language in which the articles were published, it was observed that 340 articles were written in Portuguese, 300 in Spanish, 62 in English, 4 in South African languages and 1 in French. Of these values, the high number of texts in English is noteworthy, considering that only 2 articles were published in English-speaking countries. This indicates, in turn, the tendency to take an international community as the main focus instead of seeking local development. It is worth noting, however, that in some cases, although the database was retrieved primarily by texts in one language, the journals also brought texts in other languages.

6 CONCLUSIONS

In view of the above, it was possible to verify, in the first place, the preference for the use of more well-known epistemological models, such as those of Kuhn and Popper, even when other models are available. As for the occurrence of preferences for the use of specific epistemologies depending on the area, with the exception of the area of teaching and learning, the most used models were also those of Kuhn or Popper, while in the case of the excluded area, Bachelard, Bunge and Lakatos gained prominence.

As for the results regarding the decision to base the research on an open access database (SciELO), it was possible to confirm a trend towards the production of texts accessible in terms of language to the local communities themselves, even though at times the production of texts in English was privileged even in Latin-speaking countries.

Specifically with regard to the low number of texts that used Piaget as an epistemological reference, it was noteworthy that, as much as within some works of epistemology focused on the human sciences, Piaget plays a central role, in terms of its use to support articles, the author was very little used, indicating a certain rigidity between the areas. This rigidity is also perceived when discussing articles in the areas of human sciences in general, and history and politics in a specific way, which strengthens Kuhn and Feyerabend's arguments regarding the difficulty of moving between areas due to incommensurability.

Finally, it drew attention to the fact that as much as the research was based on the search for articles that discussed the way in which science itself is constructed within each area, the use of explanations using isolated models of epistemologists predominated, instead of seeking to appeal, as the epistemologists' own essays do, to the dialogue between different models. Thus, no matter how shabby Kuhn's (1982) proposition may be, according to which most of the time the scientist dedicates himself to the realization of a normal science that seeks only to expand the area of application of what is already established, to a certain extent it seems that this is what is often done in the case of epistemology, remaining the hope that effective scientific innovation is being implemented for the objects in which such models have been applied.

REFERENCES

Avena, M. J., & Barbosa, D. A. (2017). Bibliometric indicators of the nursing journals according to the index databases. Revista da Escola de Enfermagem, 51. https://doi.org/10.1590/S0080-623420170000100004

Bachelard, G. (1996). A formação do espírito científico: Contribuições para uma psicanálise do conhecimento. Contraponto.

Bardin, L. (2016). Análise de conteúdo. Edições 70.

Bourdieu, P. (2009). Razões práticas: Sobre a teoria da ação. Papirus.

Bunge, M. (1980). Ciência e desenvolvimento. Editora da Universidade de São Paulo.

Clarivate. (2025). Scientific and academic research. https://clarivate.com/academia-government/scientific-and-academic-research/

De Almeida, C. C., & Grácio, M. C. C. (2019). Brazilian scientific production on the “impact factor” indicator: A study at the SciELO, Scopus and Web of Science bases. Encontros Bibli, 24(54), 62–77. https://doi.org/10.5007/1518-2924.2019v24n54p62

De Freitas, A. (2006). Apolo-Prometeu e Dioniso: Dois perfis mitológicos do “homem das 24 horas” de Gaston Bachelard. Educação e Pesquisa, 32(1), 103–116. https://doi.org/10.1590/S1517-97022006000100007

Descola, P. (2016). Outras naturezas, outras culturas. Editora 34.

Eichler, M. L. (2009). Revisão acerca dos possíveis compromissos entre as obras de Gaston Bachelard e de Jean Piaget. Ciências e Cognição, 14(1), 171–194.

Elsevier. (2025). Scopus: Comprehensive, multidisciplinary, trusted abstract and citation database. https://www-elsevier-com.ez45.periodicos.capes.gov.br/products/scopus?dgcid=RN_AGCM_Sourced_300005030

Feyerabend, P. (1977). Contra o método. Livraria Francisco Alves Editora.

Feyerabend, P. (2010). Adeus à razão. Editora UNESP.

Feyerabend, P. (2011a). A ciência em uma sociedade livre. Editora UNESP.

Feyerabend, P. (2011b). Contra o método. Editora UNESP.

Feyerabend, P. (2013). Filosofia natural: Una historia de nuestras ideas sobre la naturaleza desde la Edad de Piedra hasta la era de física cuántica. Debate Editorial.

García, R. (2002). O conhecimento em construção. Artmed.

Gorski, P. S. (2004). The poverty of deductivism: A constructive realist model of sociological explanation. Sociological Methodology, 34(1), 1–33. https://doi.org/10.1111/j.0081-1750.2004.00144.x

Gould, S. J. (1992). Darwin e os grandes enigmas da vida. Martins Fontes.

Gould, S. J. (1999). A falsa medida do homem. Martins Fontes.

Hirvonen, I., & Karisto, J. (2022). Demarcation without dogmas. Theoria (Sweden), 88(4), 701–720. https://doi.org/10.1111/theo.12359

Kuhn, T. S. (1982). A estrutura das revoluções científicas. Editora Perspectiva.

Kuhn, T. S. (2006). O caminho desde a estrutura. Editora UNESP.

Kuhn, T. S. (2011). A tensão essencial: Estudos selecionados sobre tradição e mudança científica. Editora UNESP.

Lakatos, I. (1978). La metodología de los programas de investigación científica. Alianza Editorial.

Laudan, L. (1983). The demise of the demarcation problem. In R. S. Cohen & L. Laudan (Eds.), Physics, philosophy and psychoanalysis (pp. 111–127). Springer. https://doi.org/10.1007/978-94-009-7055-7_6

Laudan, L. (2011). O progresso e seus problemas: Rumo a uma teoria do desenvolvimento científico. Editora UNESP.

Le Moigne, J.-L. (1995). O construtivismo: Volume II - Das epistemologias. Instituto Piaget.

Lorenz, K. (1969). L'agression: Une historie naturelle du mal. Flammarion.

Mayr, E. (2005). Biologia, ciência única: Reflexões sobre a autonomia de uma disciplina científica. Companhia das Letras.

Nichols, J. D., Kendall, W. L., & Boomer, G. S. (2019). Accumulating evidence in ecology: Once is not enough. Ecology and Evolution, 9(24), 13991–14004. https://doi.org/10.1002/ece3.5836

Pérez Mora, R. (2022). Obstáculos al conocimiento y pensamiento crítico en educación. InterCambios. Dilemas y Transiciones de la Educación Superior, 9(1), 2–12. https://doi.org/10.29197/INTERCAMBIOS.V9I1.406

Piaget, J. (1961). A linguagem e o pensamento da criança. Fundo de Cultura.

Piaget, J. (1967). Logique et connaissance scientifique. Gallimard.

Piaget, J. (1983). A epistemologia genética. Abril Cultural.

Piaget, J. (1994). O juízo moral na criança. Summus Editorial.

Popper, K. (2012). A sociedade aberta e os seus inimigos: O sortilégio de Platão (Volume 1). Edições 70.

Popper, K. (2013a). A lógica da pesquisa científica (2nd ed.). Cultrix.

Popper, K. (2013b). A sociedade aberta e os seus inimigos: Hegel e Marx (Volume 2). Edições 70.

PubMed. (2025). PubMed overview. https://pubmed.ncbi.nlm.nih.gov/about/

Ruiz, M. A., Greco, O. T., & Braile, D. M. (2009). Fator de impacto: Importância e influência no meio editorial, acadêmico e científico. Revista Brasileira de Hematologia e Hemoterapia, 31(5), 355–360. https://doi.org/10.1590/S1516-84842009000500014

Santos, D. M., & Nagashima, L. A. (2015). A epistemologia de Gaston Bachelard e suas contribuições para o ensino de química. Revista Paradigma, 36(2), 37–48.

SciELO. (2025). Programa SciELO, modelo SciELO de publicação e rede SciELO. https://www.scielo.org/

Simpson, G. G. (1974). A biologia e o homem. Cultrix.

Weinert, F. (2000). The construction of atom models: Eliminative inductivism and its relation to falsificationism. Foundations of Science, 5(4), 491–531. https://doi.org/10.1023/A:1011397804509