

# New methods for developing critical thinking and decision making in Latin American schoolchildren

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## Abstract

A documentary review was carried out on the production and publication of research papers related to the study of the variable new methods for developing critical thinking and decision making in Latin American schoolchildren. The purpose of the bibliometric analysis proposed in this document, is to know the main characteristics of the volume of publications registered in Scopus database during the period 2015-2020 in Latin American countries, achieving the identification of 188 publications. The information provided by said platform was organized by means of graphs and figures categorizing the information by Year of Publication, Country of Origin, Area of Knowledge and Type of Publication. Once these characteristics were described, the position of different authors regarding the proposed topic was referenced by means of a qualitative analysis. Among the main findings of this research is that Brazil, with 79 publications, is the Latin American country with the highest production. The area of knowledge that made the greatest contribution to the construction of bibliographic material referring to the study of new methodologies for the development of critical thinking and decision making in Latin American schoolchildren. New methodologies for developing critical thinking and decision making in Latin American schoolchildren was social sciences with 129 published documents, and the type of publication that was most used during the period mentioned above was the journal article, which represents 72% of the total scientific production.

**Keywords:** critical thinking, schoolchildren, methodologies.

## 1. INTRODUCTION

Education at school is a fundamental element in the development of critical thinking in children and adolescents, since it provides them with the necessary tools to analyze the veracity of the knowledge offered in order to increase the students' learning capacity and, as a result of this, encourage the student to develop effective solutions to problems that may arise in the daily life of the educational process. According

to Faci One (2007) critical thinking helps to develop liberal education, which is learning to learn and to think for oneself based on previous knowledge, since thanks to it, the evolution of personal decision making is understood towards another that takes into account a level of integrity of principles and concern for the common good and social justice. This shows that the development of critical thinking is a characteristic of innovation in pedagogical

processes that helps students get the best out of the knowledge offered, making them a fundamental part of the construction of their knowledge through new methodologies that integrate the development of analysis, inference and criticism of the knowledge taught in Latin American schools.

The implementation of methodologies that aim to encourage critical thinking in students is necessary, especially in recent years where there is access to unlimited amounts of information which may prove to be false or with a half-truth, so that students can determine and evaluate the reasoning of this knowledge; an example of these new methodologies is presented by Loaiza and Osorio (2018) in the article entitled "The development of critical thinking in natural sciences with high school students in an Educational Institution of Pereira - Risaralda" in which a methodology is used in order to encourage students to build analytical, critical-reflective and argumentative skills in situations of the immediate context, especially in the competencies of the Natural Sciences area, as well as to identify which experiences of the teaching process contributed to the formation of critical thinking. Thus, the need to implement new methodologies that help students to develop critical thinking and to strengthen decision making through analysis and inference processes is evident. Therefore, it is important to know in terms of bibliographic resources, the current state of research related to the New methodologies for the development of critical thinking and decision making in Latin American schoolchildren, so a bibliometric analysis of the scientific production registered in Scopus database during the period 2015-2020 is proposed to

answer the question: How has been the production and publication of research papers related to the study of the variable New methodologies for the development of critical thinking and decision making in Latin American schoolchildren, during the period 2015-2020?

## 2. General Objective

To analyze from a bibliometric and bibliographic perspective, the production of high impact research papers on the variable New methodologies for the development of critical thinking and decision making in Latin American schoolchildren during the period 2015-2020.

## 3. Methodology

Quantitative analysis of the information provided by Scopus under a bibliometric approach on the scientific production concerning the new methodologies for the development of critical thinking and decision making in Latin American schoolchildren is carried out. Likewise, from a qualitative perspective, examples of some research works published in the area of study mentioned above are analyzed from a bibliographic approach to describe the position of different authors on the proposed topic.

The search is carried out through the tool provided by Scopus and the parameters referenced in Table 1 are established.

### 3.1 Methodological design

Table 1. *Methodological design.*

|         | PHASE           | DESCRIPTION                                                                                                         | CLASSIFICATION                                                                                                                                                     |
|---------|-----------------|---------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| PHASE 1 | DATA COLLECTION | Data was collected using the Scopus web page search tool, through which a total of 188 publications were identified | Published papers whose study variables are related to methodologies for the development of critical thinking and decision making in Latin American schoolchildren. |

|                |                                            |                                                                                                                                                                         |                                                                                                                                                                                            |
|----------------|--------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                |                                            |                                                                                                                                                                         | Research papers published during the period 2015-2020.<br>Limited to Latin American countries.<br>Without distinction of area of knowledge.<br>Without distinction of type of publication. |
| <b>PHASE 2</b> | CONSTRUCTION OF ANALYSIS MATERIAL          | The information identified in the previous phase is organized. The classification will be made by means of graphs, figures and tables based on data provided by Scopus. | Word Co-occurrence.<br>Year of publication<br>Country of origin of the publication.<br>Area of knowledge.<br>Type of publication                                                           |
| <b>PHASE 3</b> | DRAFTING OF CONCLUSIONS AND FINAL DOCUMENT | After the analysis carried out in the previous phase, we proceed to the drafting of the conclusions and the preparation of the final document.                          |                                                                                                                                                                                            |

Source: Own elaboration (2021)

Figure 1 shows the co-occurrence of keywords within the publications identified in the Scopus database.

## 4. Results

### 4.1 Co-occurrence of words

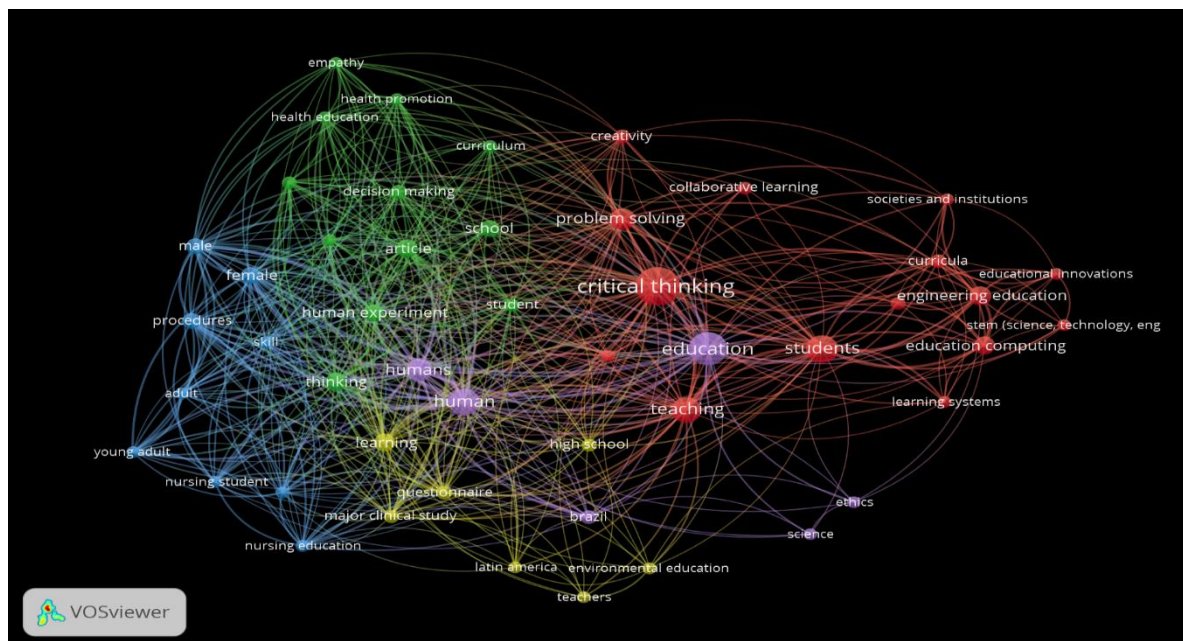


Figure 1. Co-occurrence of words

Source: Own elaboration (2021); based on data provided by Scopus.

The keywords most used in research related to the variables under study are critical thinking and education, which refer to the role of pedagogical processes in the development of analysis and inference skills, which are necessary for the liberal knowledge that makes it possible for students to obtain an active role in the creation of their own knowledge and the ability to determine which are of greater importance in their training process. Figure 1 shows other keywords such as problem solving, collaborative learning, societies and institutions, and decision making, which are related to the need for educational institutions to implement new methodologies that encourage the appropriation of knowledge from a critical process in which students can determine the reasoning and veracity of the information they can access, helping them to make decisions depending on their learning needs. In the human component we find key words such as student, learning processes and creativity which show the need to implement methodologies that help develop critical thinking and in turn is done through innovative processes that encourage study in creative ways.

#### 4.2 Distribution of scientific production by year of publication.

Figure 2 shows how the scientific production is distributed according to the year of publication, taking into account the period from 2015 to 2020.

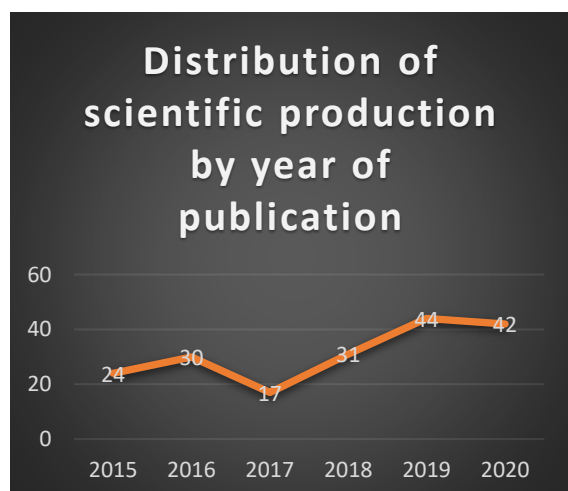


Figure 2. *Distribución de la producción científica por año de publicación.*

Source: Own elaboration (2021); based on data provided by Scopus.

2019 is the year with the highest number of publications related to the variables under study, having a total of 44 papers in all within which is "Studying the impact of critical thinking on the academic performance of MBA executive students" (D'Alessio, Avolio, & Charles, 2019) in which critical thinking is analyzed as an essential aspect of education that has been the effort of many instructors over the years, since it is believed that it can lead to higher academic performance, the instrument used was the Watson Glasor Critical Thinking Assessment Test (WGCTA) resulting in the conclusion that critical thinking has a positive impact on academic performance since it implies a greater use of the knowledge offered and the selection of the most convenient information for the training process.

In second place is 2020 with 42 publications registered in Scopus, among which we can identify "Photographic workshop "culture and tourism" in the critical thinking of students from Amantani Island" (Aguirre, Bouchon, Juárez, & Chacara, 2020) this study applies the photography workshop as visual communication to improve critical thinking in students in 4th and 5th grade of high school at the Agro Artesanal Miguel Grau educational institution, as a new methodology with innovative tools that promote educational processes, this research results that 100% of the students in the experimental group reached a better level in critical thinking, showing that the implementation of innovative methodologies through creative processes.

#### 4.3 Distribution of scientific production by country of origin.

Figure 3 shows the distribution of scientific production according to the nationality of the authors.

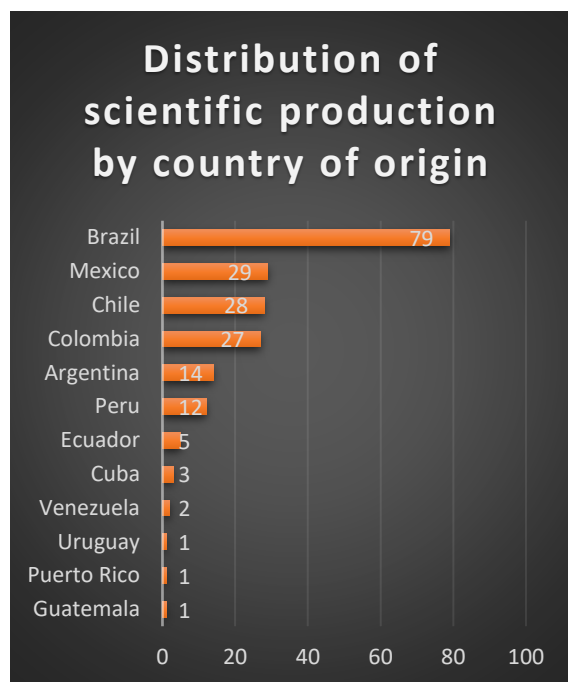


Figure 3. *Distribution of scientific production by country of origin.*

Source: Own elaboration (2021); based on data provided by Scopus.

Brazil is the Latin American country with the greatest contribution in research related to methodologies for the development of critical thinking and decision making in schoolchildren

with a total of 79 registered publications, among which is the document entitled "Improving critical thinking in university students through the use of a history tool for the formation of self-regulated learning" (Rosário, y otros, 2019) this study evaluates the effectiveness of narrative tools to promote self-regulated learning (SRL) and critical thinking, through a narrative approach presenting Letters from Gervase as a story tool to improve SRL for 1st year university students demonstrating the effectiveness of this new methodology which seeks to implement narrative and digital tools for the development of critical thinking and decision making.

At this point, it should be noted that the production of scientific publications, when classified by country of origin, presents a special characteristic and that is the collaboration between authors with different affiliations to both public and private institutions, and these institutions can be from the same country or from different nationalities, so that the production of an article co-authored by different authors from different countries of origin allows each of the countries to add up as a unit in the overall publications. This is best explained in Figure 4, which shows the flow of collaborative work from different countries.

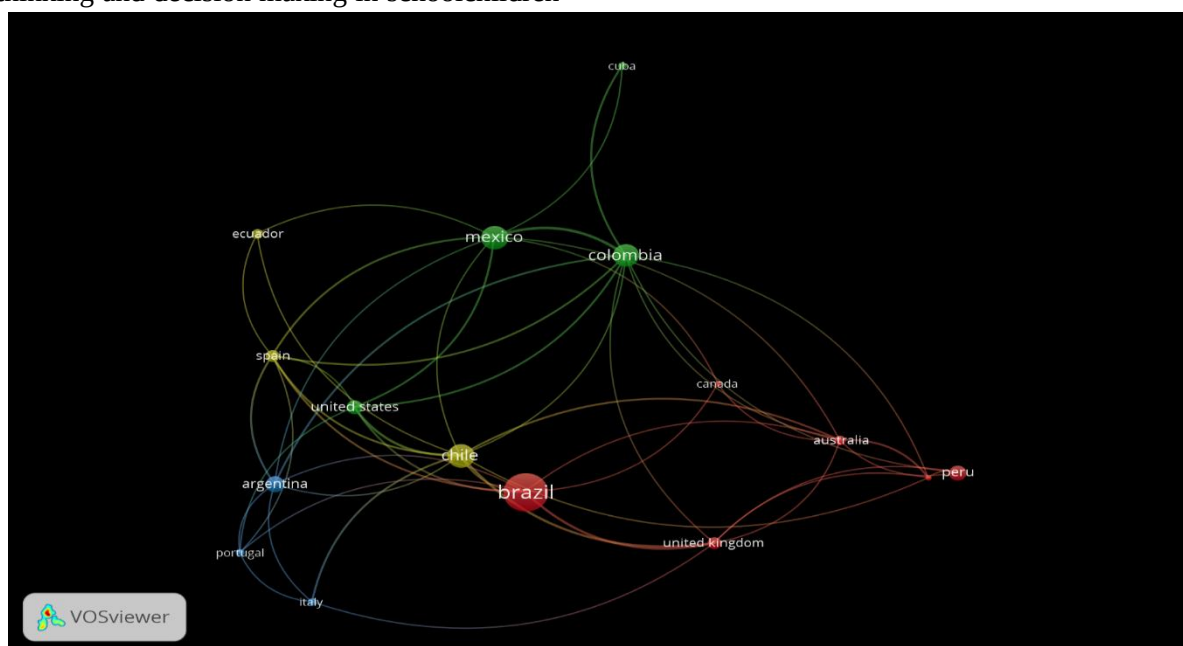


Figure 4. *Co-citations between countries.*

Source: Own elaboration (2021); based on data provided by Scopus.

As mentioned above, Brazil is the country with the largest number of publications with collaborations with authors affiliated with organizations that do not belong to Latin American countries, such as the United Kingdom and Australia. In second place is Mexico with a total of 29 publications in total in co-authorship with organizations affiliated to organizations that belong mainly to the United States, Portugal and Italy, among these is the one entitled "The development of critical thinking skills in science in elementary school students" in this research is presented a strategy of inquiry in the classroom to promote the development of critical thinking skills in children, which includes a guide to answer critical thinking questions. This study was conducted with 2 focus groups, one of them called control group implemented traditional methodologies and the other group implemented a new methodology aimed at fostering the development of critical thinking, which showed a significant improvement in the type and quality of the answers given by the students of the experimental group to the critical thinking questions in comparison with the control group, presenting more complete and better elaborated answers.

#### 4.4 Distribution of scientific production by area of knowledge

Figure 5 shows how the production of scientific publications is distributed according to the area of knowledge through which the different research methodologies are executed.

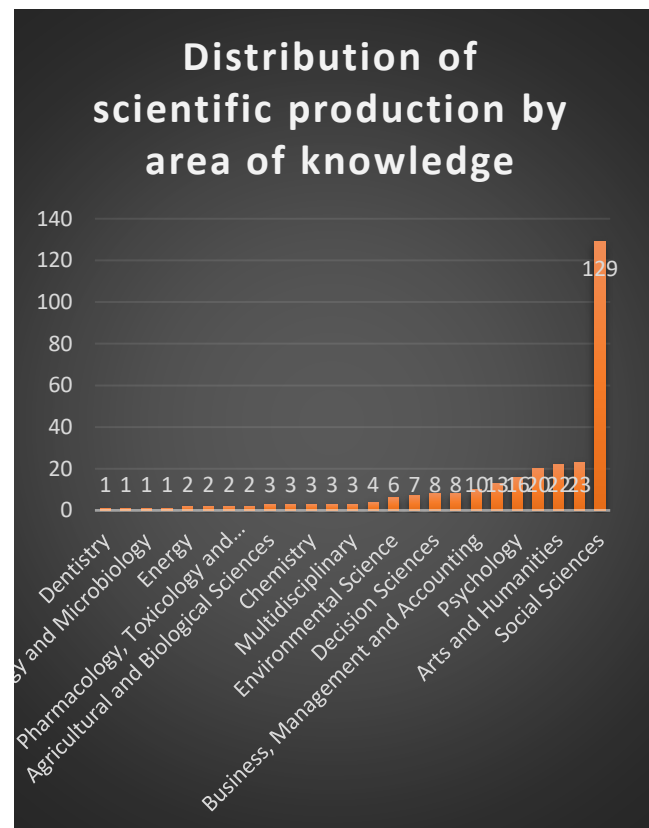


Figure 5. *Distribution of scientific production by area of knowledge.*

Source: Own elaboration (2021); based on data provided by Scopus.

Social sciences is the area with the greatest contribution in research related to the variables under study in Latin America having a total of 129 registered documents, among which is "Do inquiry-based teaching and school climate influence scientific achievement and critical thinking? Evidence from PISA 2015" (Gómez & Suárez, 2020) this study studies research-based teaching as one of the most recommended "active" methodologies to develop intellectual autonomy and complex thinking processes and that in turn helps to improve the school environment through a test conducted in Colombia, which resulted in positive aspects that relate teaching through research with the development of critical thinking in students and showed the need for further research on the effect of the so-called active methodologies and the school context on student learning.



In second place is computer science with 23 documents registered in Scopus, among which is the article entitled "Cyberactivism and education for global citizenship: a participatory research and action with two educational experiences in Bogota" (Forero, 2019) this study was conducted at the media school and Colegio Venecia IED in 2017, in which the exchange between educational communities from different contexts was analyzed in order to develop critical thinking and propose collective actions, supported by technological tools, on problems that concern humanity, that is, through technological innovations implement methodologies that develop critical thinking of students depending on their social context and the problems that arise there; This study resulted in the efficacy of these methodologies in the reflection of students in the face of global problems, encouraging them to take an active role in the face of these problems.

#### 4.5 Type of publication

Figure 6 shows how the bibliographic production is distributed according to the type of publication chosen by the authors.

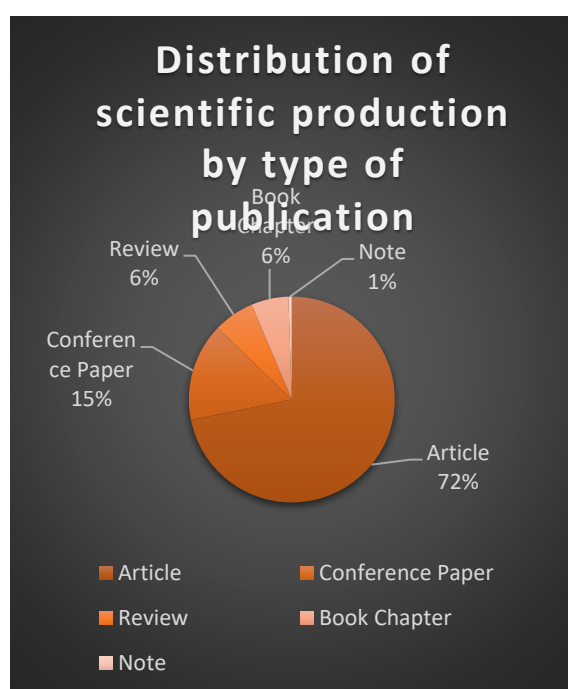


Figure 6. *Type of publication*

Source: Own elaboration (2021); based on data provided by Scopus.

As shown in Figure 6, within the different types of publications, 72% of the total number of documents identified in Phase 1 of the Methodological Design correspond to Journal Articles, including the one entitled "Relevance of the sociocultural perspective in the discussion on critical thinking" (Imperio, Staarman, & Basso, 2020) This study shows a general description of critical thinking, as well as an evaluation of practices, in order to provide researchers or professionals (particularly those involved in primary education) with a reference for the development of new theories and methods on the integration of critical thinking in teaching processes, as this is an essential tool in the 21st century where students are exposed to a large amount of information and must know how to identify its veracity. In second place are conference proceedings representing 15% of the total number of publications identified, followed by reviews with 6%, book chapters with 6% and finally notes with 1%.

## 5. Conclusions

Thanks to the bibliometric analysis proposed in the present research, it can be determined that Brazil is the Latin American country with the largest number of bibliographic records in Scopus database during the period from 2015 to 2020 with a total of 72 documents. The scientific production related to the study of the New methodologies for the development of critical thinking and decision making in Latin American schoolchildren, has presented an important growth during the period previously mentioned, going from 24 publications in 2015 to 42 units in 2020, that is, the creation of bibliographic records was doubled in a period of 5 years, which indicates the importance that the new educational methodologies represent for the strengthening of skills that promote critical thinking in students helping them to strengthen knowledge for decision making.

Critical thinking plays an important role in education in all its stages, since it also influences the academic performance of students as well as making them participate in

the creation of their knowledge by having an active role in this and encouraging liberal education and autonomous thinking determined by the knowledge that was taught and its interpretation by the student depending on the social context and the problems that he/she identifies. In the creation of new educational methodologies should also take into account the implementation of innovative measures that in addition to developing critical thinking use digital and creative tools that seek to awaken the interest of the new generations in the knowledge that should be obtained depending on their level of education, helping the autonomy of learning and making the teacher a guide through this process. Therefore, it is evident the importance of implementing new methodologies in educational institutions that encourage critical thinking and provide students with the necessary skills for decision making depending on the pedagogical needs they present. All the above, allows this article to conclude, highlighting the importance of knowing the theory or bibliographic resources that seek to awaken the interest in educational institutions in renewing their educational methods and direct them to promote critical thinking of students through analysis and inference. That is why the need for studies such as the one presented in this document is highlighted, which make a tour of those texts that address the aforementioned topic, in order to give the reader a broad view of the current situation of the literature on new methodologies for the development of critical thinking and decision making in Latin American schoolchildren.

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