



# Critical Thinking in Basic Education Students: An Inventive Analysis

Clariza Romero Mendoza<sup>1\*</sup>

<sup>1</sup>Universidad César Vallejo, Chiclayo, Perú.

## Author's contribution

The sole author designed, analyzed, interpreted and prepared the manuscript.

## Article Information

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## ABSTRACT

This documentary review work is aimed at examining the approach to critical thinking in basic education students, in order to determine how studies have been approached to improve that thinking, published in currently indexed scientific journals in the most prestigious databases, indicating the work characteristics to be included or excluded, the type of methodological design, the type of study, the year of publication and the results obtained, it is necessary to indicate that this competence has been left to abandonment as there are no mechanisms of curriculum progression that guarantee their progress within educational programmes; in this sense, from the initial stage students should be promoted the ability to acquire autonomous learning, collaborative teamwork, to promote the skills of analysis and problem solving, but based on pre-established criteria that involve the need for critical and constructive judgment.

*Keywords:* Critical thinking; analysis; students; basic education.

## 1. INTRODUCTION

This study captures findings for a systematic review of the various researches that have emerged on the importance of developing critical thinking (CT) in primary school students [1-6].

Considering CT is essential for innovation, improvement, creativity and commitment, therefore the relevance of developing it in school. Today, people acquire a wealth of data and information through the media, which is why it is essential that students develop the CT's skills,

\*Corresponding author: Email: [clary3031@hotmail.com](mailto:clary3031@hotmail.com);

necessary to address that knowledge more deeply and in an organized way [7-10].

In this sense the CT's development since childhood has been a topic of great interest by various researchers, so the requirement to research in various search engines such as ProQuest, EBSCO, Scopus and Google academic emerged, being these search engines recognized and of great reliability in the academic world [11-16]. As inclusion criteria, the search for indexed scientific articles and doctoral theses for reliability in the information collected in them was taken into account, as well as the age of no more than 3 years [17,18].

Systematic review is a research methodology that arises precisely to make a critical analysis of academic overproduction on a particular topic. Among the areas that comprise this critical review, is the classification of doctoral articles and theses according to their evidence level, that is, according to the strictness of the research designs and the controls applied to the process, so that it is possible to establish recommendation degrees that indicate the text quality [19-23]. In relation to the above, it emerged as a research question: What is the approach to critical thinking in basic education? Therefore, this research seeks to contribute to the discussion on the emphasis that has been placed on the use and promotion of thinking skills in the classroom, having as a central variable of analysis, the methodologies used to address the topic.

Among the research chosen on the subject, are the studies of Ros, Ortiz and Zelaieta [24], point out CT involves different skills, which involve questioning the knowledge source, testing the validity of the acquired information, analyzing its reliability and obtaining appropriate explanations for specific tasks or situations.

While Gómez [25], his research focused on the development of a program for CT's development, taking into account CT recipients and the context where it will be carried out. The results showed that it is an effective program since the realization of this program has been an opportunity to change the teaching methodology, giving students the possibility to develop their CT, to reflect scientifically in class, to work with real situations and to contribute to the construction of certain intellectual tools that allow them to be able to make the right decisions in a society as dynamic and alienating as the current one.

Meanwhile, Martínez, Ballester and Ibarra [26] used an open pretest-posttest questionnaire, used in the control group, and the commentary activities included in the sequence implemented with the experimental group. Finally, the development of critical thinking in the control group students was compared from the responses given to the pretest-posttest, with that of the experimental group students from the replies to the activities of the sequence [27-33].

Continuing research, it is observed that the qualitative methodology was mostly used, it is the thought, psychometric and intelligence tests the most commonly used tools to evaluate the results, the population in which the most intervened was primary and secondary students, and the number of people who participated in the programs oscillated, for the most part, between 1 and 100 people.

Such is the case of the Sálica's study [34], according to this research, teaching focuses mostly on how and what characteristics has the teaching knowledge of the content, how it has been determined in the teachers, its relationship with the disciplinary knowledge to teach and with the students learning, its use in the teachers training and on what scientific topics it has been studied. However, little or little attention has been paid to knowing the thinking skills or cognitive resources required to be a good teacher; because research to characterize didactic knowledge of the content is done with teachers who identify as excellent teachers.

While Martínez, Cabrera, Borjas, Torres and Judex [35], in his study considered the qualitative approach, the digital educational platform Edmodo was used, which led to a technological learning environment for the project's execution. The results reflect that middle school students can improve their critical thinking skills in terms of utility categories and error recognition in the Advanced Biology subject. However, the development of CT components involves medium or long term and cross-cutting work in all academic areas.

Based on this, the development and evaluation of critical thinking invites educators to propose strategies that influence the mobilization of these components: skills, dispositions and motivation. CT development involves time, so it's important to work on educational institutions at medium- and long-term intervals, using various evaluative activities that hold students to think about their own thinking, actions, and mistakes.

## 2. CRITICAL THINKING SKILLS

Despite a coincidence between authors who research and write about critical thinking, a wide variety of definitions are recorded, depending on one aspect or another or the scope in which they specialize. López y Villa [36], consider critical thinking to be the disciplined intellectual process of actively and skillfully doing conceptualization, application, analysis, synthesis or evaluating the information collected, or generated by observation, experience, reflection, reasoning or communication, as a guide in their thinking way and their actions. In its exemplary form, it is based on universal intellectual values that transcend divisions of subject matter: clarity, certainty, precision, consistency, relevance, solid evidence, good reasons, depth, encouragement and justice.

Aranda [37] notes that the CT is that conscious and deliberate process used to interpret and evaluate information and experiences, using a set of thoughtful attitudes and skills that challenge beliefs and actions. That is, the type of thinking that is applied in problem solving, the calculation of probabilities or the formulation of inferences in decision-making.

As Ortega and Gil [38] point out, PC becomes complex, so four fundamental aspects must be specifically taken into account in order to do good teaching: strategies, meta-knew-how, provisions and practice. Strategies to guide learning and identify certain critical thinking skills need to be put in place; leaving spaces for reflection on thought processes (the internal thought process is more important than the product); and motivate students to be predisposed to put into practice specific PC skills and practice using them.

In short, through CT students are sought to learn to learn, one of the four education pillars. Because of its complexity, there is no unanimous definition, and it has been defined and interpreted in many ways by various authors and all definitions associate critical thinking and rationality [39-44]. Where their main function is not to generate ideas but to review them, evaluate them and review what is understood, processed and communicated through the other types of thinking.

In many educational programs and in the teachers' goals, there are often statements that indicate that what is sought is the training of critical students, who become aware, who

question their social reality and participate in their role as social actors [45-49]. However, these educational agents are unclear what it is to think critically or how they can pedagogically intervene to promote such skill. Traditional opinions about the CT nature have not been able to respond to Nietzsche's call for a critical search for truth. Thus, competency training creates an ideal environment for the continuous use of active pedagogies, since teachers want to teach students to be active learners, thus recognizing the values of critical thinking. To encourage students to participate in this process, numerous teaching strategies have been documented or exhibited in literature [50].

Botero [51] believes that the school environment should be a dialogue between subjects and information, where the resources available to it are used and thus advance the use of strategies that involve not only the academic goals achievement from the mastery of information, but in turn, how new knowledge favors continuous development and individual and collective development in the different dimensions. This would contribute to strengthening students' personal beliefs.

There are several researches [52-56] that have been conducted on the importance of critical thinking for basic education, also today have been carried out several activities that aim to measure and improve the critical thinking ability that students possess to carry out their learning process, obtained among the results a low level of these skills in students, that is why this systematic review is intended as a general objective to examine the approach that has been given to critical thinking in basic students, in order to determine how activities to improve critical thinking in students have been addressed since basic education.

## 3. METHODOLOGY

For the realization of this methodological process, it was raised as a research question, the following: What is the approach that has been given to critical thinking in basic education? Regarding the searching process and collecting research it was found through search engines: Google Academic, Scopus, EBSCO Host and Pro Quest; to make the development of research possible (Table 1). For the search for research have been considered some criteria such as: keywords and Boolean operators (Critical Thinking), year of publication (2017-2020),

limitation (Full text), language (Spanish), type of studies (education articles) (doctoral thesis), among others useful to find accurate information.

In addition, research that is not within the databases described, as well as those that do not contribute to research, has been considered as exclusion criteria; they are focused on different topics, they are incomplete, they are not in Spanish language, in the same way those who have part of the search terms are linked to other areas or disciplines. On the thesis, master's thesis and undergraduate thesis were excluded because this doctoral-level study was treated, so those that are unrelated to the subject and are not in the 2017-2020 years' ranges have also been excluded.

#### 4. RESULTS

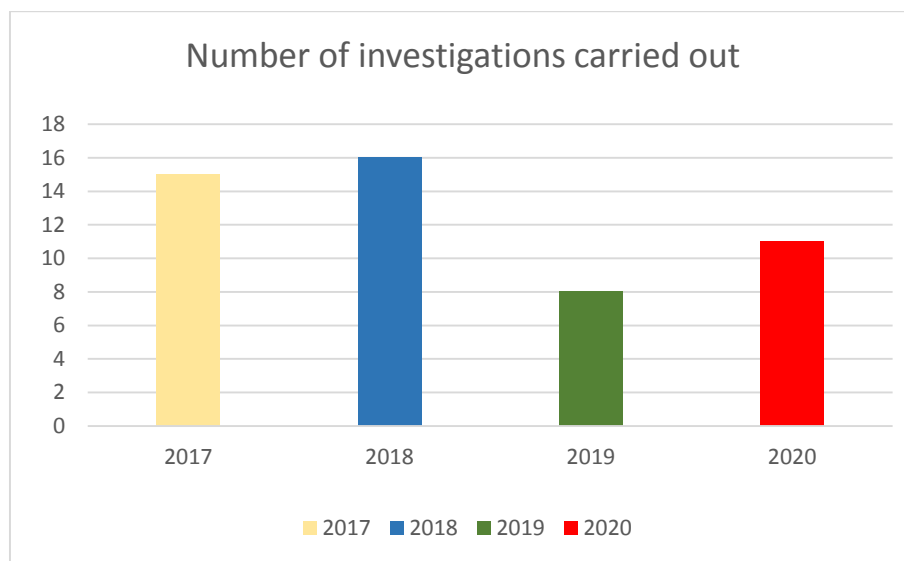
By analyzing research for the year of publication (Fig. 1), it is appreciable that the largest number of researches found was between 2017 and

2018, which shows that there are currently few studies that have been focused on studying the importance of developing CT skills since primary education. In this sense, promoting the PC arises from the urgency that exists today to promote developments of deliberative and divergent thoughts that question the complexities presented by the current context. To progress in this task, it becomes necessary on the part of the actors of education to generate a panoramic view of the educational process such that the development of this competence is present in all the extensive of curriculum programming.

The Fig. 1 shows that they were found in 2017, 15 researches that talk about critical thinking in basic education, while in 2018, 16 researches were chosen, however, in 2019 there was little research that focused on the subject since 8 were chosen, and in 2020 11 researches were chosen that relate to critical thinking in primary education.

**Table 1. Search strategies**

Resources	Inclusion criteria	Exclusion criteria
Exploration in academic search engines (Scielo, Redalyc, EBSCO host and academic Google)	Indexed articles and doctoral thesis on education	Newspapers, theses, pptts, technical reports, files.
Findings of digital publications: with open access and code	Language: Spanish	Documents in other languages
Author	Education Basic education	One authored or un nameless documents



**Fig. 1. Number of research by years of publication**

The research obtained has also been classified by their publication country (Fig. 2), so it was found that much of these were published in Colombia and Peru, both countries have conducted greater research amount to establish the low level participation causes of educational institutions in the development of critical thinking skills in the educated. In Colombia Guerrero, et al. [57], they conducted research in which it was contemplated that to promote the development of critical thinking in students, the use of teaching methods that trigger cognitive, volitive, affective processes and generate capacities and skills aimed at analyzing, interpreting and proposing solution alternatives to a problematic situation is required; this brings with it interpretation, inference, self-regulation and a flexible mindset in the apprentice that helps him take a critical stance in the face of the context around him. Critical thinking is the clear and rational thinking that favors the development of thoughtful and independent, allows everyone to make reliable judgments about the credibility of an affirmation or the desirability of a certain action.

Another country with a good number of publications on the subject mentioned is Spain; wherea meanwhile, the rest of the publications are entirely from Latin American and Central American countries including Chile, Mexico and Argentina.

Among the criteria considered for the review of research is the study type (Fig. 3), on which 80% of the research has to correspond to a qualitative study, they also correspond to quasi-experimental designs and documentary analysis, mostly instruments were used to measure the students' skills. Thus, 12% of the 2% of joint research has to be carried out by descriptive research and 6% quantitative research aimed at measuring the learning process of students through instruments. Process that led to the analysis of curriculum documents to see the presence, characteristics of thoughtful critical thinking in these documents and the ways of thinking of the student and teacher.

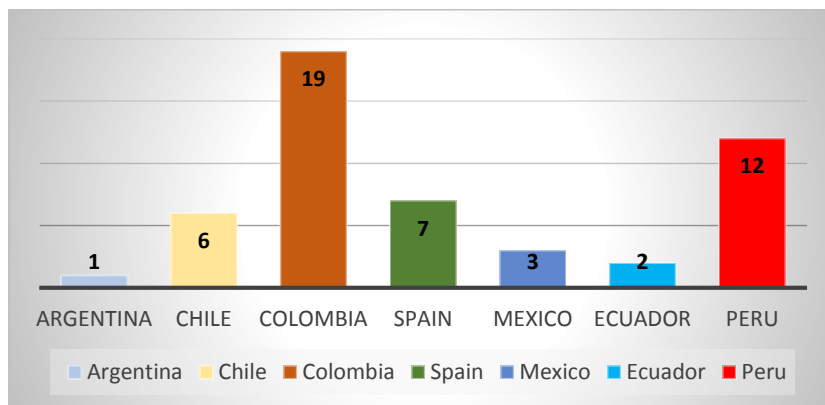


Fig. 2. Research by country of publication

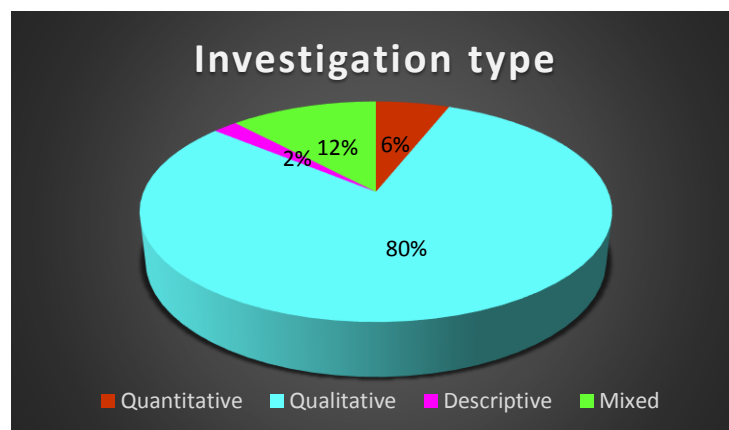


Fig. 3. Research by study type

## 5. DISCUSSIONS AND CONCLUSIONS

Based on the above, it is concluded that it is now considered necessary to strengthen CT's skills at all education levels in order to promote structures that allow students to acquire complex thinking, which will contribute to their performance at the academic and social level. This also highlights that in the disciplined process involved CT does not rival the nature of any type of subject. There are activities that can be implemented both in subjects with theoretical orientation, whether in the revision of specialized texts or discussions, as well as in those of an effector nature whose purpose is the proposal and projects execution. The particular interest in studying CT skills for analysis, evaluation and argumentation in basic education students is because they contribute to the understanding and assessment of information, which when used appropriately will increase opportunities to develop critical thinking.

The research selected and analyzed was mostly from Colombia and Peru; this leads to the conclusion that these countries have a greater concern to improve critical thinking skills from basic education, since teaching the elements of critical thinking, intellectual standards and virtues explicitly, on a positive attitude towards learning, will cause true critical thinkers to form.

## COMPETING INTERESTS

Author has declared that no competing interests exist.

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