Initial Cognitive Development That Supports The Critical Thinker's Formation In The University Context

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Abstract

The content of this text is a product of the research entitled Implementation of a didactic program based on the LASRED model and hybrid learning, aimed at developing critical thinking skills in students of the Corporación Universitaria del Caribe, has the phases of diagnosis, design, implementation and evaluation of a didactic strategy aimed at intervening the reality found. Following this process, a diagnosis was made with the first semester students of 2023, finding heterogeneity in the sociodemographic and cultural factors, with certain homogeneity in the global performances below the national average, shown in the Saber 11 test, specifically in areas as important as Critical Reading, Quantitative Reasoning and Natural Sciences. According to the analysis carried out, students entering the Institution should not only be attended to in cognitive and cognitive leveling processes, but the socioemotional dimension should also be addressed, considering the origin of the students and the historical events they have lived through their communities that have strongly marked their visions and expectations. This demands an adjustment in the meso- and micro-curricular sections of the institutional educational project, attending to the psychological restoration processes demanded by the identified weakness and promoting a dialogue of knowledge among the different courses that are part of the university's academic programs, reflecting on the learning outcomes, seeking to improve interdisciplinary integration, use emerging technological resources to facilitate learning and train teachers in the pedagogical approach, didactic strategies required and in the evaluation demanded by the formation of a critical thinker, without the need to create new courses, only attending to the generic and transversal nature of critical thinking.

Introduction

One of the parameters taken by academics and leaders in Latin American countries to measure the quality of education offered by a university is the value added (Rodríguez-Sandoval, M. and Vilchez-Pirela, R.[1] (2017). This is the reason why in recent years' studies on this line of research abound and new statistical protocols are increasingly used that take into account not only the evaluations that are made at two moments in the academic life of a student in their transit through the university, but also take into account some factors that may be influencing

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the students' performances in some of the tests performed, which determine the contribution that the university makes to their training. In this sense, one of the most important competencies in higher education is the critical thinking that a student demonstrates in scenarios of rational demands both in the classroom and in his daily life, so its promotion requires planning adjusted to the needs detected and a continuous monitoring of the intervention process, semester after semester, making the corresponding traceability along the curricular mesh, to avoid surprises in the results that may occur when value-added calculations are made using two moments of the student's academic life as is the case of using the Saber 11 and Saber PRO results. With this information, questions arise related to the definition and establishment of a protocol that shows the progress and development of a student in the course of the academic curriculum of a university program. Given this specificity, it is necessary that the intervention process has an analysis of the state in which the student is in cognitive, physical and socioemotional terms, with a description of the resources that the institution has to receive and incorporate the student into a university context that demands the learning of generic and specific current knowledge, to put them in evidence both in the academic and labor field. Therefore, it is necessary to specify terms such as the following:

Cognitive development of the critical reader.

Critical thinking and critical reading are terms that, although there may be a close relationship between them, their definitions present marked differences in terms of the purpose and development of the cognitive processes that are set in motion in the processing of texts. Therefore, it is important to know the concept of critical reading, in order to subsequently discuss its relationship with critical thinking and the cognitive developments developed by the critical reader. Critical readers put into operation high-level cognitive skills such as attention, memory, language and abstraction that influence the learning process (Restrepo et al., 2019). That is, to develop in students the ability to "look" between the lines, grasp the intentionalities and understand the internal logic of the text (Díaz et al., 2015). In this case, Cassany (2006) affirms that critical reading is the position with which the reader encounters a text with the intention to doubt, disregard and inquire. In such a way that he/she does not perform a superficial process of recognition, but seeks alternative explanations in a deep analysis of the text.

Likewise, Cassany (2006) proposes three levels of comprehension: the lines, between the lines and behind the lines. In the lines, the perception of the text is considered, understanding the literal and the meaning of the words. Between the lines, the emphasis is on what can be deduced from the words, from a more analytical view than the previous one; it is the process of inference of ideas that have not been explicitly mentioned in the text. And finally, behind the lines, it takes as a reference the positions, ideologies, purpose and intention to which the author points.

Kurland (2000) states that critical reading is a technique for the discovery of information and ideas within a written text, referring to careful, active, reflective and analytical reading. While critical thinking is the technique for evaluating such information and ideas in order to decide what to accept and believe, which implies reflecting on the validity of what has been read. However, this same author asserts that these two techniques in practice work together in harmony. In that sense, each technique develops different higher level cognitive processes, but they are connected to each other.

For his part, Serrano (quoted by Páez and Rondón, 2014) considers that critical reading is a process, which seeks the analysis of texts from the significance of the author's discourse taking into account the reader's previous concepts. Thus, the text is approached from the reader's own knowledge and experiences, taking into account the reading strategies that allow the understanding and interpretation of the text. In this way, one begins to consider that to think

critically is to coordinate several operations simultaneously, operations that are found at the moment of reorganizing the read text, interpreting it, understanding it, identifying the main ideas and other thinking skills, until arriving at evaluating what has been read and establishing the reader's position. It is then, where it is understood that critical thinking is the ability to understand a situation from different angles and perspectives, where they begin to form their own ideas or conceptions from contact with the readings, with the context, above all, to develop positions, attitudes or enriching solutions for the individual and for society.

According to Argudín and Luna (2013) present the cognitive developments of integration, hierarchization and analysis of information, with the sense of constructing the meaning of the text, implementing critical reading strategies that arise from the identification of central ideas and relationships between concepts. Likewise, such strategies will be determined by: who reads, what is read and how it is read. Solé (1998) proposes to identify three important stages where the development of different thinking skills is proposed.

Before reading: to find the objective, activate previous knowledge and develop elements at first sight. Here the reader must answer: why am I going to read; what do I know about this text; what does its structure tell me? At this stage it is necessary to formulate hypotheses and predictions. During the reading: to check the predictions and hypotheses established in the previous step, if not, these should be replaced by others. From this, a feasible interpretation of the text is constructed in order to subsequently reach comprehension. In addition, during this stage, the reader must face and solve the different problems that appear in the course of the activity; for example: false interpretations and gaps in comprehension. After reading: to construct a global comprehension and apprehend knowledge; to point out the main idea of the text, to elaborate on the main idea of the text, to elaborate on the main idea of the text, and to develop the main idea of the text.

In this way, the critical reader must be exposed to different types of texts, for example: literary and informative, where he can learn about different realities and give way to the construction of knowledge networks that interconnect with his own experiences and, in turn, can provide solutions to his own realities and contexts.

Cognitive development of the critical thinker

The learning process of students in higher education institutions requires various efforts, physical and mental, even more when it comes to learning about exact science courses, however, there is the accompaniment of teachers and the accommodation of learning environments. Chrobak (2017) mentions "that an adequate proposal to improve this situation would be the application of the competency model, which generated new ways to mediate the learning and evaluation processes in students, by seeking that they were in conditions to identify, interpret, argue and solve relevant problems of the context, these being the mental processes characteristic of critical thinking." (p. 2). Applied also to improve the cognitive processes of students who, sometimes, we find as passive or uncritical receivers to problem situations presented to them.

For which it is important to work on these mental processes or develop cognitive skills in educational institutions with models of active methodologies, where the student each time applies what he learns and transforms his ways of learning, involving the teacher in the transformation of his teaching model. In short, it is about "learning to learn and learning to change", in such a way that the classrooms and all learning environments are accustomed to develop critical thinking, through critical reading and writing exercises, with the achievement of reaching from basic thinking dimensions or skills to higher order ones, integrating

metacognition processes that enhance meaningful learning methodologies and skills to solve problems and make decisions.

Furthermore, to become good critical thinkers, we must relate theories to practices, ask our own questions, search for and use new evidence, evaluate arguments, find links between different arguments and, finally, categorize the main lines of thought. These last statements bring us closer to the knowledge and application of Ausubel, Novak and Gowin's theories, today known as the ANG theory, and to the application of one of the metacognitive tools developed within the framework of this theory: concept maps (Novak, J. D., and Gowin, D. B., 1981, cited in Chrobak, 2017, p. 3).

In line with this, Facione (1992) refers that, in the consensus of the expert panel, using the Delphi method, the skills of a critical thinker were established: interpretation as the ability to understand and express meanings of experiences; analysis that consists of identifying the relationships of actual and supposed inferences between statements, questions, or other forms of representation that are intended to express judgment, experiences, beliefs, or opinions; evaluation of both the assessment of the credibility of statements or representations that describe perception, experience, judgment, or belief, and the assessment of the logical strength of the relationships between actual or supposed inferences; inference, which assists in identifying the elements necessary to draw reasonable conclusions, formulate hypotheses, weigh the relevant information to reach the conclusions drawn from data, statements, judgments, beliefs or opinions; explanation as the ability to present the results of one's reasoning in a reflective and coherent manner; and self-regulation, which is the self-conscious monitoring or control of one's cognitive activities.

These qualities of thinking enable a person to understand the logical connection between ideas, evaluate arguments, detect errors, identify what is important and solve problems. Also, to reflect on their own ideas, beliefs and values to improve the arguments and strengthen the cognitive skills we use. In this sense, tools such as graphic organizers, allow us to develop thinking skills from the exercise of critical reading, generate critical writing from understanding, developing arguments and timely solutions to the proposed problem situations to think and solve. Chroback (2017), recommends following the following sequence: a) categorize the main concepts involved; b) establish the interconnections and cause-effect relationships between those concepts; c) make comparisons and contrasts between all the central concepts and point out the problems addressed; and, finally, d) proceed to the resolution of the problems to suggest the possible solutions obtained.

In this way, a critical thinker is capable of thinking for himself, evaluating the theories he consults and relating them to practice, at the time of making known the proposed solutions to the problems presented, starting from the skills used such as identifying, interpreting, evaluating, arguing and solving problems. In this context, for authors such as Aznar and Laiton (2017, cited in Robles, 2019), the development of critical thinker skills implies a comprehensive education, which develops their competencies and their fundamental characteristic of being in the sense of knowing how to mobilize the knowledge possessed in the different and changing situations that arise in practice.

Contexts for the formation of the critical thinker

Díaz et al. (2015) cites several authors who affirm that the university, as an institution and as a training context, is the promoter of critical thinking strategies, as well as of reading dimensions. Within this order of ideas, it is necessary for tertiary education to develop structured syllabuses that include critical thinking as a competence for the development of skills to understand and solve problems, for this it is essential to implement methodological strategies that support the

experience inside and outside the classroom, as well as to have prepared teachers, that is, critical thinkers who train critical thinkers.

Chrobak (2017), within his proposals for the development of critical thinking, proposes the development of a good pedagogical classroom climate should be characterized by a series of elements that contribute to the formation of creative competencies, such as: having respect for the individuality of the student; focusing the training process on their needs and possibilities to raise motivation levels; tending to a teaching-learning process that considers the pace of development of each student to achieve creative thinking and learning; and, finally, fostering freedom and responsibility to experiment, problematize and disagree by developing independence of action, judgment and imagination. None of these characteristics will be fulfilled if we do not ensure that university teaching helps students to formulate their own questions. (p. 7).

It is then, when from the classroom itself, the teacher must promote the development of critical thinking and its skills, setting the space in such a way that it is reflective, taking into account the own experiences and the learning pace of each student, allowing the imagination, but in turn, according to the realities, the judgment and the expression of their ideas. Also, to stimulate critical thinking from the planning of activities with different active learning methodologies, such as: learning by projects, by problems, by research, challenges, among others, that are presented in the classroom to put into play all the skills of students and the resolution of situations that may arise from their daily lives.

From the perspective of Villalobos, Avila and Olivares (2016, cited in Robles, 2019), "the nature of critical thinking is very complex, it is so that thinking critically implies taking charge of the mind and, therefore, of life, seeking to improve it based on one's own criteria." Therefore, one of the most important missions of schools is the development of critical thinkers, because in addition to mastering concepts or subjects, they must also become effective citizens, capable of reasoning ethically, communicating effectively, as well as being intellectually empathetic with alternative ways of seeing things and acting for the benefit of all.

For his part, for Alvarado (2014) the methodological strategies that should be applied in the classroom to foster this type of thinking are the following:

● Creating a favorable environment that fosters critical thinking.

● Use of audiovisual resources to generate curiosity.

● Fostering a context where students ask questions and construct their own knowledge based on reflection.

● Questioning previous learning through interactive dialogue.

On the other hand, Campos (2007) states that critical thinking is linked to other processes, forms, strategies, of thought and knowledge. In this sense, the dispositions that the ideal critical thinker should have are taken into account, such as concern for their beliefs, concern for understanding and concern for others. That is, they are concerned that their beliefs are true, consider different points of view, seek and offer reasons, keep themselves informed, avoid confusing others by taking into account the feelings and level of understanding and use their critical thinking skills (Ennis, 2011).

Thus, it is assumed that critical thinking "is directly associated with logic and reasoning, intuition and creativity, decision making and problem solving, and with reflective practice and the exercise of convergent and divergent thinking" (Campos, 2007). In this regard, Nájera (2016) establishes a connection between critical thinking and emotional intelligence, in which

he takes into account sensations, feelings and emotions in the learning process of students. It is because of them, that comprehensive education should be considered in the creation of environments within the contexts. As well as considering the development of the stages of cognitive development, since critical thinkers must be systematic, analytical, open-minded, inquisitive, truth seekers and trusting in reasoning (Facione, 1992), which can be developed when concrete thinking has been acquired.

In such a way that the teacher, through his pedagogical planning, who creates activities and tools that motivate students to develop thinking skills, organizing and evaluating his own teaching praxis, not only from the theoretical, but also, allowing to know his students from their links and situational factors. As Hunt (2009, cited in Alvarado, 2014) mentions, "other skills that a teacher should have are: treating their students fairly and justly, correcting mistakes in a positive way by helping them to visualize life lessons, applying formative evaluations to make the necessary adjustments according to the progress of the program and the learning obtained, as well as creating affective and value bonds". Understanding then, that from the daily life of the students to their integral formation generates tools to contextualize their situations and develop higher order thinking skills.

Critical media literacy

Critical media literacies have appeared as the media in which information moves and in order to make a critical reading of it, one must take into account both the medium in which it is presented and the textual typology (Kurland, 2000) and everything related to the management of the ideology of the discourses (Cassany, 2005).

Cassany (2006) states that

Contemporary literacy theory holds more relativistic and postmodern conceptions about the nature of knowledge, the perception of reality or the role of discourse. Discourse does not possess knowledge in itself, but rather it emerges when it comes into contact with the meanings provided by each community through the reader.

Likewise, Cassany (2006) highlights four dimensions of critical literacy; the resources of the code, in which the student assumes the role of code processor, with grammatical competence; the resources of meaning, in which the student assumes the role of meaning builder, with semantic competence; the pragmatic resources, in which the student assumes the role of communicative user of the text, with pragmatic competence; and the critical resources, in which the student assumes the role of critic or text analyst, with critical competence.

In this sense, the student is expected to interact with the media in a critical way through the representations, systems, ideological structures and power dynamics that shape and reproduce culture and society (Definition of Critical Media Literacy, n.d.). That is, what is intended is to develop in students the critical awareness of the reader to evaluate and assess their position starting from the link between language, representations and distribution of power (Foley, 2017). Meanwhile, for Abbiss (2016) it is a way to instill criticality and frame informed analysis and debate on social issues, representing a learning orientation and a set of teaching and learning strategies, which can adopt different reading perspectives.

Methods

This study has a quantitative approach, with descriptive scope and non-experimental design (Hernández, Fernandez and Baptiste, 2014). To propose the type of study, according to the research objective, a review of information was made, using the Mendeley manager, on the

topic addressed in the academic production of recent years and 6361 results were found, distributed as follows:

Table 1. Descriptive of the academic production on critical thinking in the last 5 years

| Year	N° Doc.	Document type	N° de doc.	Publications	N°	Author	N°
2019	583	Journal	5375	Ciencia latina	44	Carlos Saiz	6
2020	687	Book	257	Rev. Boletín REDIPE	27	Linda Elder	6
2021	667	Book section	243	Zona próxima	22	Nidia Torres	6
2022	593	Conference proceeding	134	Actualizaciones investigativas en educación	15	Richard Paul	6
2023	35	Thesis	112	Revista innova	13	Abdiel Rodriguez	4

From this information it was possible to extract that there are both internal and external factors that affect the formative process of students, specifically in the development of generic competencies. For the case of the formation of critical thinkers, (Alvarado, 2014 and Betancourth-Zambrano, S., Tabares-Díaz, Y., and Martínez-Daza, V., 2021) scenarios are required that promote debate among participants through work sessions where critical reading and the exercise of permanent criticality lead to the development of skills such as analysis, synthesis, evaluation and argued decision making, turning (Table 1) these exercises into thinking routines. As for the number of documents produced in the last 5 years on this subject, it is seen as an effort by academics and universities to meet the training demand of professionals and citizens with high levels of critical thinking.

The sample unit was taken from a universe of 1013 classroom plans and learning guides that were reviewed and evaluated institutionally, according to the indicators that were formulated for this purpose. Classroom plans and learning guides were taken from the language workshop I and II courses and the learning techniques course, which contribute to the learning outcome based on communicative competence. With the 29 documents, a descriptive analysis was made using the instrument significant traits promoting critical thinking in the classroom plans (Rodríguez-Sandoval, et al., 2021).

Results and analysis

In order to make a fair analysis of the reality of CECAR, the historical average global score (PGP) of the Saber PRO test was taken to compare it with the national average, as shown in Figure 1:

Figure 1. SABER PRO average global score 2016-2022.
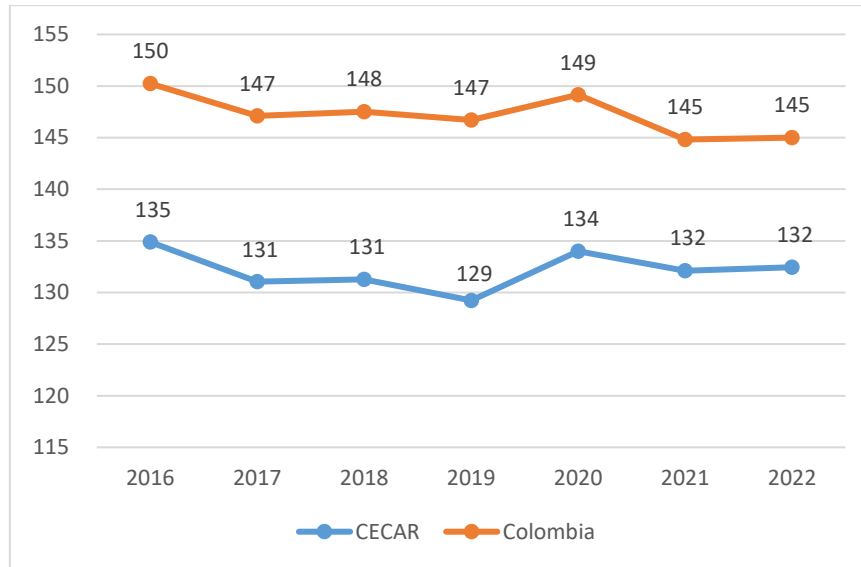
Source: ICFES - OECC Calculations

According to the content of the graphs, they show that the performance of CECAR students is below the national average in the generic competencies evaluated in the SABER PRO test in the last seven years.

However, despite the fact that the information presented in Graph 1 is conclusive, there is a possibility of making a fairer comparative analysis of these performances, using a technique that generates information on the location of national universities that receive students with averages similar to those of CECAR in the SABER 11 test. This initiative is shown in Figure 2, seeking arguments on the added value of these universities and the location of internal or external factors that are generating this type of behavior in the students' performance.

Figure 2. Average Score and Individual INSE in Saber 11. Students evaluated in Saber Pro 2016-2021
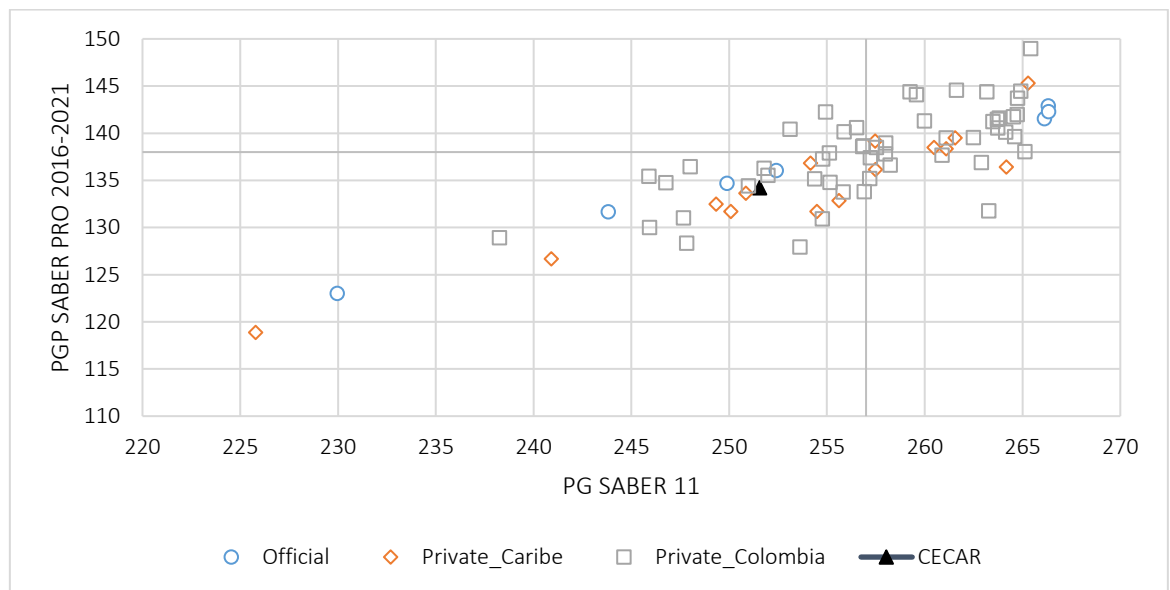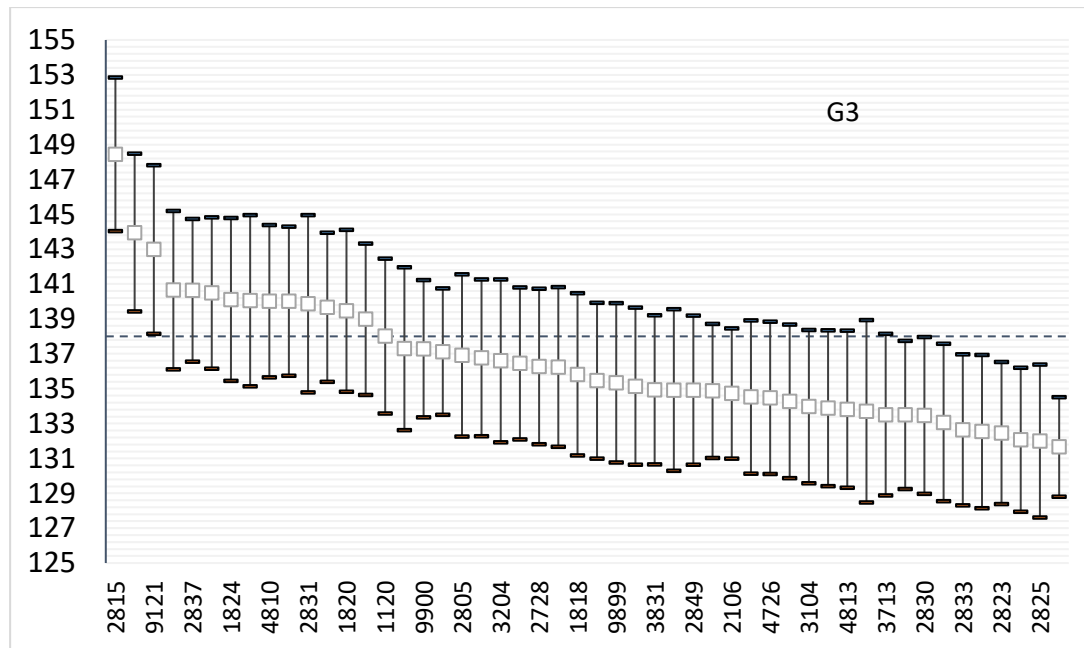

Source: ICFES - OECC Calculations

Due to its position, CECAR receives students with averages below 250 points (maximum score 500), which indicates that they show weaknesses in the competencies that are part of the basic nuclei of knowledge (NBC) for any of the careers that the university has. This information is important to determine the contribution that CECAR gives to its students, the university in their transit through the courses of each academic program.

If CECAR is compared with related universities, that is, with higher institutions that receive students with a similar profile to those received by CECAR, as shown in the following figure:

Figure 3: Comparison of universities with similar profile to CECAR-Saber 11 Test.

Source: ICFES-OECC calculations-SNIES code of universities participating in this exercise (CECAR-2823; Corporación Universitaria Adventista 2815; Fundación universitaria San Agustín 9121; Fundación Colombo-Internacional 2837).

Compared to other HEIs, CECAR hosts students with lower levels of performance in Saber 11 and a lower INSE, both overall and at the cluster level. Nevertheless, its PGP in Saber PRO has been improving since 2016, even during the pandemic. Even so, despite evidence of a slight improvement, it is still below the national average.

The performance gap between CECAR and G3 is evident in all basic competencies evaluated in Saber Pro. It is wider in English (32 p.p.), Quantitative Reasoning (18 p.p.) and Critical Reading (17 p.p.). In Written Communication, the difference is only 3 p.p. In addition, it should be taken into account that the G3 population represents 25% of the CECAR population.

If we consider only the group with which CECAR is 'comparable' in terms of Saber 11 and INSE, and also compare them with the 50 HEIs in this group with the highest PGP in Saber Pro, only significant differences are observed with 3 institutions (threshold of the effect). The Value Added (VA) to basic competencies is at the average of the measurement. That is, compared to the HEIs in its cluster, CECAR students obtain scores in Saber Pro close to what is expected according to their results in Saber 11.

Figure 3. Percentage of Students with Adequate Performance Levels (3 and 4) Generic Competencies Saber Pro 2022.
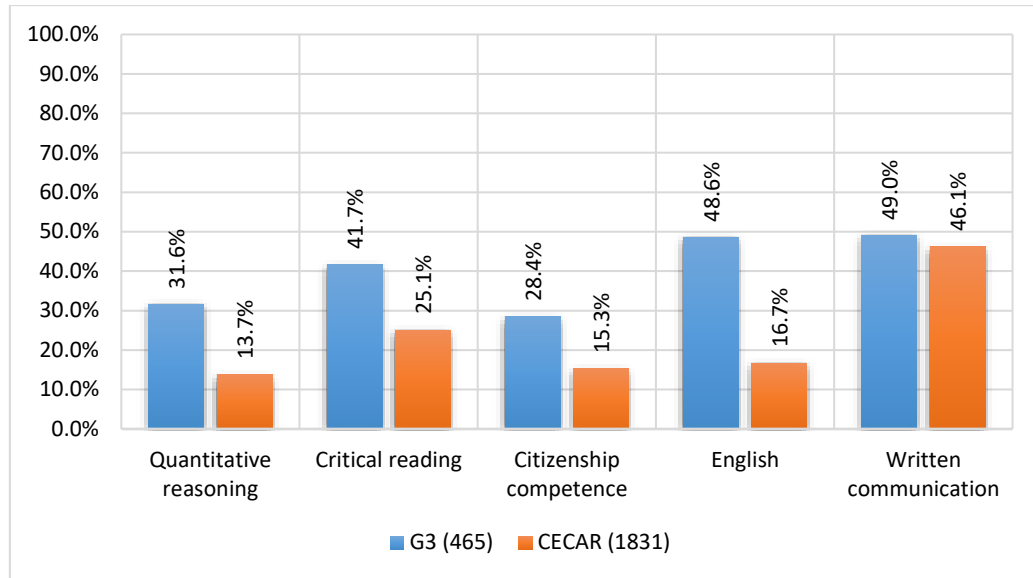
Source: ICFES-OECC calculations. G3= Corporación Universitaria Adventista - Antioquia Fundación Universitaria Cervantes San Agustín - Bogotá D.C. and Fundación Universitaria Colombo Internacional - Bolívar.

In the comparative shown in the table above, the gap in the contribution of the group of universities (G3) and CECAR is notorious. This reference is considered important because it highlights the work of the university in the development of the generic competencies evaluated in Saber PRO. This outlines the thesis that by eliminating the differences in the Saber 11 performances that students may have at university entrance due to the affinity that the universities have (G3), it is necessary to analyze the internal factors of CECAR, both academic and situational factors, which may be affecting the contribution of the university in the improvement of the students' performances in the evaluated competencies.

Moving forward in the identification of the internal factors that determine the performance of students in the Saber PRO test, the historical critical reading performance of students entering CECAR was analyzed and it was found:

Figure 4. Historical student performance on the critical reading test.
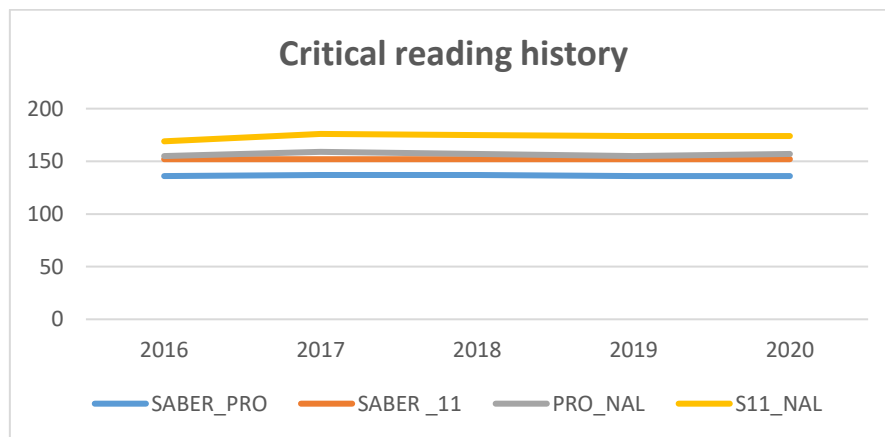
Source: ICFES-Calculations REDINA group

The figure above presents the historical performance of students in critical reading in Saber 11 and Saber PRO. It is observed that the critical reading results in Saber 11 and Saber PRO are below the national average. It is also observed that the performance of students in critical reading in Saber PRO is below the performance shown in Saber 11. This behavior of the trajectory of the graphs shown makes the contribution given by the university as added value to its students in this competency insignificant or null and, in this context, the predictive models that take as a basis the Saber 11 performances, provide values of very low statistical significance that explain this behavior.

Subsequently, the performances of both students and the university in the census tests were analyzed and a socioeconomic characterization of the students who entered in the first semester 2023 was made, with the purpose of discriminating both internal and external factors that may be influencing the low performances of students in Saber PRO and it was found:

Table 2. Characterization of CECARENSE students enrolled 2023-1

| N°	Aspect	Description
1	Social group	Of the 773 students enrolled in the first semester of 2023, the following stand out: Displaced: 21.08%, Indigenous: 19.76%, Victim of the conflict: 5.43%, Afro-descendant: 4.78%, LGTBIQ+=0.12%, Other groups: 0.25% and of rural origin: 40.87%.
2	Previous studies	138 are technicians, 20 are technologists, 16 are professionals, 3 are specialists and the rest are bachelors.
3	Residence	341 live in Sincelejo, 249 commute to campus and 122 are pensioners in Sincelejo.
4	Stratum	Stratum: 58.6% stratum 1 and 27.30% stratum 2, with the rest distributed in strata 3, 4 and 5, respectively.
5	Gender	53, 65 % are women and the rest are men.
6	Monthly household income	Less than 1 SMMV*=16,81%; 1 and 2 SMMV=50,97%; 2 and 3 SMMV=15,65%; Greater than 3 SMMV= 8,92%
7	Educational level parents	346 are high school graduates, 214 are university graduates, 85 are elementary school graduates, 61 have completed postgraduate studies and 6 have no recorded studies.

Source: ARECCECAR (Analysis of results of CECAR characterization survey. *SMMV=Minimum monthly salary in force.

There is a high percentage of students displaced from the lands affected by the Colombian armed conflict who, to date, have not had a special socioemotional restoration program that allows them to minimize the impact of such an event. Neither is there any discrimination in the accompaniment of the predominant ethnic groups in the area that regularly demand CECAR's programs. We attend equally to those with indigenous, black or peasant origins. Each of them has a history that determines their beliefs and has a great contribution in their thoughts, feelings and attitudes. This psychological base is the source of the dispositions that a student has to learn and continue learning.

In relation to the review and assessment of the documents of classroom plans and learning guides, using the instrument of Rodriguez-Sandoval, M. et al., (2021), seeking to identify significant features that promote critical thinking in their structure and content, it was found:
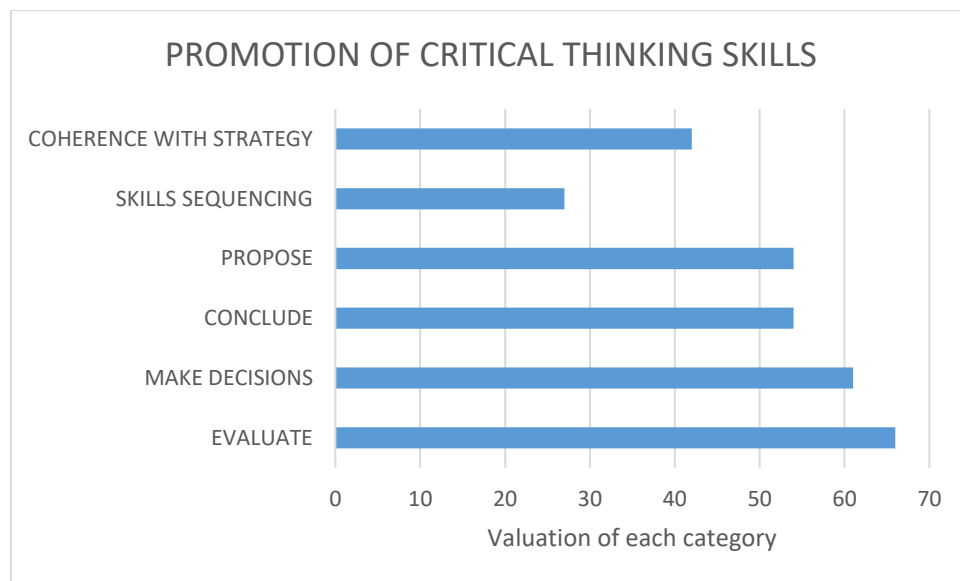
Figure 5

Significant traits of critical thinking in classroom plans and learning guides
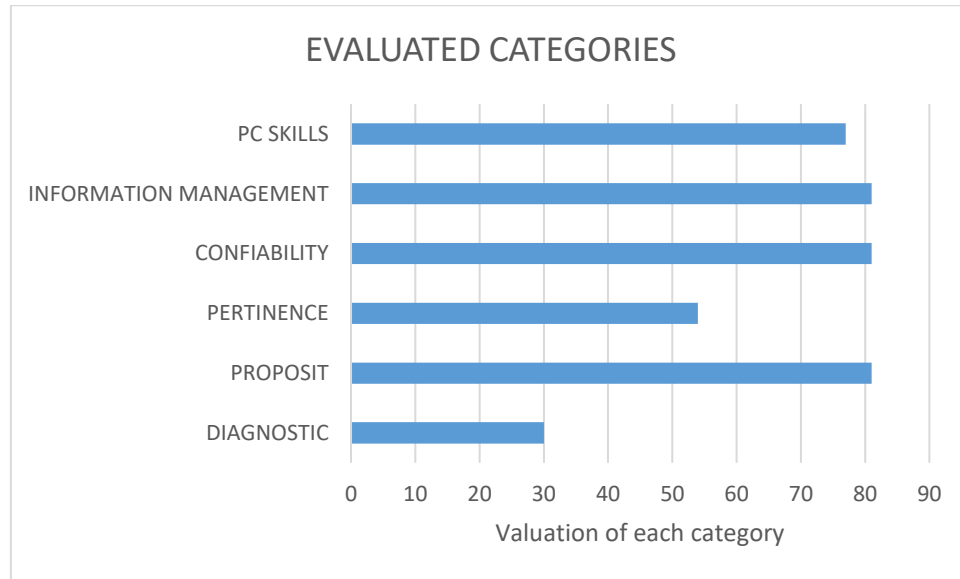
Source: REDINA Group

The documents evaluated show strengths in the activities corresponding to the purpose, reliability of the information and information management. A very marked weakness is evident in the diagnostic section, which should be in the content of the classroom plans and learning guides of the courses of the academic programs. The formats of classroom plans and learning guides do not require this information, therefore, the flaws are present from the design. Without this information, the classroom plan presented is seen as something hypothetical, i.e., it is based on the assumption that there are some weaknesses that the teacher believes his students present.

Figure 6 Promotion of critical thinking skills

Source: REDINA Group

According to the results presented in Figure 6, strengths are observed in the activities that seek to evaluate the development of the tasks and make decisions, and weaknesses in those that seek the student to infer or conclude. Also, it is observed that the declared methodological strategies are problem-based learning and case studies compatible with the protocol sequence required to promote the development of critical thinking skills, this coherence is not evident in the proposed activities, which appear in isolation and not in the expected sequence. In this sense, from this information, a proposal should be generated or specific suggestions that define a thinking routine or concrete actions to improve a situation should be taken into account.

Discussion of the results

The discussion is centered, in the first instance, on the heterogeneity of the population that enters CECAR's programs. In it, the needs of attention to particularities such as displacement and extreme structural poverty of the indigenous, black and peasant communities are notorious, factors that have been the common denominator throughout its history. The first point of intervention of the Plan of Attention to Students of the University Welfare Office of the Corporation should focus on these differences and organize the intervention and follow-up model in such a way that it addresses not only the cognitive weaknesses shown but also the socioemotional component. The second aspect to be addressed is the relevance of classroom plans and learning guides. These should have an explicit section for both institutional diagnosis and classroom particularities so that the teaching exercise does not start from a hypothetical approach (Stenhouse, L., 1998, p.3), but takes into account the context defined in the diagnosis, considering the initial state in which the actors of the teaching and learning processes find themselves, as well as their context. In this case, the problematic situations that are part of the context of analysis in the classroom are part of the students' training scenario.

The third aspect points to the use of a strategy that integrates activities that promote the development of critical thinking skills in a sequential manner. One of the weaknesses shown in the study of the documents reviewed is the lack of sequencing of these processes in the activities proposed. Although methodological strategies based on problem-based learning and case studies prevail, it is not evident that the product obtained is the result of the use of a thinking routine that leads to decision making and proposition.

The fourth aspect focuses on the contribution given by the university to each student in his or her transit through the academic programs. According to ICFES (2018), "Value Added models are statistical models that seek to quantify how much educational institutions contribute to their students in terms of learning, independent of the students' entry conditions". With this, the estimation of Value Added models seeks to capture the causal influence of institutions on students (Cunha & Miller, 2014) through the measurement of the proportion of the variance in students' standardized test scores that can be attributed to the HEI and programs. According to the results presented in Figure 3, it is observed how a group of universities that have a similar behavior to CECAR in the Saber 11 test, present a greater contribution in the training of students than CECAR. This reveals the incidence of personal and institutional factors in the magnitude of the added value that the university contributes to the students' education.

The fifth aspect consists of the level of competence that students reach at CECAR, as evidenced in the SABER 11 test. According to the history (Figure 1), the average performance of students in this test is below the national average and, in the critical reading test, the average also has this behavior (Figure 4). In the Saber PRO test, although in recent years, there has been a slight improvement (Figure 3), the average is still below the national average. These two benchmarks are important to adjust classroom plans, learning guides and complementary activities to improve levels of critical reading and dispositions to use information to make decisions and solve problems. In this sense, the levels of comprehensive reading, criticality as an important

trait for advancing in the development of critical thinking, and the ability to use information to make decisions and solve problems are improved.
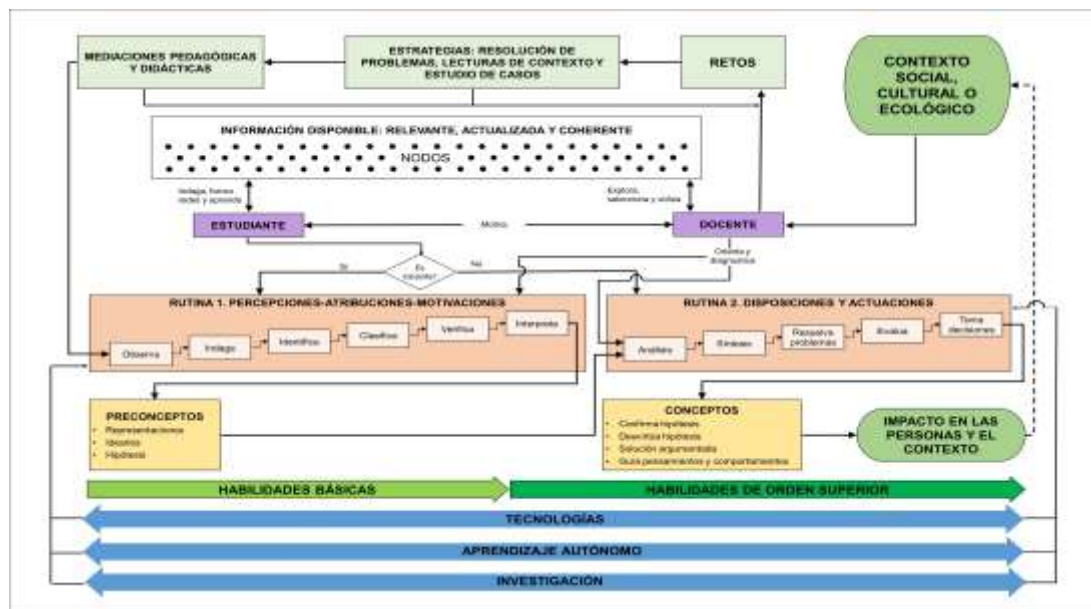
Source: Rodríguez-Sandoval, Bernal-Oviedo, G. and Rodríguez-Torres, M. (2022)- LASRED (Read, analyze, synthesize, solve problems, evaluate and decide).

A didactic model is proposed that starts from the problems of the student's context. In this sense, the social, cultural or ecological problems are part of the text that must be used by the teacher to design the strategy that promotes the development of basic and higher order skills, based on the comprehensive reading of the text, the analysis of its content, the synthesis of arguments, their evaluation and decision making, adjusted to pre-established management indicators. In this planning process, the teacher counts on methodological strategies, adjusted to the need and purpose, such as problem-based learning, case studies and project-based learning, which have a long tradition of research and pedagogy in the deployment of the sequence of skills that a critical thinker must have in his transit from the preconceptions he has of the object of study to the elaboration of a concept.

The use of technologies that allow the creation of physical, virtual or mixed learning environments compatible with artificial intelligence, augmented reality and data analysis applications, make it possible to manage information, evaluate it and guide the decision-making process with arguments, which is fundamental in a critical thinker. This type of scenarios must have techniques and instruments, built with the help of these technological tools and used in the evaluation of information and in the quality of the products built and decisions made.

Evaluation forms that are adjusted to make traceability at each moment of the process, based on techniques and instruments, with quality indicators and performance levels. In this process of elaboration of rubrics, the latest developments in artificial intelligence applied to education allow guiding the process to be followed, the clear conceptualization of the type of products to be elaborated or challenges to be addressed and the level of autonomy to be achieved.

Critical and creative thinking: the construction of high impact products based on information management, with the compliance of criticality standards and the approach to legitimacy. In this sense, the formation of a critical thinker requires a clear and intentional instructional design, with a didactic approach that enables the planning of a didactic sequence that is part of

a methodological strategy that allows the sequence deployment of cognitive and metacognitive tools in terms of solving a problem or overcoming a challenge. However, the effectiveness of the method depends on the intention of the teacher-trainer, i.e., if he/she intends to confirm or refute a thesis, he/she must have a theory or reference that allows him/her to make comparisons adjusted to this work. In this direction, approaches are used that determine the debate from the geopolitical as from conspiracy theories (Oliver & Wood, 2014; van-Prooijen, 2018; Drochon, 2018) and protectionist and interventionist ones, which define media texts, which must be criticized from the source and intention of the author with the purpose of contributing to the audience with arguments to mitigate the effects of the media content (Craft et al., 2017; Samuel-Azran & Hayat, 2019). These worldviews can be clearly evidenced in the text analysis from criticality, considering that many of the texts to be used come from the Colombian socio-political and cultural context, where political polarization has permeated all sectors of the population leading to behaviors of the social collective characterized by the worship of certain political leaders or caudillos without questioning the veracity of the information that reaches them.

Regarding the need to approach problems from an interdisciplinary and transdisciplinary perspective, it implies fostering the students' ability to approach complex problems and issues from multiple perspectives and fields of knowledge. In this sense, it allows the student, in the first instance, to analyze the object of study from different points of view, considering its complexity, identifying, characterizing and giving explanations that conform to a holistic structure and dynamics, discriminating the contributions of each segment or part in the problems, to propose argued, pertinent and coherent solutions with what is sought. The strategies and approach that best fit this aspiration are: Fostering collaboration by integrating disciplines, using projects as a strategy consistent with the aspiration. Formulate questions or select cases that allow approaching the object or problem of study from different approaches: historical, cultural, scientific, social, ethical, aesthetic, etc. Consider debates and discussions as the appropriate scenario to discuss visions and arguments. Encourage reflection and metacognition on their positions or decisions with the purpose of acquiring a clear vision of the object in question in order to minimize the effect of harmful messages disseminated through the media (Jeong et al., 2012).

This process, which is apparently simple, is highly complex, because in the first instance, in order to manage the information on the topic addressed, a series of basic cognitive skills are required to search, select, evaluate and process it, with the purpose of knowing the subject matter, the author's intention, its origin and its usefulness in the context of the work. This first part concentrates all those skills to learn to learn from a quiet, detailed and intentional text reading exercise, which will allow the reader, according to Lau (2007, p. 12), to make an exercise of informative literacy in a sequential way, so that the process leads to locate, access, retrieve, evaluate, organize and use the information. Secondly, critical literacy, as Cassany (2006) calls it, becomes the scenario that the critical thinker must go through in the process of learning and automating skills such as analysis, synthesis, evaluation and decision making. The method for learning contents and obtaining new knowledge in the process of research work is the procedure of critical reading. It constitutes, in our opinion, in a methodological tool to approach the text and to awaken in the student the critical spirit, obtain own ideas, coin criteria and turn him into an authentic intellectual (López Yepes, 2015a, pp. 9-11) of The transdisciplinary content is evidenced when the student is able to question a content from social ethics, without biases or conveniences.

For the establishment of a proposal of this nature at the university level, the process must have the support of senior management, so that the necessary resources are available to carry it out. Next, the scenarios and strategies must be adapted to carry out training processes in the design,

implementation and evaluation of a didactic sequence aimed at promoting the development of critical thinking using the disciplines that are part of the curricula of the academic programs. This process requires addressing issues such as situated learning, LASRED didactic model, methodological approaches, didactic resources, emerging technological resources, learning scenarios and evaluation forms of evaluation consistent with the development of criticality and critical thinking. From this process of conceptualization of the LASRED didactic model in the university curriculum by the teachers, traceability is made in the adjustment to the classroom plans and learning guides of the courses of the programs offered. In this way, an intervention capacity is created from the pedagogical, didactic and technological point of view, in order to give an added value to the training programs of the university organization.

Conclusions

The first-time students at universities with CECAR's profile are characterized by their heterogeneity of origin, history and culture. Each group has a history loaded with violence that has been a determining factor in its development as a people and in the future expectations of its inhabitants. The homogenizing factor consists of the structural poverty in which the vast majority find themselves, according to DANE (2022), which determines their thoughts, feelings and actions, in a scenario full of shortages, debts and resignations. These aspects should be addressed from university welfare, specifically from the TAE program (Student Academic Path) because without personal restoration processes, little progress in cognitive and socio-affective developments can be achieved in terms of improving their beliefs, attributions and dispositions towards study and improvement in general.

The intervention proposal must have an intention that encompasses personal, institutional and contextual factors that address the detected needs of the students. In this sense, the characterization of the entering population defines the type of plan to be used considering the institutional capacities and the disposition of the impacted population to participate in processes aimed at editing their beliefs and improving their representations of the reality in which they live in order to generate new expectations towards school and the future in general and not, as expressed by Bourdieu (1999, p.122), the generational reproduction of the same way of thinking throughout their history because it is part of the cultural capital. After this precision, Bourdieu (2005), makes explicit the form of intervention that makes possible substantial changes in this cultural trajectory: "The reproduction of the structure of the distribution of cultural capital operates in the relationship between the strategies of families and the specific logic of the school institution" (p.108). With this consideration, the belief about the anchoring of cultural capital in a community and the possibility of intervening it in university institutions considering its origin and institutional capacities to meet the demand is distorted.

In the curricular part, the use of a didactic model such as LASRED, enables the teacher to design curricular plans situated with methodological strategies that address the problems of the context, proceeding to solve them using established procedures that will guide the student to advance, overcoming cognitive and metacognitive challenges, making the necessary decisions according to the proposed goal, seeking the necessary resources that will allow him to continue in the process and constantly evaluate his learning process and the results acquired in terms of improving his levels of criticality and critical thinking. In this sense, universities such as CECAR should make adjustments in the plans of attention to the diversity of incoming students, ensuring the accompaniment of the processes, not only in the cognitive but also in the socioemotional, so that these two dimensions make synergy in the student's transit through the university.

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