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Academic factors associated with the formative research process in the educational institutions of the official sector of Sincelejo, Sucre

Factores académicos asociados al proceso de investigación formativa en las instituciones educativas del sector oficial de Sincelejo, Sucre

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ABSTRACT

The study's objective was to describe the academic factors associated with developing the formative research process in public educational institutions in the municipality of Sincelejo. For this purpose, a quantitative and descriptive methodology was used, applying surveys to the students and teachers of the sample of 14 educational institutions; Additionally, a documentary analysis was carried out based on the variable of academic factors. Among the most relevant results, it was determined that the academic factor, which prevails in formative research from the student's perspective, is linked to the pedagogical practice implemented by teachers. It is concluded that the traditional model based on the transmission of knowledge and its accumulation predominates in educational institutions. At the same time, some oriented towards formative research and learning by doing have been implemented.

Keywords: Learning, school, research, curriculum, educational resources

RESUMEN

El estudio tuvo como objetivo describir los factores académicos asociados al desarrollo del proceso de investigación formativa en las instituciones educativas públicas del municipio de Sincelejo. Para tal fin, se utilizó una metodología de enfoque cuantitativo y de tipo descriptivo, aplicando encuestas a los estudiantes y docentes de la muestra conformada por 14 instituciones educativas; adicionalmente, se realizó un análisis documental a partir de la variable sobre los factores académicos. Dentro de los resultados más relevantes, se determinó que el factor académico, que impera en la investigación formativa desde la perspectiva de los estudiantes, se encuentra vinculado a la práctica pedagógica implementada por los docentes. Se concluye que en las instituciones educativas predomina el modelo tradicional basado en la transmisión de saberes y en su acumulación, y, al mismo tiempo, se han implementado algunos orientados hacia la investigación formativa y de aprender haciendo.

Palabras clave: aprendizaje, escuela, investigación, plan de estudios, recursos educacionales

JEL classification: I20, I21, I24, I25

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INTRODUCTION

Research, as an essential pillar in students' cognitive knowledge development, generates significant contributions in their lives, transforming and adapting them to the changing times. For this, education with quality must include formative research as a transversal axis that changes and impacts people's lives in their family's social and cultural environment, enriching the vision of the world (García et al., 2018). Research allows the transformation and generation of spaces for the construction of knowledge in children and young people in public educational institutions, bringing a differentiating value to the teaching and learning process. This process stimulates changes in the mentality and life of students by developing research skills -reflecting, criticizing, questioning, and inquiring- to provide solutions to the problems of the environment (Espinoza, 2020).

On the other hand, the education of the 21st century has as its main challenge the formation of individuals who

transform society with research capacity and analytical and critical spirit (Flórez et al., 2018). Education must contribute to the generation of changes that guide the development of people in their daily tasks, from integrality, i.e., to train the individual from the cognitive and involve physical, social, and emotional skills, to contribute to their growth. This will lead institutions, educational centers, and universities to transform and generate knowledge. For this, the essential mechanism is research, as demonstrated by the educational models implemented in developed countries that work with research practices as the basis of curricular processes in educational institutions.

Among them, it is worth mentioning, on the one hand, Finland's educational model, which is characterized by prioritizing teacher training based on research (Didriksson, 2017), and secondly, Singapore's educational model, which aims to develop creativity, research, and entrepreneurship in its students, based on teacher empowerment and competencies (Casillas, 2018). In this sense, these flexible and innovative educational models open spaces for forming "empowered, happy and healthy students, lifelong learning, entrepreneurship, programming, technology inclusion, gamification, social responsibility, collective power and Agora" (Bernate, 2021, p.3). At the same time, these models favor learning towards participation, collaboration, knowledge transfer in the classroom, and the recognition of problem situations in their environment (Araque, 2020).

Therefore, this research describes the academic factors associated with the formative research process in the educational institutions of the city of Sincelejo, its advancement, development, and action in the teaching and learning processes, in which the student, from his training environment, makes transformational changes in his environment, whose task is crucial the teacher's participation as a motivator and inciter of this transformation (Toro, 2020). Likewise, necessary elements are provided to transform and innovate school scenarios to change the attitude, didactics, and methods of teachers, students, and the community whenever research projects are generated from productivity and competitiveness in their environment. The study is part of the research "Analysis of the academic, economic and institutional factors associated with the formative research process in the official educational institutions of the municipality of Sincelejo," established in the specialty thesis, Corporación Universitaria del Caribe CECAR.

Theoretical elements for process understanding

Research is considered an element of great importance in the educational context and a universal source of it (Arteaga & Escobedo, 2016). A synergistic relationship is established between the two since research provides knowledge, while education applies to teaching and learning processes. According to Rivadeneira and Silva (2017), "research-oriented learning develops skills in students to approach state of the art (knowledge), solve problems (procedures) autonomous and team learning (attitudes), as long as teachers promote intrapersonal and interpersonal skills in the classroom" (p.6).

In addition, we speak of formative research when research is involved in the teaching and learning processes as a must in the school. Restrepo (2004) defines it as "research activities that add the logic of research and apply research methods, but do not necessarily imply the development of complete research projects or the discovery of new and universal knowledge" (p.3). Similarly, Parra (2004) understands it as "that research that is part of the teaching function with a pedagogical purpose, and that is developed within a formally established curricular framework" (pp. 71-72).

Consequently, it is intended that the student learns research from the practice itself, using different methods and techniques to carry out his work as a learner under the guidance of a teacher, which allows him to develop thinking skills such as interpretation, analysis, and synthesis of information so that he can formulate and solve problems in his context from the observation, description, and comparison of phenomena. Thus, for formative research, it is necessary to think of pedagogical practice from a different point of view, where the teacher is the subject that leads to the inquiry and training of students since they, in turn, are learners of the processes involved in research.

On the other hand, current trends in education are inclined to implement formative research inside the classroom, from the use of active, critical-reflective models, such as meaningful learning, discovery learning, research seminars, Classroom Pedagogical Projects (PPA), problem-based learning, among others, which guide students to the knowledge of their context and the positive transformation of reality (Espinoza, 2020). In turn, these pedagogical models are oriented to forming children and young people with an investigative spirit who abandon the behaviorist paradigm that limits teacher-student interaction to a hierarchical authority environment (Álvarez, 2017). With this, it is sought that the student is recognized as an object and subject of education with a role preferably disposed to the inquiry of solutions to the problems of their context.

Therefore, teachers should assume research as a source of personal and professional growth, which will allow substantial changes in their practices towards novel pedagogies, in which critical and reflective attitudes are promoted, rational confrontations with the other, the inquiry of their reality and the context in general with divergent approaches and strategies (Gómez et al., 2019). Thus, training practices in educational institutions are established as quality elements, leading teachers to a critical self-evaluation of their academic work, assuming significant commitments that enrich the school's reality and improve its quality. For the development of research inside the classroom, it is necessary to mention the learning environments, which, according to García-Chato (2014), corresponds to:

> Integrated system, made up of interrelated and organized elements, which help to generate stimulating scenarios for learning. It is based on the planning, design and arrangement of all the elements that promote it and concerns the context in which the child develops and his or her learning process (p. 71)[Sistema integrado, conformado por elementos relacionados y organizados entre sí, que ayudan a generar escenarios estimulantes para aprendizaje. Se cimenta en la planeación, diseño y disposición de todos los elementos que lo propician y concierne al contexto en que el niño se desenvuelve, y a su proceso de aprendizaje].

The educational environment must have the necessary means for the performance of school practices, foster motivation and incentive in students, and develop their capabilities, competencies, skills, and values; it must also provide the conditions for enriching learning that allows students to exercise not only their autonomy and freedom but also the appropriation of knowledge through strategies implemented by the teacher for the best use of the contents. It is important to highlight the need to establish the academic factors for the good performance of an educational institution and to generate effective results in the research process. Among them, the curriculum, study plans, teaching methodologies, and resources (library) are worth mentioning. In this regard, Law 115 (1994) defines the curriculum as:

> The set of criteria, curricula, methodologies and processes that contribute to the integral formation and the construction of the national, regional and local cultural identity, also including the human, academic and physical resources to implement the policies and carry out the institutional educational project.(p. 17)[El conjunto de criterios, planes de estudio, metodologías y procesos que contribuyen a la formación integral y a la construcción de la identidad cultural nacional, regional y local, incluyendo también los recursos humanos, académicos y físicos para poner en práctica las políticas y llevar a cabo el proyecto educativo institucional].

In this sense, the curriculum is a school component that specifies the actions, skills, contents, national references, learning needs, types and forms of evaluation, among others, that teachers must take into account in order to develop their pedagogical practice. In turn, Angulo (1994, p.1) indicates that the curriculum is used by experts to:

> indicate a "plan" for the education of students and 2. identify a "field of studies"). In the first sense, it acquires a prescriptive (normative) meaning about what should be carried out in an academic institution, it is the plan or planning by which the teaching-learning processes are organized and in the second sense, it is treated as a phenomenon worthy of being studied as the foundation of a disciplinary region, which is nourished by the research of any of the aspects in which, as a phenomenon, the curriculum is present. This author defines it as a curriculum system when all the processes and the organizational structure through which it is applied are present[indicar un "plan" para la educación de los estudiantes y 2. identificar un "campo de estudios). En el primer sentido, adquiere un significado prescriptivo (normativo sobre lo que debe ser llevado a cabo en una Institución académica, es el plan o planificación por la cual se organizan los procesos de enseñanza-aprendizaje y en el segundo sentido, es tratado como un fenómeno digno de ser estudiado como fundamento de una región disciplinar, la cual se nutre de la investigación de cualquiera de las vertientes, en las que, como fenómeno, el currículo se presente. Este autor lo define como sistema curricular, cuando están presentes todos los procesos y la estructura organizativa a través de lo que es aplicado].

On the other hand, the construction of the curriculum is oriented from different levels of concreteness to move from educational policies and national references to institutional curriculum planning and from there to classroom planning (Fernández, n.d.). The first level of concreteness or macro-curriculum corresponds to the educational policies outlined by the Ministry of National Education, which are the fundamental basis for the definition of the institutional policies of educational institutions. This corresponds to the national educational regulations, whose quality references include guidelines, standards, basic learning rights (DBA), and methodological and evaluation criteria.

The second level of concreteness, or meso-curriculum, focuses on institutional curricular planning and is based on the educational policies of the first level. In the meso-curriculum, the necessary adaptations are made to concretize the institutional, educational policies based on the needs and realities of the context. The educational establishment defines objectives, performances, contents, competencies, and methodological and evaluative criteria

to satisfy institutional and contextual educational needs (Álvarez, 2011).

At the third level of curricular concreteness or micro-curriculum, we find class plans, classroom plans, and classroom pedagogical projects concretized specifically in the teacher's actions in the classroom. This level is considered the most important since the classroom is the scenario where the teaching and learning processes take place, and the objectives, skills, procedures, content, teaching and learning activities, and evaluation instruments are specified; all the above, according to the formative needs of the students and their peculiarities and individualities (Álvarez, 2011).

Hence, the construction of the curriculum should be based on a diagnosis in which the needs and interests of the educational community are revealed, and efforts are made to prepare for a changing world. Therefore, a justification must be established before including or excluding any area or discipline from the curriculum. In addition, cultural diversity must be considered, which is an indispensable condition to achieve harmony in the curriculum and, therefore, greater stability for the children in the classroom. This means the school should offer the same opportunities to all with a basic curriculum.

In addition, as an integral part of the curriculum are the study plans, which are a "structured scheme of compulsory, fundamental and optional areas with their respective subjects that are part of the curriculum of educational establishments" (Ministry of National Education, n.d. para. 1). In turn, Santiago and Castro (2006) point out that the curricula are, "the materialization of the academic component, within the framework of the curriculum definitions, which will be implemented through the IEP" (p. 34).

Thus, curricula are a guide that orients the contents and activities to access knowledge and provide spaces for student learning. In addition, the authors indicate that study plans should contain the following elements: "the planning, programming, and development of areas, subjects, standards, achievements and achievement indicators, competencies, projects, and the sequential and temporal distribution of these elements" (Santiago & Castro, 2006, p.34). Therefore, the curriculum is an instrument that allows the resolution of problems and needs of the educational community.

Regarding methodologies, these correspond to the "set of strategies, procedures, actions organized and planned by teachers, consciously and reflectively, to facilitate student learning and the achievement of the objectives set" (Mejía, 2017, p.72); in this way, the teacher establishes the necessary strategies and mechanisms so that the classes, besides being generators of dynamic, active and participatory training, become an enriching moment for the student and can be applied in their work. According to Hernández et al. (2014), the methodology "implies a concrete way of teaching; it points the way and a tool that we use to transmit the contents, procedures, and principles to the students, fulfilling the learning objectives outlined by the teacher" (p. 10).

It is important to mention that the educational methodology adopted in educational institutions and related to the PEI is based on learning theories (behaviorism, cognitivism, constructivism, and, lately, collectivism). Each approach has its processes, activities, and action methods (Guerrero & Flores, 2009).

It is necessary to mention both the current teaching and learning models, as well as the role of the teacher who, from being a simple transmitter or reproducer of knowledge, becomes an innovative guide who leads his students to discover their reality and from it to transform and generate knowledge to change their context and improve their environment; all this, with a critical awareness of their role in society and their commitment to the environment. Although it is not enough to change educational policies and models, it is necessary to have teachers with a positive attitude toward change who develop new professional competencies.

Likewise, it is "a self-critical behavior, in which personal and professional change is assumed as a necessity of the research and innovation process itself" (Castillo and Cabrerizo, 2005, cited in Arias, 2008, p. 36). Therefore, a teacher with research knowledge is required, a study professional whose constant is to track information, categorize it, process it, relate it, interpret it, and propose reflections with criteria (Parra, 2004). On the other hand, among the educational methodologies regularly used by teachers for primary, secondary, and university education are: "Lectures, practical classes, laboratory classes, tutorials, individual work, group work, and seminars and workshops" (De Miguel, 2006, p. 34).

Regarding resources (library) this, according to Morales (2018), "is the social entity that allows information to be available to society. According to this perspective, the library is one of the oldest organizations, whose focus is service" (p.13). According to the needs of the academic community, this resource must have new and recent

material that contributes to the development and maintenance of its bibliographic collections. The role of the library focuses on the service and orientation to students and professors with programs and workshops, which allow access to information through "online catalog, access to databases and electronic books, tools for researchers, creation of bibliographies, among others" (Zambrano & Alcívar, 2019, p. 5). In the current globalized context, information, technology, and the diversity of resources become an open door of information for learners and a propitious scenario for the search and generation of knowledge.

METHODS

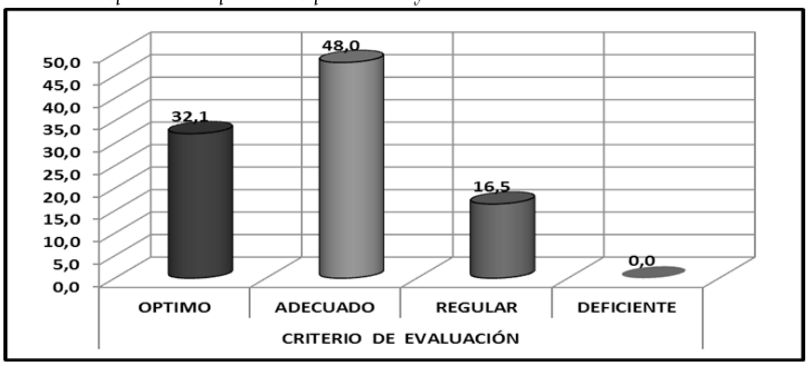
This research has a quantitative approach and descriptive scope, "descriptive studies seek to specify the important properties of people, groups, communities or any other phenomenon that is subjected to analysis" (Hernández et al., 2014, p. 72). Therefore, this study describes and characterizes the academic factors associated with the formative research process. The population was constituted by the total number of educational institutions in the official sector of the municipality of Sincelejo, which amounts to thirty-five (35) institutions distributed in six (6) nuclei.

The non-probabilistic purposive sampling method defined the sample according to the following three inclusion criteria: the first subject to the participation of the educational institution in research events; the second, subject to the existence of formative research products in the institution; and the third, the presence of formative research subjects in the curricula of the institution's 10th and 11th grades. Consequently, fourteen (14) educational institutions in the municipality met the inclusion criteria from which the following elements were taken: a total number of teachers who develop research subjects between 6th and 11th grades or advance formative research processes (42) and a total number of students assigned to research processes or formative research subjects amounting to one hundred and forty eight (148).

The study used an instrument for data collection, the survey, from which two (2) questionnaires were applied: one directed to teachers linked to research processes or assigned to research subjects, and the other directed to students in grades 6 to 11 who take research and documentary analysis subjects. This research was carried out through a documentary analysis guide and applied to the PEI of the selected institutions, institutional policies document, and curricula of research subjects.

RESULTS

Figure 1.
Evaluation of academic factors as perceived by students

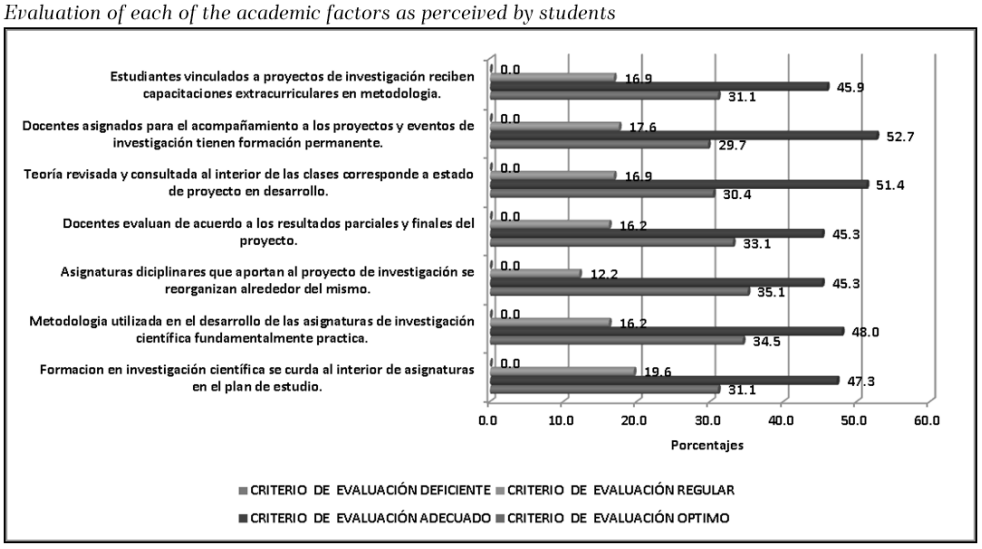


Source : Own Elaboration
Note: the figure appears in its original language

Figure 1 shows that 48.0% of the students consider the academic factors associated with the development of research processes in the public educational institutions of Sincelejo to be adequate, while 32.1% consider them to be optimal, and only 16.5% consider them to be regular.

Figure 2 shows the percentage distributions of the evaluation of each of the aspects evaluated; it is noteworthy that, concerning the aspects "the teachers assigned to accompany the research projects and events have permanent training" and "the theory reviewed and consulted within the classes corresponds to the state of the project under development," more than half of the students value it as adequate, and approximately one third consider it optimal. In the other aspects, adequate evaluation ranged between 45 and 48%.

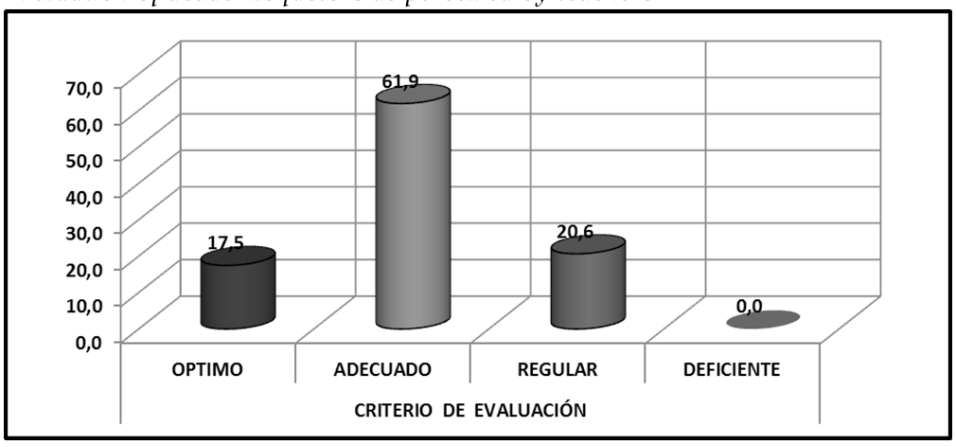
Figure 2.
Evaluation of each of the academic factors as perceived by students



Note: the figure appears in its original language.
Source: Own elaboration

When asked if they had evidence of the statements made, they responded for each factor as follows: Training in scientific research is taught within subjects in the study plan (58.1%), Methodology used in the development of scientific research subjects is mainly practical (65.5%), Disciplinary subjects that contribute to the research project are reorganized around it (45.3%), Teachers evaluate according to the partial and final results of the project (60.1%), Theory reviewed and consulted within the classes corresponds to the status of the project under development (57.4%), Teachers assigned to accompany research projects and events have permanent training (72.3%), and Students linked to research projects receive extracurricular training in Methodology (60.8%).

Figure 3.
Evaluation of academic factors as perceived by teachers

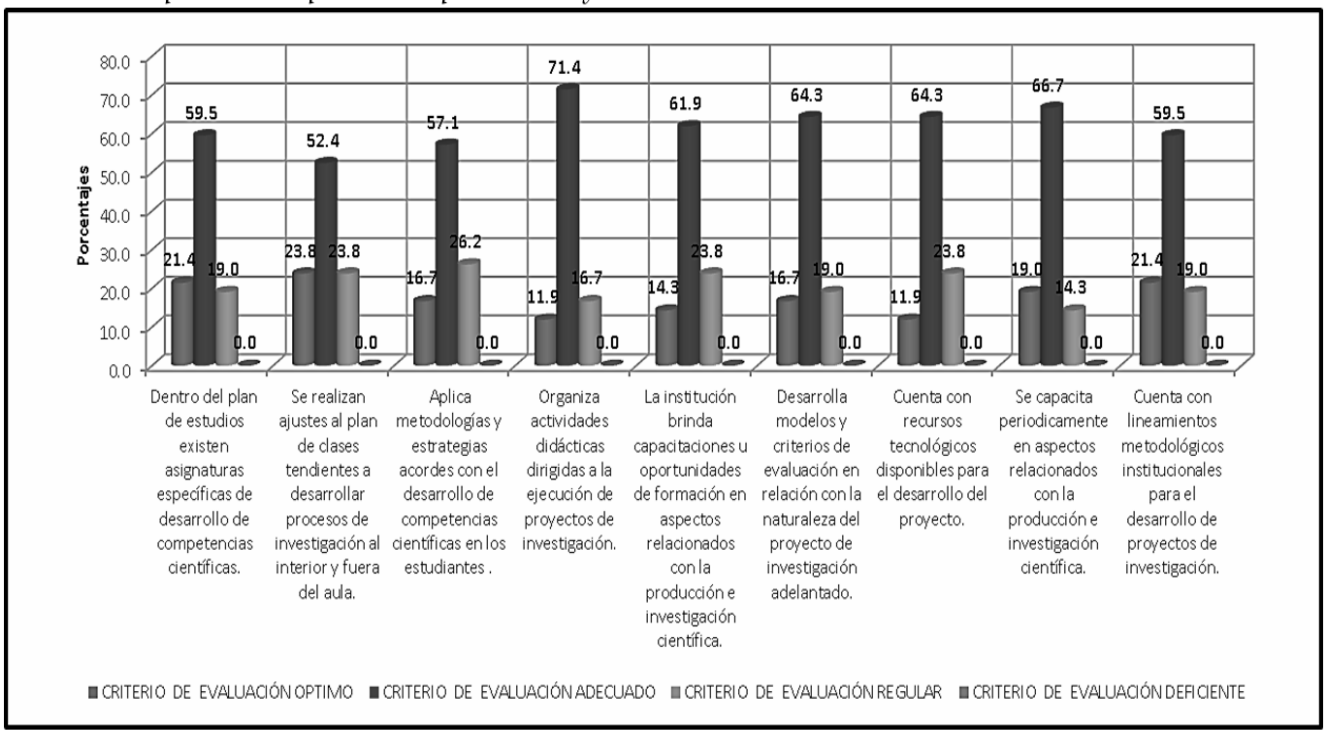


Source: Own elaboration
Note: the figure appears in its original language

Figure 3 shows that 61.9% of teachers consider academic factors to be adequate; 17.5% consider them to be optimal, while 20.6% of them consider them to be average.

Figure 4.

Evaluation of academic factors as perceived by teachers



Note: the figure appears in its original language.
Source: Own elaboration

Figure 4 Shows that the academic factors with the highest percentages are “organizes didactic activities aimed at the execution of research projects” (71.4%), “periodically provides training in aspects related to the production of formative research” (66. 7%), “It has technological resources available for the development of the project” (64.3%), “It develops evaluation models and criteria about the nature of the research project advanced” (64.3%) and “the institution provides training or training opportunities in aspects related to scientific production and research” (61.9%). In the other factors, the percentages ranged between 52% and 60%, all valued by the teachers as adequate.

When asked if they had evidence of the statements made, they responded to each factor as follows: Within the curriculum there are specific subjects for the development of scientific competencies (62.9%), Adjustments are made to the lesson plan tending to develop research processes inside and outside the classroom (62.9%), It applies methodologies and strategies in line with the advancement of scientific competencies in students (71.4%), It organizes didactic activities aimed at the implementation of research projects (66. 7%), The institution provides training or training opportunities in aspects related to scientific production and research (31.0%), Develops evaluation models and criteria in relation to the nature of the research project undertaken (69.0%), Has technological resources available for the development of the project (59.5%), Periodically provides training in aspects related to scientific production and research (45.2%) and Has institutional methodological guidelines for the development of research projects (50.0%).

Documentary Analysis

Based on the systematized information on the IEPs of the educational institutions in the sample under study, the following classification is established according to the importance given to formative research.

Table 1.
Classification - Importance of Formative Research

Institutions - research Formative	Institutional horizon	Pedagogical approach	Curricular structure	Financial resources	Products derived from the research
Group 1	Research is an essential axis for improving teaching-learning processes in the classroom.	Is consistent with this line	Elements are planned to mainstream it.	Allocation of resources in the AOP for Research	Research products and active participation of teachers in internal and external school projects.
Group 2	Research appears partially as a necessary axis to optimize teaching-learning processes.	Is consistent with this line	Some elements are planned to materialize it.	Allocation of resources in the AOP for Research	Research products and active teacher participation in internal and external school projects.
Group 3	Research is not an essential axis for improving teaching-learning processes in the classroom.	It is coherent with the type of education offered to the community.	Some elements linked to formative research are related.	Does not exist	Some teachers participate in projects external to the school
Group 4	Research is not established as a basic axis to modernize teaching-learning processes in the classroom.	Is linked to the type of education offered to the community, but does not involve research in its components.	elements linked to educational research are not evidenced.	Does not exist	Little teacher participation in research-mediated projects.

Source: Own elaboration.

DISCUSSION

Once the documentary analysis of the educational institutions in the sample and the review of the surveys applied to the different levels had been carried out, it was possible to establish:

State of the art in the projects, which is advanced, corresponds to the theory reviewed and consulted within the subjects; in that sense, the curriculum is based as an essential tool for pedagogical practice in terms of Research in the classroom and concretizes the teaching and learning processes, establishing the objectives, skills, procedures, content, teaching and learning activities and evaluation instruments (Alvarez, 2011). Likewise, we agree with Santiago and Castro (2006) when they point out that the study plans as an integral part of the curriculum allow solving problems and community needs.

The teachers accompanying research projects and activities have permanent and sufficient training in science and scientific methodology. Gómez et al. (2019) indicate that teachers who undertake Research consider it a source of personal and professional growth to generate novel changes in pedagogical practices and promote critical and reflective attitudes in their students. It should be added that research skills are considered to positively impact educational processes with quality and serve teachers to improve their pedagogical practice (Guerrero & Flores, 2009). Based on the above, from the perspective of the teachers, the following aspects are observed as those of greater compliance in the field of academia in the official educational institutions of Sincelejo:

It organizes didactic activities aimed at carrying out research projects: in this aspect, the current trend in education and the implementation of active, critical-reflective models (meaningful learning, discovery learning, research seminar, Classroom Pedagogical Projects (PPA), problem-based learning), allow students to learn about

their context and transform their reality (Espinoza, 2020). It is worth highlighting the use of active learning methodologies such as ABP because it uses innovative methods "not only for the development of curricular skills about the teaching of science and literature (hard skills) but also to enhance soft skills or personal skills related to employability and coexistence" (Luy-Montejo, 2019, p. 366). Thus, it enables students to discover and build knowledge, the teacher being a tutor who helps to reflect, inquire, and build from guiding questions.

Periodic training in formative research processes is crucial for the training of teachers in Research; in this regard, Bennet (1993) states that teachers need preparation or experience in Research to achieve a connection between Research and effective classroom practices. The research work becomes a technical practice (cited in Pineda and Orozco, 2017); Parra (2004) mentions the importance of study and self-training. A teacher who works on Research in the classroom must know at least the basics to build research processes with his or her students.

The resources available for the development of Research are projected for the training of students, from the use of new technologies as resources that help systematize, analyze, and optimize research processes and bibliographic resources that guide the access of information through "online catalog, access to databases and electronic books, tools for researchers, creation of bibliographies, among others" (Zambrano & Alcívar, 2019, p. 5).

CONCLUSIONS

Formative research in the educational institutions of the official sector in the municipality of Sincelejo is still limited, despite the intention and effort of some educational establishments, and this is based on the following reasons:

The official IEs in the municipality of Sincelejo have established the investigative component as a model for forming students in their PEI. However, the reality shows a different aspect in which master classes are predominant, focusing on the transmission of knowledge and its accumulation. This makes the model of formative research, learning by doing, and transforming knowledge lag behind.

Managers are unaware of the importance of incorporating, supporting, and appropriating the research component in the institution from the conception of the curriculum and the establishment of the necessary items for the component; consequently, the study plans are saturated with content for all areas, but there is no planning of areas and subjects that support the theory and practice of research by students.

The integration between the teaching role and research is null; even in the classrooms, a transmissionist model prevails where the student is a simple receiver of knowledge and not a generator of it; finally, the infrastructure is limited, and the development of spaces for research is not adequate and decreases the motivation of students towards the research component.

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