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Transversal Processes Between Physical Education And Natural Sciences To Improve Learning In Eighth Grade Of Basic Secondary Education In Colombia

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This research is the effort of a team of teachers and students from the Popular University of Cesar and is framed in the modality of action research with a qualitative approach. In addition, transversal processes are carried out between the areas of natural sciences and physical education in order to improve learning in eighth grade of basic secondary education in an educational institution in the city. In the first semester, a total of 119 students were linked and, later, in the second semester, a total of 136 students under the thematic spaces of natural ecology. One of the most obvious problems that can be glimpsed in the implementation of classroom projects and experiments as a way of relating experimental sciences in students is to observe that, in proportions of less than 51%, the percentage of experimental work tending to obtain significant results that support the theories and principles studied is fulfilled. At the same time, it is observed that, despite having some conceptual elements in their immediate environment, students feel apathy to study the natural sciences, which are taught in a conventional, mechanical, simplistic and decontextualized way. In physical education, it is evident that, in the learning of topics such as healthy habits, students stop obtaining significant learning, since they lack interconnections with the formal spaces of natural sciences and biology, even more so in the eighth grade, where the human being begins to develop very noticeable physical changes. On a day-to-day basis, in the development of natural sciences classes, it is possible to observe in students the lack of motivation to learn and the little capacity for meaningful learning, a fact that may be caused by the way in which the teacher guides the course; He comes to class by sitting the students at their station and conducting a rote lesson.

Keywords: transversality, natural sciences, physical education, education.

1. Introduction

For many years it has been evident that the learning that is generated in an educational institution is not necessarily focused on the disciplines assigned to each of the teachers, that is, in the classroom. In many cases, the contribution comes from the generation of spaces

specific to each of the educational disciplines, either from the relationships that arise in the resolution of problems between the subjects, or from particular knowledge or skills. For all of the above, it seeks to identify the shortcomings present in the teaching-learning process that is based on specific situations and ignoring the existing relationships between each of the areas of study. It is proposed to develop activities that, based on the interdisciplinarity of each of the areas, generate an understanding from the relationship between them.

At the INSPECAM Educational Institution, a number of students do not carry out extracurricular explorations that allow them to compare the processes developed by Natural Sciences with those developed by Physical Education. Based on what has been mentioned and what has been suggested by the city's Secretary of Education, it seeks to welcome the approaches of those who claim that students only understand things when they can intervene in them. Giving understanding to the arguments raised, it is proposed to develop a pedagogical proposal based on the implementation of activities of evident interaction between the areas that seek to strengthen the research processes in students, whose ultimate purpose is to develop opportunities for mobility and problem solving in order to improve the quality of education.

1.1. Context of education in Colombia

Social, cultural and regulatory ecosystem that conditions it, the latter being a central determinant. The importance of exploring the context is vital when using the term education, since the reader's ideas probably do not coincide with those conceived by the author (Rojas Muñoz & Perdomo Aguirre, 2021). Education in the country is based on four principles: human dignity, the common good, ideological pluralism and secularism, and democracy. Education is a right of the individual and a service to the community. It is organized and integrated into a student-centered system, which is responsible for the quality of education and its promotion and encouragement. Therefore, all regulations relating to education seek to contribute to the achievement of the purposes of education, which should coincide with the needs of the country.

The Colombian education system is organized into academic levels: education that complies with compulsory schooling and, at its completion, awards the baccalaureate degree, and higher education. Compulsory schooling covers pre-school education (some institutions serving children under five years of age), basic primary school (grades 1 to 5) and basic secondary school (grades 6 to 11). Preschool education is not compulsory, but its quality must be monitored in the terms established by law. Primary and secondary education shall be free of charge in State institutions, without prejudice to the collection of academic fees from those who may pay for them. The law shall regulate the provision of this service by private parties and the conditions for the recognition and maintenance of subsidies to them.

1.2. Justification of the study

It is significant from an educational point of view to refer to different topics of the Natural Sciences, such as sound waves, from the context of different areas of knowledge. Since these know no limits, as they share concepts and methodologies, it is possible from the contents of

Physics to seek connections in cross-cutting research with the area of Physical Education (Pérez and Bedoya-Ríos, 2023). Naturalize or justify the fact that the situations practiced physically are familiar to the students and, therefore, significant. Thus, this study aims to justify the need to generate transversal projects that involve different disciplines of knowledge that contribute to the study or practice of science. In such a way, the lack of knowledge of daily situations that can be explained from a scientific point of view deteriorates and it can be proven that, in addition, adherence, learning and appreciation of the areas of knowledge are significantly improved. Collaborative work between teachers from different areas of knowledge is beneficial, not only for students, but also for teachers themselves, as it facilitates the updating, reflection and application of knowledge and didactic strategies. In addition, it allows them to enrich and discuss the concepts of their discipline, obtain answers to new questions, examine problems that come from various domains of their discipline and share relevant information, because each individual who participates contributes with their explanation the angle of vision provided by their activity in it.

1.3. Research objectives

With this innovation proposal, it is intended to be carried out in the context of activities in the natural environment in relation to information and communication technologies through the subject of Physical Education at the INSTPECAM Educational Institution, thus being the center of our work the design of an application that we believe will substantially improve the health of students. The general objective is to propose transversal processes between Physical Education and Natural Sciences that facilitate meaningful learning on the subject of air pollution among secondary school students in an educational institution. The specific objectives are: to diagnose the conceptions that sixth, seventh and eighth grade students have about the phenomenon of air pollution, to identify the possible links between what is offered at the curricular level in the areas of Physical Education and Natural Sciences with the contents presented in the area of Natural Sciences on air pollution, implement a pedagogical proposal under a transversal approach between Physical Education and Natural Sciences that promotes the resolution of the problem of air pollution through the integration of specific knowledge of the areas, evaluate the type of learning generated by the projects and/or transversal activities implemented and generate recommendations from the experience for teachers interested in improving student learning with proposals curricular for the integration of areas, specifically in Physical Education and Natural Sciences.

2. Theoretical Framework

This innovation proposal aims to intervene in the dichotomy between physical education and natural sciences in the educational process, forming a single more pertinent thematic block. It is proposed to design and apply a method that consolidates a single educational process in students, less complex and facilitating for learners, by presenting evident interconnections for thought. The aim is to focus the teaching of the contents from the educational processes that generate homogeneity in the student and develop a critical educational mentality in the student. Once this process has been developed, an attempt is made to optimize open teaching, so that the student does not punish the object of study for the fact of having been interested in the subject.

The constant search for an education that forms integral beings has led to the development of multiple theories, some of a behaviorist, psychometric and cognitive nature. The latter has guided research since the middle of the last century, taking into account the restructuring of a student's previous thought, structuring new knowledge as an indirect response to external stimuli. This path is initiated by mathematics and logic and then progresses to the abstraction of less and less concrete concepts, which recommends working with clear and evident examples. Specifically in natural sciences, a second theory that guides knowledge is the theory of meaningful learning, which is based on the representation of signifiers to the cognitive and not on memorization.

2.1. Physical education in the school curriculum

The teaching of IPEF in Colombia has varied throughout history, and it is currently mandatory. Its inspectorates are under the inspection of each Ministry of Education and it is cataloged within the fundamental areas along with: mathematics, social sciences, Spanish, and natural sciences (Cavallín et al., 2023). For the year 2013, the guidelines of the National Ministry proposed as the purpose of this area the integral formation of students in a healthy and creative body through the development of physical, cognitive and creative skills, based on: games, competitions, creativity, body expressions, sports and the social and cultural environment, where the phenomena that depend on human motor behavior are understood, fundamental to articulate the perceptual, coordinative and conditional differences characteristic of movement.

Within the justification for the inclusion of this area in the curriculum, the National Ministry points out the components: cultural, educational-social and individual, stating that these must be closely related to areas such as: natural sciences, humanities and technology. Hence the relevance in meaningful learning and not only reproductive. At this level of schooling, this area has been focused on the preparation of students as potential high-performance athletes or allowing the student to use this modality as an excuse not to attend other institutional spaces (Romero Silvera, 2024). Due to this situation, a new conception is being generated in the country at this level, framing it within the area of the arts, which would allow working on artistic competencies that are recognized in the standards, which will be contextualized in the curricular guidelines, such as the creation and cultural and artistic understanding of human production. both individual and social, with a socializing and expressive purpose. The development of competencies that would allow the student to create artistic projects that guarantee them to create, interpret, understand and transform their own and others' roles in the development of individuality and the collective.

2.2. Natural Sciences in the school curriculum

As a physical educator, it is necessary to make the relevant ethnohistorical approaches, in this case to the field of Natural Sciences, to understand how their work with other fields of knowledge has determined the codes of disciplinary segregation with implications for the education that the student receives about them (Rebollo & Ábalos, 2022). The curricular justification of the area of Natural Sciences is determined by the need to cooperate in the integral formation of the student, through their approach to their own knowledge, methods and processes, necessary to interpret their environment critically, improve their school

performance in other areas of the curriculum, or simple practical benefits of the facts themselves. From the above are the affirmations that any society faces the challenge – and dilemmas – of educating its children, with the help of a system, a set of institutions that cooperate under what is supposed to be the general orientation of values and objectives of that society. Responsible for sustaining this system in an increasing, efficient and satisfactory way is the group of educators (whose decisions in the classrooms and in the school systems are fundamental). Extremely important are the recommendations on the teaching of Natural Sciences in 1968. In this document he invites, among other things, to establish "the common structure of knowledge", to reflect on "the characteristics of the areas", the "principles and procedures of pedagogy", for this, precisely, to carry out "theoretical foundation" of the educational work and preferably with updated information. One might think that this recommendation was not only valid at that time, but that it is clearly due in the face of the educational legislation that exists, that of 1968 as the most important and used to date, since it professes as one of the fundamental principles of secondary education the preparation for a useful life within the vocational nucleus of guidance. It also emphasizes that the selection, arrangement, and methods of teaching in what are called secondary schools must be appropriate to the types and abilities of the pupils and to the needs of the preservation and further development of those who have been assigned different tasks. Share your knowledge by attending to the assignments or references you make in it, by using the following significant words in charge.

2.3. Importance of interdisciplinarity

Interdisciplinarity allows the articulation of ideas, concepts and knowledge between different areas of knowledge, with the aim of establishing relationships that explain particular phenomena, in order to present the student with a broader and more real panorama of the dimensions and explanations of reality at the level of knowledge in all its areas. When science students see appropriate applications of the physical knowledge derived from sports practices, they spontaneously tend to commit to that knowledge, relating it to their scientific competencies (Mora and Correa, 2023).

Interdisciplinary and intradisciplinary competencies are acquired from specific knowledge that is strengthened when there are appropriate pedagogical processes. The search for a horizontal integration of knowledge involves a common and collective search by all teachers to produce knowledge or solve problems about the very nature of the object of knowledge and its proposals and its social implications. Interdisciplinarity is understood as an addition of scientific knowledge that is then mixed with each other, to produce something new that has not existed before to isolated knowledge.

2.4. Applicable learning theories

Depending on the pertinent learning theories, the implementation, projection, reflection, research and suggestions to increase the participation, responsibility and achievement of students will be legalized, based on natural sciences and physical education in teaching and learning during the development of the activities proposed in the training process in eighth grade.

Within the classroom, there is a teaching methodology known as science for all, where in practical activities, students identify, raise, investigate, theorize and validate problem situations or curious facts of their environment through ecopedagogy, in addition to the design and conduct of experiments that allow them to know the systems, how they are based and tests seek to confirm ecological-scientific knowledge to improve the understanding and interpretation of the knowledge (Ibarguen Posso & Onogama Gutiérrez..., 2024). There are other conditions where learning is significant, including the activity of recreation, sports and aerobic exercise that allows the integration of the physical, physiological and ecological in a sense that improves the quality of this process and favors different types of interrelations and commitments in the cultivation of new groups for the improvement of the quality of the environment. Among these conditions are: activities inside and outside it, outside the school environment, etc.

3. Research Methodology

The study is developed through the research methodology based on the pedagogical research approach with a qualitative and quantitative character, that is, with a cross-sectional approach, where researchers collect information and carry out analyses with a qualitative and quantitative character, making use of descriptive statistics such as comparisons of means, identifying the results that are of greatest interest according to the objectives set (Rebollo & Ábalos, 2022). The researchers work on the diagnosis of the problem and its permanent evolution during the study, that is, in an approach to a qualitative inquiry, considered as a revised relationship in permanent evolution through constant feedback. It is presented as a case study, where based on observation, active teaching with the monitoring of achievements and feedback to the student, project work, active education methodologies as a proposal for structuring education, the recording of classes, meaningful learning, the use of technological tools, institution-university pedagogical conferences and continuous work with students, are reflected in the most appropriate description of the students' realities and the achievement of significant experiences. In addition, the results generated and their impact are interpreted. The information of the proposal will be collected with different instruments and techniques of the research. On the one hand, participatory observation will be carried out assiduously, about the work in general and specifically about the aspects considered in the study, questionnaires applied by the teacher will be worked on and group workshops will be held.

3.1. Research design

The research was quasi-experimental, since institutions were selected in which the academic performance in physical education and natural sciences of two groups associated with a certain pedagogical activity was compared. The design of a single group was implemented, introducing a pre-test in two independent populations, taking into account the pedagogical factor. The institutions offer the same kind of education and curricular model, with objectives and indicators by educational levels and framed in the institutional educational project. The two official institutions are part of the educational networks of the same territorial entity, characterized by having differential or inter-institutional study programs. Both institutions

have an identity given from the state context by respecting the project marked by the Ministry of Education.

The study population consisted of 941 students from two official educational institutions in Valledupar. EI 1 is an EI focused on basic primary and secondary education, the latter extended to grades 8, 9, 10 and 11 with a total of 460 students, of which 108 correspond to grade 8. For its part, EI 2 has a population of 305 active students enrolled in a new campus with a level of studies from sixth to tenth grade; Its population has historically not exceeded 750 students and it also attends the afternoon shift. The contribution to the undergraduate work was to unify the academic projects of EI 2. Since 2015, interdisciplinary work processes have been carried out with management staff, teachers, students and families, promoting a real educational transformation, more aware of our mission: to believe in and build a life cycle.

3.2. Population and sample

The population group is made up of approximately thirty (30) students in the eighth grade of an INSPECAM educational institution. This educational institution has about four hundred (1400) students from grades six (6) to eleventh (11) of basic and secondary education, most of whom belong to strata one, two and three (1-2-3) of the National Family Welfare System. It is for this reason that the average number of schoolchildren reaches five and a half percent (5.5%) of the population of this city. The selected students are in the eighth grade, with the morning and afternoon sessions. The educational institution has its daytime days formed in areas such as: Mathematical and Physical Sciences, Natural Sciences and Physical Education.

The scope of this study will be of an explanatory descriptive nature, which will be based on an exploratory study of the shortcomings in the way of teaching topics related to the content of physical education and natural sciences of students of this grade of secondary education. After this, an intervention will be carried out in which the change between the two traditional ways of teaching and the teaching of natural sciences through transversal processes will be observed, and will be reinforced from the area of physical education. This intervention aims to find new ways that allow meaningful learning and that, from different areas, not only the contents are replicated, in the hope of changing the shortcomings that education currently has in Colombia.

3.3. Data collection instruments

1. Instrument for the characterization of the population: it will be designed and validated by expert judgment to identify difficulties and strengths around the implementation of transversal strategies between Natural Sciences and Physical Education. Through which the main cross-cutting strategies and tools will be selected, classified and organised and possible improvements will be proposed. Contributions to the evaluation of didactic processes are presented, from an interdisciplinary perspective of the Curriculum, in a shared work between the areas of Natural Sciences and Physical Education.

2. Universal assessment instruments and electronic tablet: it is proposed to implement the tools developed for Natural Sciences and Physical Education for the use of electronic

tablets, in the application to students with the topics that are the object of this course, with the topics that are the object of this course and the development of the three synthesis projects that our program seeks. In particular, we will use the contributions made. Different types of evaluation were implemented that gave good results, particularly for the assessment of the achievement of the standards. Universal assessment tests are an excellent instrument for evaluating performance. It is important that the teacher selects the variety in the development of competencies that are coherent with meaningful learning. Each subject, area or propaedeutic line of educational institutions generates relevant tests to assess the standard, which meet two fundamental conditions: they will be serialized and applied no more than two weeks after the imposition or explicitly argue the reasons for taking the test later than the next test.

3.4. Data analysis procedure

The information is collected, classified, compared, and contrasted in five moments with the names underlined: Moment 1: Characterization of the teachers; Moment 2: Characterization of the transversal processes in the two teachers; Moment 3: Prevalence of transversal processes; Moment 4: Improvement in the integration of the two teachers; Moment 5: Characterization of learning. The main source in each section comes from the data collected from the students as the main actors in the process, adding interviews and reviews of teachers' field diaries. This type of analysis requires discipline on the part of the analyst so as not to deviate from the objectives of the study, since, if the principles of relevance, adequacy, reliability, reproduction, openness, verifiability of the data and logical coherence in the presentation, validity, objectivity and useful relevance of the researched content are followed, then the procedure discussed is the correct one and the conclusions reached are adjusted.

4. Results and Analysis

Two transversal processes were carried out between areas of knowledge, which aim to enhance student learning, evidencing the relationships that are found in the educational context by taking into account the analysis of the information collected, generating spaces for reflection among teachers of the specific areas. The first strategy called "Text Production" project type (physical education) insisted on the reading of sports text and its link with the natural sciences with a view to the understanding of sports. The management and control of the writing of the students in the subject of Natural Sciences was achieved; For this reason, topics of the subject that were most addressed were chosen and the attention of the students in their realization was evident. The second strategy called "Sports Challenges" with research practices was carried out the process carried out by scientists with a view to understanding sport and the construction of scientific knowledge, supported by practices and field tests that allowed them to understand the phenomena, to be able to present the arguments of the contents of the physical education subject "Comprehensive Training" of eighth grade. Although the project was carried out in spaces of the class area, the impact of other areas of knowledge such as English, which seeks to listen, understand and speak proposed basic modules, was seen.

The opportunity to carry out integrative projects presented itself in an educational company, with physical education and natural sciences teachers in the eighth grade. They are already managing the project of course excursions, literary production and counting throughout the year with scheduled dates. The months of August, September, October and

November were chosen, leaving priority to the realization of the practices of the activity and in November, this would establish the final product. They are open and freely elective activities. Throughout these four months of work, the joint work of the two teachers was carried out for the programming of the transversal activities, which could consist of joining classrooms, collecting the archived time, or providing support in the programmed activities such as seedbeds, research groups and participation in the activities programmed by other areas of knowledge.

4.1. Description of the findings

Greater concentration on the study of solutions is a step towards understanding scientific concepts. During the development of the experiment, it can be seen that the students actively participated, interacted with their classmates, discussed their findings, gave their opinion on the topics raised and actively participated in class. This situation occurs due to the fact that the students found a relationship between sport (experience) and biological factors that influence whether or not there is improvement. The fact of permanent dialogue is the main axis of the transversal work. After performing the sports activity, the students found a relationship between the previous knowledge acquired and the tests performed previously, using concepts such as the difference between positive and negative tests, energy-efficient muscles of the sports activity, taking into account aerobic and anaerobic muscles. Another case of transversal work is the total development of the class "Biochemical Processes in Physical Training" in which the specific sport, chosen by the students, is soccer, thanks to the collaboration of the Physical Education teacher for the planning and implementation of the activity.

4.2. Analysis of results in relation to objectives

Regarding the identification and description of the properties of matter, 92.0% of the students were able to identify that when a substance sublimates, it goes from a solid state to a gas without forming the intermediate liquid state, so it is expected that this result will be obtained thanks to the implementation of the proposed strategy. In the development of legal requirement 2, 67.3% identified that the change from liquid to gaseous state is known as vaporization. Following the analysis, 60.7% of the students managed to achieve legal requirement 1, taking into account that at the beginning of the school year the figure was 57.3%, it can be considered that this value exceeds 10.3%. According to this result, this value can be considered to be 10.3% higher than the figure provided. In their methodology, the acquired mean was 4.1 for a standard deviation of 1.2, the mean of the averages was 3.8 and a standard deviation of 1.4. Motivating students with this activity, 9.3% to research work. Finally, it can be said that the students progressed in the concept of properties of matter, allowing them to identify and describe more fully the legal requirement 1. Through the development of this research work, the aim is to improve educational processes in the learning of physics through the development of experiments related to the concepts of properties and variables.

5. Discussion

In the experience developed, project proposals are provided with their respective activities that teachers can carry out during the course of the school year, generating linked developments, on the one hand interdisciplinary, and on the other transversal. These are of support for teachers who have difficulties in carrying out both processes autonomously and that will not

be a finished solution as a recipe, being the proposal flexible and open to other possible strategies. The development of the activity will allow self-care, teamwork and the appropriation of the experimental activity, linking part of the fundamental competencies of the area of physical education and the area of natural sciences, from a project that addresses the importance of generating active spaces in order to improve the quality of life. Teachers must understand the importance of developing shared activities with their other colleagues to generate interest in students, since they will see the different possibilities of confronting knowledge in the different disciplines, which will allow teachers to generate situations or projects that allow students to highlight the transdisciplinary learning obtained in different disciplines. The proposal is structured in two transversal projects that aim to enhance the different skills of students both in the area of physical education and in the natural sciences, which is why it recognizes the existence within the process of two interdependent areas between which permanent processes of interaction are generated.

5.1. Implications of the results

The development of generic competences in the scientific field has an impact that transcends the different areas of education at all stages. In this regard, the results perceived by the students in the subject of Natural Sciences, in terms of the level of progress in generic competencies, are satisfactory at the end of the classroom project, evidencing a continuous improvement in their training in disciplinary, personal and socio-occupational areas, although there may be an impact on the learning style through which the training process was developed. The teachers' perception, in terms of generic competencies, at the end of the project is positive. Four of them, despite reporting that the evaluation of generic competencies is a limitation for the monitoring of the project program in the subject of Natural Sciences, show that they have responded to the development of generic competencies in resources, activities and evaluation, despite other deficiencies that affect the project, obtaining satisfactory results in their perception, since they visualize the progress of their development in the students at the end of the project, showing that the implementation of the motivation theme in all the activities of the project allowed the students to work on the generic competencies proposed.

5.2. Comparison with previous studies

Carminati and Donolo researched in Italy part of the curriculum focused on the metabolic and mechanical functions in the subject Biology, and on its relationship with the practice of physical exercises in the subject Physical Education. They demonstrated with the applied pre-test-post-test and the growth of the averages that, although the contents of Biology are learned in physical education, there is a lack of common methodologies for its transmission to students. Finally, they suggest in their conclusion: "Important is the choice of a gap between different learning environments, due to different methods and a lack of integration of the acquired competences, so that the student is not fully aware or is not able to bring these competences into play in different contexts".

From the pedagogy of movement, the relationship between science and physical education was studied, in the specific case of the teaching of the composition of the human body by a physical education teacher to sixth-grade students, both in 1998 and in 2001, comparing both years and concluding that it needs time to progress. The process of progressing

towards better science education was slow, accompanied by ups and downs and contrasts. Each lesson was studied and the results show that, from her platform, the teacher was more active, but the results were confusing because the student did not progress in understanding better. It was advised that she (the teacher) be less active as an avenue to promote learning. In the long run, this combination (less cognitive configuration, less teacher response, activity, greater configuration and student response) paid off, but between a passive and active principle, moving on to the long term takes more time than an individual.

5.3. Limitations of the study and recommendations for future research

One of the limitations of this study, which we consider undoubtedly the most important, was the duration of the experiment, since it lasted only 13 didactic units, which are insufficient to verify the full magnitude of the pedagogical contribution of the transversal processes, although it provided important indications in favor of it. In future research, a complete follow-up of the laboratory notebook and the research portfolio is suggested, through a quasi-experimental methodological design, to further strengthen the findings of this study. A recommendation for further research is that an additional control group be taken, Spanish; This would be a reliable way to accurately identify the effects of cross-cutting processes, since as already explained throughout this text, as the comparison groups were not homogeneous, this weakness occurred. An alternative to overcome this weakness will be to use the baseline measure and thus develop a true change measurement design, which will allow comparing the changes observed in the stakeholder group with the changes within the homogeneous group. In fields of inquiry such as natural sciences, didactic situations that promote discipline through physical activities could be a viable topic.

6. Conclusions and Recommendations

The difficulties found in students in the eighth grade of basic education in this research require the contextualization of the teaching work in their respective areas or subjects. A didactic proposal to improve teaching and learning with mutual contributions between the areas of physical education and natural sciences must follow a series of substantial characteristics to promote actions of real and effective integration in students. Different games and sports can be seen as a representation of different scientifically explained physical and chemical phenomena, which although these characteristics are theoretical representations, will play a significant role in the learning process as their principles, concepts, and phenomena can be analyzed, explained, or modeled to further ground and understand their structures.

Taking advantage of the physiological processes that are triggered in an organ, system and even at the level of a complete living being such as in physical education and biology demonstrates in students the comprehensibility of their knowledge followed by multiple skills. For all of the above, it is considered that it is possible and desirable to find ways that imply having an authentic unified knowledge of the world, instead of having watertight knowledge. The comprehensive approach to science education indicates that at all levels of education, and especially in secondary education, it is desirable to change poorly integrated curricular structures and teaching practices. That the natural sciences should generalize practices and a common basic purpose.

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