

The school environmental project (PRAE) as an interdisciplinary strategy in the development of environmental awareness.



El proyecto ambiental escolar (PRAE) como estrategia interdisciplinar en el desarrollo de conciencia ambiental

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ABSTRACT

Environmental awareness is the system of knowledge, experiences, attitudes and values that individuals have towards the environment and can be promoted from an integral and interdisciplinary environmental education. It is necessary to articulate the categorization of the environmental awareness of the educational community from the school environmental project with the design of the subject plans to achieve an environmental approach that guides the educational practice with vocational high school students. The strategy contemplates the optimization of information gathering instruments and the interpretation of the multidimensionality of the environmental awareness of the student population, an analysis of the articulation of the subject plans with the national education guidelines and the integration of environmental education that yields improvement strategies, and finally, the discussion of teachers on the curricular environmentalization within the Ciudad de Ipiales Educational Institution in order to develop environmental awareness from the

classrooms. The spiral strategy of reflection - action leads to a practical exercise of construction of an integrated environmental education that allows, from an interdisciplinary approach, the adaptation of the teaching - learning processes towards the development of the environmental awareness of the students.

Keywords: Environmental awareness, school environmental project, interdisciplinarity, interdisciplinarity.

RESUMEN

La conciencia ambiental es el sistema de conocimientos, vivencias, actitudes y valores que los individuos tienen frente al medio ambiente y puede promoverse desde una educación ambiental integral e interdisciplinar. Es necesario articular la categorización de la conciencia ambiental de la comunidad educativa desde el proyecto ambiental escolar con el diseño de los planes de asignatura para lograr un enfoque medio ambiental que oriente la práctica educativa con estudiantes de educación media vocacional. La estrategia contempla la optimización de instrumentos de recolección de información y la interpretación de la multidimensionalidad de la conciencia ambiental de la población estudiantil, un análisis de la articulación de los planes de asignatura con los lineamientos nacionales de educación y la integración de la educación ambiental que arroje estrategias de mejoramiento, y por último, la discusión de docentes sobre la ambientalización curricular dentro de la Institución Educativa Ciudad de

Ipiales con el fin de desarrollar la conciencia ambiental desde las aulas. La estrategia en espiral de reflexión – acción conlleva a un ejercicio práctico de construcción de una educación ambiental integrada que permite desde un enfoque interdisciplinar la adecuación de los procesos de enseñanza – aprendizaje hacia el desarrollo de la conciencia ambiental de los estudiantes.

Palabras clave: Conciencia ambiental, proyecto ambiental escolar, interdisciplinariedad

Introduction

Environmental pollution has been tried to be controlled and reduced in different ways. From the social aspect, it has been intended that environmental management be carried out through concerted actions among all those involved, such as individuals, industry, local and national governments and international organizations (Valadez, 2003). This intention is approached from the political aspect through the creation of institutions and the enactment of laws and from the economic aspect through the implementation of market incentives. From the cultural aspect of the exposed problem, the solutions are focused on strengthening Environmental Awareness, which can be defined as "the system of experiences, knowledge and experiences that the individual actively uses in his relationship with the environment" (Gomera, 2012, p. 214). According to the conception provided by Chuliá (1995), environmental awareness is outlined around four dimensions: cognitive (information and knowledge), affective (beliefs, values, feelings of concern), conative (attitudes) and active (individual and collective behaviors). In response to this need, environmental education emerges as the main actor. The concept of environmental education changes with the idea of environment and with the socio-cultural, political and economic dimensions (Bedoy, 2000), however, it can be stated that it is "the formative orientation in harmonious attitudes towards the environment that achieves the prevention, treatment and solution of environmental problems and with respect to the sustainability of life" (Cuellar & Mendez, 2006, p. 184). Consequently, Environmental Education is a fundamental pillar in the strengthening of Environmental Awareness through the development of pro-environmental competencies and attitudes.

The Ministries of National Education and of Environment, Housing and Territorial Development offer environmental strategies for environmental education through the definition and implementation of School Environmental Projects (PRAE) that "are pedagogical projects that promote the analysis and understanding of local, regional and national environmental problems and potentialities, and generate spaces for participation to implement solutions in accordance with natural and socio-cultural dynamics" (Restrepo, 2018, p. 2). In other words, the PRAE is a transversal reference that seeks the curricular inclusion of the environmental dimension from all disciplines, including those that do not consider experimental processes as a teaching method (Cortés & González, 2017).

Environmental education can be approached from an interdisciplinary and integrated approach to develop environmental awareness. From this perspective, we start from an action - reflection research design, which takes up the epistemological and phenomenological paradigms, and which leads to a spiral reflective process that addresses the relationship between the intentions proposed by the subject plan, the basic standards of competence and the school environmental projects, and their impact on the dimensions developed by tenth and eleventh grade students, in their teaching - learning process, facing environmental issues within the Ciudad de Ipiales Educational Institution.

Initially, in the first loop of the research spiral, this work addresses the construction of a profile that evidences the interpretation of environmental problems by students in tenth and eleventh grades. For this purpose, a strategy is structured that allows interacting with the environmental phenomenon of the institution, in which the participating students reflect on their educational progress regarding the dimensions of environmental awareness, and such consolidation of perceptions allows the research teachers to identify symbols and meanings that value different categories of the system of beliefs, attitudes and knowledge of the students regarding their environment. This allows the second level of the spiral that supports the design of the research route to be filled with meaning.

With the assessment of the categorization of environmental awareness, the research focused on analyzing the quality of the articulation of the environmental policies of the educational system as proposed by the curricular guidelines and basic standards of competence with the institutional environmental policies as proposed by the school environmental project and the subject plans. This reflection allowed assessing the practice inherent to the teaching and learning of the different areas regarding environmental education, evidencing the cohesion and vertical and horizontal

coherence of the educational process oriented by the tenth and eleventh grade curriculum, and finally, identifying the categories that such curriculum has to enhance, improve or implement the integration of an interdisciplinary environmental education that characterizes the Ciudad de Ipiales Educational Institution in the management of development and social change within its community. These reflective actions guide the route towards the following research spiral.

With the identification of the potentialities, risks, challenges and limitations of the subject plans, a possible space was created for discussion and reflection on the meaning of environmental education that should be established from the subject plans with the perspective and expertise of the institution's teachers, This reflection is active and proactive to the extent that the conceptions that the teaching staff has about environmental education are studied, key concepts of the proposed curricular structuring are unified and oriented, and possible educational practices with an environmental approach are opened, which from the interdisciplinary approach transform the comprehensions about the framework of knowledge applied to the environmental context of the Ciudad de Ipiales Educational Institution.

Materials and methods

The IA model established in this research is based on Whitehead's research cycle since it allows improving the relationship between environmental education and the development of environmental awareness through a cyclical research process that includes reflection on the relationship between students' environmental awareness and the subject plans of the different areas in order to integrate environmental education in an interdisciplinary way.

Initially, the reflection is focused on understanding the nature of the environmental awareness of this population through its categorization. The instrument proposed by Gomera, designed under Chuliá's model of environmental awareness, was coupled and optimized within the context of the Ciudad de Ipiales Educational Institution. The optimization lies in the elimination of items that do not present a desirable internal or global correlation for the functioning of the questionnaire, since these can provide a non-assertive description of the phenomenon and inadequately focus the reflection on environmental awareness. To this end, the results are initially coded according to whether they are indicators of the categories of each dimension of environmental awareness, the results are collected and the value of the "Cronbach's Alpha" statistic is calculated and the best items of the questionnaire are estimated to be used each year

as an institutional tool to guide the investigative spiral of the school environmental project and to orient the environmental education strategies in the institution. Finally, descriptive statistics are used to analyze the dimensions of environmental awareness that represent a more considerable weight within the system of experiences, beliefs and attitudes that are being built in the Ciudad de Ipiales Educational Institution and are evident in the profile of environmental awareness within the students, in order to reflect on where to focus the educational practice established within the subject plans.

Next, the reflection focuses on relating the subject plans of the areas of Spanish, mathematics, social sciences and natural sciences with the dimensions of environmental awareness. A SWOT analysis of subject plans is carried out, a SWOT strategy is developed and modifications to the plans are proposed to ensure the integration of environmental education.

Based on this reflection, subject plans can be designed with an environmental focus through a focus group with teachers. The proposals for modification identified for each of the subject plans are presented. A focus group of teachers is opened for the design of subject plans with an environmental approach for tenth and eleventh grades. At this point, the investigative spiral of the present work is closed and the necessary tools are left for the Ciudad de Ipiales Educational Institution to continue in a new investigative spiral to improve environmental education within the institution.

Results

AAA1 and AAB1 have an acceptable rating and are indicators of the "information" category of the cognitive dimension. AAA1 is measured by the question "Q1. There are the following sources of information: 1. Classes 2. Institutional activities 3. Books and specialized magazines 4. In how many of the above are you provided with information about the environment". AAB1 is measured through the question "Q2. To what degree do you consider yourself informed about environmental issues within the Ciudad de Ipiales Educational Institution (with a lot being the highest degree of response)". On the other hand, ABA1 and ABB1 do not present an acceptable valuation are indicators of the category "specific knowledge" of the cognitive dimension. ABA1 is measured through the question "Q3. All the institutions have a school environmental project. Do you know what this institutional project consists of within the Ciudad de Ipiales Educational Institution?". ABB1 is measured through the question "Q4. Do you know what the environmental policy consists of within the Ciudad de Ipiales Educational Institution?".

From these results, it can be inferred that although the student considers himself to be acceptably informed within the institution about environmental issues through various sources of information, he is not aware of the environmental project and the scope of the activities carried out as a result of this project are not perceived or identified as elements of the environmental education of the institution. The environmental policy is not known because it has not been established institutionally, nor has it been documented. This means that within the student's environmental awareness, the institution is not clearly and forcefully perceived as an active institution in environmental management and environmental education. This offers a scenario for intervention by the school environmental project.

From indicators BAA1 and BAA4, which are within the category of environmental belief, it can be inferred that students consider that, despite our special abilities, human beings are still subject to the laws of nature and that the balance of nature is very delicate and easily alterable. On the other hand, indicator BAB4, which is within the same category reveals that students do not consider that humans were created to dominate the rest of nature. In addition, the behavior of indicators BAC1 to BAC4 reveals that students consider that the human population is approaching a limit to the number of people the planet can hold, and that, if sustainable development is not sustained by industrial control and a balanced economic situation, an ecological catastrophe is very likely to occur. Students recognize the planet as a spaceship with limited resources and space. These results reveal that the environmental belief of these students has a high degree of ecocentrism with a recognition of the limits of the biosphere, and that the position of anthropocentrism is very weak.

The indicators with acceptable valuation of the category "environmental valuation" BBA1 and BBA2, show that students consider the environment as a local and global issue but at a non-urgent level.

With respect to the perception of environmental seriousness, the indicators related to solutions to environmental problems at the Ciudad de Ipiales Educational Institution, BCA1 and BCA3, reveal that students consider themselves responsible for improving the environmental character of the educational institution.

In conclusion, the affective dimension of the students' environmental awareness consists of an environmental belief of a high degree of ecocentrism and recognition of the limits of the biosphere, an environmental valuation that conceives the environment as an important local and global issue, and a considerable degree of responsibility within the institutional environmental issue.

The conative dimension presents the category "assuming costs" from two indicators, CAA1 and CAB1. The first is related to the willingness to receive environmental information, which indicates that students are willing to receive such information through "Classes, institutional activities, books, media: social networks, television, email". The second indicates that students do not consider that their daily activity affects the environment, which coincides with the category of the affective dimension, on the perception of environmental seriousness, where students consider themselves responsible for the improvement of the environmental problems of the institution. However, a second intervention scenario is offered, in which the PRAE allows improving the conative dimension of environmental awareness.

Within the active dimension of environmental awareness of tenth and eleventh grade students, the category of collective behavior according to the DAA1 indicator indicates that students are willing to participate in environmental campaigns within the institution. However, with respect to the category of individual behavior expressed by categories DBB1 and DBB2, it can be inferred that students are not willing to use recycled paper for their academic activities, collect plastic paper in the elaboration of an ecological bottle. With respect, to the high and low cost behavior category, the valuation of indicators DCA1 and DDB1 is acceptable, which indicates that students are willing to sort solid waste in the environmental points of the institution and in the choice of walking or cycling as transportation mechanism options.

In conclusion, the articulation of the PRAE must take into account the development of individual behavior within the active dimension of environmental awareness.

Reflection on the articulation of environmental education in the tenth and eleventh grade curricula of the Ciudad de Ipiales Educational Institution.

For the second spiral of reflection of this research, the reflective action was oriented through an evaluation of the curricula analyzed that seeks the relationships between an element of the educational project of the institution and the dimensions of environmental awareness found in the students of tenth and eleventh grades. This reflection was approached in relation to the factors and the following results were obtained:

Strengths: Regarding the category of "competencies" based on the articulating axes of textual production, textual comprehension and interpretation, literature, media and communication ethics, it can be observed that they are contemplated within the Spanish language subject plan and present a strong emphasis on argumentative text, reading and writing. This structure should be maintained because it supports a

necessary competence for the construction of the cognitive dimension of environmental awareness. In line with the above, the vertical coherence of the subject plan is established by contemplating the processes of reading, writing and argumentation/criticism in explicit order to achieve the competencies initially proposed. On the other hand, the horizontal coherence of the same is maintained by responding from Spanish or universal literature to the approaches of textual comprehension and interpretation through exercises typical of the media. For example, the characterization of universal literature texts is approached with the reading of Renaissance texts and the development of discourse as an oral argumentative text.

Weaknesses: With respect to the category of performance indicators, it is found that 0% of indicators proposed within the plan are focused towards the development of environmental awareness. With respect to the category of generative topics, 0% of the generative topics proposed in the plan are focused on the development of environmental awareness.

Opportunities: At the tenth grade level, performance indicators related to knowing how to be and generative topics related to argumentative text can be enhanced.

Threats: It is necessary to face the barrier that is generated when the articulating axes and the dimensions of the Spanish language do not directly involve the development of performances of the dimensions of environmental awareness, which if maintained could diminish the relationship between the development of the environmental awareness of the institution.

A mathematics curriculum aims to enhance mathematical thinking through the five types of thinking: numerical, spatial, metric, random and variational. The interweaving of these types of thinking underpins the horizontal coherence of mathematics. To this end, mathematical competence addresses a process in which a concept and a context are related through communication, reasoning, formulation, comparison and exercise.

Strength: The mathematics curriculum presents a strength in its articulation with the national guidelines, since the competencies proposed address the five types of mathematical thinking. For example, in the competency "Knows and applies the properties of triangles, trigonometric ratios and the laws of sines and cosines, the notions of statistics: population, sample, variables, frequency tables, graphs and statisticians to solve application problems both in mathematics and in other sciences and technology", the clear intention to include from the numerical system to algebraic

or analytical systems can be evidenced, which is consistent with the intention proposed by the basic learning standards. On the other hand, if we compare the competencies of tenth grade and eleventh grade, vertical coherence is evident in the evolutionary complexity of thoughts and systems used between one grade and the next. In addition, horizontal coherence is safeguarded by weaving all five ways of thinking into each of the periodic divisions of the subject plan.

Weaknesses: Within the mathematics subject plan, no competencies related to the development of environmental awareness are presented, despite the fact that problem solving is contemplated within mathematics and other sciences. Therefore, the null percentage of competencies alluding to environmental awareness is a factor that is identified as a weakness in view of the integrated intention of environmental education.

Opportunities: An opportunity presented by the subject plan is that the generative topics or thematic axes in spite of obeying completely to the body of mathematics can be susceptible to be oriented towards problems of an environmental nature. This factor presents itself as an opportunity to integrate elements of environmental education. In addition, the performance indicators of knowing and knowing how to do are focused on strengthening mathematical thinking. The performance of being has an allusion to the student's attitude system, but it is not emphasized within the environmental approach. This configuration is adopted as an opportunity for improvement.

Threat: The barrier presented by the processes, concepts and contexts of mathematics should be mitigated by not directly including the development of performances of the dimensions of environmental awareness, which if maintained could diminish the relationship between the development of the institution's environmental awareness.

Strength: The natural sciences subject plan of Institución Educativa Ciudad de Ipiales presents as a strength that the competencies for tenth and eleventh grades have an environmental focus. For example, in the tenth grade competency "Understand the relationship between molecular structure and the different chemical reaction mechanisms (oxidation-reduction, decomposition, neutralization and precipitation) for the elaboration of products with low environmental impact", it can be recognized that the knowledge in chemical sciences is connected with the cognitive dimension of environmental awareness since the student must recognize the physical and chemical properties of compounds with environmental impact, in addition to promoting the conative dimension of environmental awareness by focusing on an environmental characteristic in the elaboration of a product that is the objective of the class. It is

interesting that what transcends the classroom practice in this grade is the environmental interest as a base factor of what we want to teach and learn, and a further factor of what is built as a cultural and scientific value. In grade eleven, the competence "Relates the structure of organic and inorganic molecules with their physical and chemical properties in biotechnological processes to critically analyze the implications of their uses and dynamics within ecosystems" promotes the cognitive and active dimension, since this competence includes the private and daily environmental behaviors involved in a biotechnological process. Therefore, with respect to the factor of % of competences related to environmental awareness, this subject plan has 100% and is presented as a strength. With respect to the vertical coherence factor, the achievement of the two competences is adequate, the knowledge of the natural sciences can be approached in a procedural way and above all, environmental awareness is built from the cognitive and conative dimension towards the active dimension, which is presented as a strength of the subject plan in this area.

Weakness: A weakness in the subject plan lies in the factor referring to the relationship of performance indicators with respect to dimensions of environmental awareness because there is only one indicator that states that the student "Designs and applies strategies for waste management in the school" as a performance of the student's knowledge. However, the other performance indicators are configured and focused on the knowledge of chemical sciences without being related to environmental awareness, which is configured as a weakness because only the conative dimension of environmental awareness is promoted, but not the other dimensions that can be focused from the other types of performance. In addition, the competence is focused on the environment but the indicators are detached from this focus, so the horizontal coherence of the subject plan is questionable. In addition, the indicators are not related to the "Science, technology and society" process, so there is a disarticulation with the national guideline.

For the tenth grade there are 21 performance indicators, none of which refer to the environment, and for the eleventh grade there are 24 indicators, 3 of which refer to the environment. The % of performance indicators related to environmental awareness of this subject plan is related to environmental education and the development of environmental awareness as a weakness.

Opportunities: The thematic axes or generative topics of tenth and eleventh grade can keep a close relationship with the environment in order to develop environmental awareness from the perspective of all its dimensions. In the subject plan, it is found that the planning and formulation of such contents are carried out in the school

planning and obey the rhythms of the group of students in development. Therefore, it is offered as an opportunity that the generative topics in each unit keep an environmental thematic closure.

Threat: The threat present in the subject plan is the exclusion of biological and physical factors, which represents a disarticulation with the basic competency standards. The biological factors by hourly intensity are contemplated up to the ninth grade, while the physical processes are contemplated from the area of mathematics. Therefore, the factor of articulation with the MEN is classified as a threat since it represents a condition that, if not corrected, could represent a problem for the teaching of natural sciences and environmental education as integrated areas with an interdisciplinary approach.

Strength: The social sciences subject plan of Institución Educativa Ciudad de Ipiales presents four competencies of which, one of them presents a completely environmental approach that contemplates all the dimensions of environmental awareness, for example: the cognitive dimension is developed to the extent that "water and mining wealth" and "types of environmental degradation" are studied, the affective dimension is framed from the problematic perspective of social sciences by approaching this knowledge within the Colombian context and its conflict, the conative dimension is developed by handling knowledge about the result of the exploitation of such resources, and the active dimension is contemplated from the critical perspective of social sciences through the understanding of the phenomenon as a natural social scientist. As a corollary of the above, this represents a strength of the plan because the articulation between the MEN guidelines, the subject plan and environmental education is evident. The vertical and horizontal coherence of the subject plan is presented by connecting in a procedural way the problems of the country with the world problems by contextualizing in a general way the geography and the Colombian and universal politics with the basic concepts of economy, politics and state.

Weakness: Some performance indicators are completely related to the development of environmental awareness such as "Identifies environmental problems in Colombia and its methodological proposal in conflicts related to water", "Proposes solutions to environmental problems" and "Demonstrates interest in environmental problems and is interested in proposing solutions to these conflicts". However, this relationship with environmental education is only covered during the first period. Therefore, about 30% of these elements are focused on the development of CA.

Opportunity: The thematic axes or generative topics of tenth and eleventh grade can be closely related to the environment in order to develop environmental awareness from the perspective of all its dimensions. In the subject plan, it is found that the planning and formulation of such contents are carried out in the school planning and obey the rhythms of the group of students in development. Therefore, it is offered as an opportunity that the generative topics in each unit keep an environmental thematic closure.

Threat: Despite the aforementioned strength, only one of the competencies is connected to environmental education. Therefore, there are only 25% of competencies related to the development of environmental awareness, which is conceived as a threat within the matrix proposed by this work, since, if the subject plan is not homogeneous, environmental education loses the possibility of being offered as something integral.

Reflection on the design of tenth and eleventh grade subject plans focused on the development of the dimensions of environmental awareness

In this third closing spiral of the research, the reflection is carried out through a collaborative action of the teaching staff whose scenario was organized and evaluated from a focus group designed to guide teachers to build an interpretation of environmental education from the subject plans that responds to the need evidenced by the students participating in the research.

Given the particular conditions of the subject plan of the Ciudad de Ipiales Educational Institution, from the reflective discussion with the teachers, parameters were established under which the strategy could provide support to teachers in their environmental education praxis and whose central effect would be the environmentalization of the subject plans. It was concluded that the modifications should define the grade, the period and the performance indicator where such improvement is concentrated. The analysis of this discussion is presented below.

Based on the triangulation of the SWOT analysis of the second research cycle, the reflection with teachers was conducted under the success strategy that identified that the strengths presented by the Spanish curriculum with respect to vertical and horizontal coherence should be maintained. Reading, writing and argumentation/criticism can contribute to the development of the cognitive dimension. One of the variables of low performance of environmental awareness related to the performance indicators related to "being" states that "There is no disposition to individual pro-environmental behaviors". Therefore, Spanish teachers

state that the language curriculum can respond to this need from the performance indicators of being and from the generative topics as follows:

In view of the success strategy proposed for the environmentalization of the mathematics subject plan, the teachers conclude that although the articulation of the mathematics subject plan with the basic standards of competencies can be taken advantage of with the possibility of implementing the environmental problem from the generative topics, a modification of the performance indicators can be made to enhance mathematical thinking through the different mathematical systems that allow the student to correlate different variables with the environmental consequences.

From the strategies resulting from the triangulation of the SWOT analysis that was presented to the teachers as a guiding input in the reflection of the subject plan, the environmentalization of the natural sciences subject plan was approached from the articulation of what is proposed by the indicators of science, technology and society, suggested by the basic standards of competencies, in such a way that from the natural sciences the cognitive, conative and active principles that develop the multidimensionality of environmental awareness are founded.

Due to the nature of the environmental problem, the natural sciences have the cognitive framework that offers the necessary tools for the understanding of the environmental problem. Within the curricular framework proposed by the Ciudad de Ipiales Educational Institution, the processes related to science, technology and society are not contemplated. Therefore, teachers decide to include within the reformulation, performance indicators that relate these processes in order to ensure the articulation with the basic standards of competence, in addition to offering the inclusion of environmental issues.

Based on the strategies resulting from the SWOT analysis, teachers focus the modifications of the social studies curriculum on the homogenization of environmental issues throughout the tenth and eleventh grades as a consequence of the socio-political dynamics of the Colombian state and globalization.

From the results obtained, the environmental awareness of tenth and eleventh grade students can be categorized within the following positive aspects:

Tenth and eleventh grade students consider themselves informed about environmental issues. Their environmental beliefs are based on a high degree of ecocentrism and recognition of the limits of the biosphere, an environmental valuation that conceives the environment as an important local and global problem, and a considerable degree of responsibility within the institutional environmental problem.

They are willing to receive information from different sources of communication and to participate in environmental campaigns, and to have high and low-cost pro-environmental behaviors.

The categories that can be improved lie in the following aspects: Students do not know the nature of the school environmental project and do not recognize an institutional environmental policy such as the management of the three R's rule and how to do the separation of solid waste at the source. They do not consider that their daily activities affect the environment. There is no disposition to individual pro-environmental behaviors.

All the dimensions of environmental awareness can be approached from any element of the subject plan of each of the areas of the educational institution city of Ipiales, therefore, it is necessary to focus the research on the promoting and guiding axis of the educational praxis and to understand which elements of the subject plans should be improved, enhanced, modified or eliminated to ensure the development of environmental awareness from an integrated environmental education.

The SWOT analysis of the subject plans helps to recognize their characteristics and to offer strategies for their improvement. These strategies are determined according to the weaknesses, strengths, opportunities or threats presented by the subject plans.

Success strategy: The strength of the Spanish subject plan is the vertical and horizontal coherence, its coupling to the development of the articulating axes of textual production, textual comprehension and interpretation, literature, media and communication ethics. And the opportunity they present is the inclusion within the performance indicators of being, that which is suggested from the basic standards of competence, "Express in a coherent and respectful manner their positions in a text or communicative situation" and the generative topic "The essay" within a context of environmental approach. Environmental education from this area can be achieved through the articulation between the knowledge of being expressed as "Express in a coherent and respectful way their positions in front of a text or communicative situation" and the generative topic "The essay" within a context of environmental approach. In this way, during the teaching-learning process, the student can improve the cognitive, affective and active dimension of environmental awareness, since the argumentative text, reading and writing are addressed.

Adaptation strategy: The adaptation of the subject plan vis-à-vis environmental education must be done because no performance indicator or generative topic focuses on building a system of beliefs and knowledge vis-à-vis the environment. Again, the

crossing of factors for adaptation constitutes a strategy that lies in the inclusion of a performance indicator and a generative topic that enhances the cognitive dimension of CA.

Reaction strategy: Given the analysis achieved, a reaction strategy to be achieved is the reflective discussion of teachers about the aspects of the subject plan that can be increased, exploited, decreased and neutralized, especially in relation to the implementation of a performance indicator and a generative topic that focuses teaching towards the development of CA.

Survival strategy: if the adaptations and potentialities that can be taken advantage of from this subject plan are not assumed, the dimensions of environmental awareness cannot be developed, in such a way that the cultural and educational aspect of the institution's environmental problems cannot be effectively solved.

The mathematics curriculum aims to enhance mathematical thinking through the five types of thinking: numerical, spatial, metric, random and variational. These thoughts address different systems such as the numerical, measurement, geometric, data and algebraic systems. Information and knowledge about environmental issues is expressed through all these systems, for example, measurements of heavy metal concentration, volume of plastic produced, environmental statistics and algebraic systems that allow correlating a production variable with an environmental consequence. Therefore, the strategies proposed in this paper are the following:

Success strategy: It is possible to take advantage of the articulation of the mathematics subject plan with the basic competency standards with the possibility of implementing environmental issues from the generative topics.

Adaptation strategy: Due to the body of the formal science of mathematics, the competencies and indicators cannot be modified. However, an adaptation of the subject plan can be made from the generative topics of the same.

Reaction strategy: immediate action is required to allow mathematics teachers to include the environmental approach under the denomination of any of the mathematical systems and thoughts from the generative topics of their subject.

Survival strategy: If the use of language and Spanish allows to approach the sensitivity to environmental problems, mathematics allows the formal understanding of these problems from which solutions can be proposed in such a way that the cognitive and conative dimensions of environmental awareness can be developed in a better way.

The natural sciences are at the forefront of knowledge about environmental problems. However, within the subject plan, it presents certain incoherencies that must be solved through the following strategies:

Success strategy: The competencies of the subject plan have an environmental focus. However, it is necessary to include indicators and generative topics that bring students closer to environmental issues and allow them to have a critical stance from the cognitive and conative dimensions of their environmental awareness.

Adaptation strategy: It is necessary to couple performance indicators and generative topics in order to ensure the development of the cognitive dimension of environmental awareness. To this end, expressions such as should be included within the indicators:

Reaction strategy: The natural sciences plan orients the teaching of biological processes up to ninth grade, for tenth and eleventh grade the teaching of chemical and physical processes is planned. It is necessary that the competencies contemplated in this subject plan include the processes related to the science, technology and society component. To this end, it is necessary that teachers, in light of this evidence, formulate a strategy that better articulates the subject plan with respect to the standards and the requirements of environmental awareness.

Survival strategies: In the subject plan, the inclusion of science, technology and society processes within the teaching of natural sciences should be reviewed.

The social sciences curriculum can address environmental issues from their social and cultural aspects so that the conative and active dimensions of environmental awareness are promoted. To this end, the following strategies are proposed:

Strategies for success: There is an articulation with the standards of competence that includes the environmental issues of water resources. However, classroom practice can be enhanced if the inclusion of generative topics that integrate environmental issues is planned throughout the year and not only in the first period of the tenth grade.

Adaptation strategies: In order to adapt this subject plan, it is necessary to identify which generative topics can be included in the subject plan in order to maintain the homogeneity of the plan in relation to environmental issues.

Reaction strategies: it is necessary for teachers to determine which generative topics and other competencies are plausible to modify or add to ensure that the conative and active dimension of environmental awareness is developed.

Survival strategy: it is necessary to modify the performance indicators and generative topics within the planning in order to ensure the development of the environmental awareness of the students of the Ciudad de Ipiales Educational Institution.

In order to make the modifications to the curriculum, the teachers recognized the different dimensions of environmental awareness that had a low valuation within the student context, and based on this reflection, they focused the modifications in such a way that the environmental education proposed by the subject plans would allow, in an interdisciplinary way, that the student manages to gather information and obtain specific knowledge about the environment to build an ecocentric perspective that values environmental seriousness that leads to assuming an environmental responsibility that results in collective and individual participation in high and low-cost activities that improve the environment. In this sense, the proposed modifications are the following:

The teachers established that the integration of environmental education within the educational praxis of Spanish that is carried out in the institution in tenth and eleventh grade can contribute to the development of environmental awareness in the third period and under the performance indicator of being, in addition, in particular the following indications are presented: i) for tenth grade, the construction of the essay can be focused, which is one of the topics to work on in third period, under the contemplation of a work of the greats of the generation of 27, Federico García Lorca, from the anthology "Poemas de la Vega" that collects the poet's environmental aesthetics and from which, in addition, to build a literary appreciation can contribute to develop the active dimension of environmental awareness since it invites to deliberate in an argumentative and propositional way an environmental theme; ii) for eleventh grade, we work on the different forms that language can use to construct imaginaries, for example, the cinema. The proposal is that the student can assume a personal position of respect in front of a documentary where the effects of the consumerist excess of neoliberal politics are exposed and can compare them with the conception of others, so that the student builds elements within their system of beliefs, values and attitudes that are enshrined under the affective dimension of environmental awareness.

In addition, performance indicators can be expanded to confirm and employ the use of environmental knowledge through processes such as extending, relating, comparing, generalizing, applying, constructing or reporting knowledge about the environment as evidenced in cartoons, texts, stories, tales, theatrical scenes or posters.

Mathematics curriculum with an environmental focus for tenth and eleventh grades

The mathematics teachers, in order to assume the success strategy of the subject plan, reflected on the reformulation of the performance indicators of knowledge in order to improve the educational praxis of mathematics in tenth and eleventh grades that allow the student to approach an environmental problem that is expressed and understood from the measurements of heavy metal concentration, the volume of plastic produced, the environmental statistics and the algebraic systems that allow correlating a production variable with an environmental consequence, so as to ensure the adaptation of the teaching-learning process to an interdisciplinary environmental education that integrates an environmental variable with an environmental consequence, environmental statistics and algebraic systems that allow correlating a production variable with an environmental consequence, in such a way as to ensure the adaptation of the teaching-learning process to an interdisciplinary environmental education that integrates, as a whole, a reality that interpellates all dimensions of the human being, and that within environmental awareness, is configured as the cognitive and conative dimension of environmental awareness. Therefore, two modifications of the performance indicators are proposed, which are established as follows: i) for tenth grade, the appropriation of the analytical elements of trigonometric functions is proposed within the life cycles of products such as extraction of raw materials, production, distribution and use of the final product until its possible reuse, recycling or disposal, and its relationship with the affectation of the environment by industry, In this way, the student, in addition to understanding the key concepts of trigonometric functions, can understand the modeling of cyclic processes from sinusoidal functions as a tool for the management of environmental problems that promote the sustainability of resources.

The proposed modifications are focused from the perspective of mathematics as a tool that allows the formal understanding of many problems from which solutions can be proposed in such a way that the cognitive and conative dimensions of environmental awareness can be developed in a better way. In addition, performance indicators can be expanded to allow separating and organizing environmental problems into parts through processes such as analyzing, categorizing, inferring, developing, producing, planning or inventing solutions about the environment in poems, decomposing arguments of environmental scientific articles and making models or graphs.

Natural science curriculum with an environmental focus for tenth and eleventh grade.

The teachers' reflections on the SWOT analysis and the improvement strategies are reflected in the proposed modification that focuses on the inclusion of science, technology and society indicators within the subject plan, a process that for years was

conceived separately from the teaching of natural sciences and whose elements are necessary for the development of environmental awareness. The need to assume the strengthening of the cognitive dimension of environmental awareness from the teaching-learning process that is built within the classroom. The environmental problem has a great point of attention on the care and management of water resources, and to assume positions on these processes is a fundamental purpose within environmental education, on the other hand, the analysis of the potential of natural resources and critical thinking on technological advances are fundamental for the construction of a knowledge system that is the cognitive dimension of environmental awareness, which can be separated from the system of beliefs, attitudes and values that are the environmental awareness of the student as an active and proactive agent of his educational community.

It should be clarified that the purpose of the modification made by the teachers by including these indicators does not include an effect on the development of chemical processes in the classroom, but rather they are offered as a pretext that allows the student to expand the competencies of the natural sciences in environmental issues. In addition, the performance indicators can be expanded to collect information and achieve environmental knowledge through processes such as identifying, memorizing, recognizing, selecting, writing and naming scientific environmental knowledge from texts, films, newspapers and other sources of information accessible to students.

Social sciences curriculum with an environmental focus for tenth and eleventh grades

The teachers of the social sciences area reflect on the results of the SWOT analysis and propose to assume a vertical coherence of the subject plans regarding environmental education in such a way that throughout the three learning periods of the school year the themes of environmental awareness are developed and from the performance indicators of knowing and doing, a social, political and economic perspective of the environmental problem is built with the student that bases a critical position of society and the individual and their relationship with the ecosystem.

To that extent, the environmentalization of the subject plan or curricular environmentalization is achieved through the disposition of environmental problems as a symptom of the phenomena and dynamics of Colombian society and globalization, which insert within the meaning of the student, a generational responsibility within the construction of society from his classroom experience to his possibility as an active subject of the social context and the challenges he assumes, which is configured as the development of the affective and conative dimensions of environmental awareness.

In addition, performance indicators can be expanded to allow them to make judgments or take positions on their ideas, emotions and attitudes towards the environment through processes such as evaluating, reporting, recommending, weighing, considering and establishing high and low-cost pro-environmental attitudes in group discussions, personal assessments and comparisons of individual and collective activities of environmental impact.

Conclusions

The categorization of environmental awareness can be adapted to the research exercise without losing the statistical validity needed to adapt the educational practice to a population that within the institution is not always the same and is subject to all the social, economic and political factors of the institutional context, in correspondence to a dialogue with the students that provides its own horizon towards which to direct the institutional educational practice.

The analysis of weaknesses, opportunities, strengths and threats of the subject plans is a very thorough reflective exercise that made it possible to identify the factors and relationship strategies that enhance the subject plans from an environmental perspective that achieves interdisciplinarity without sacrificing the depth of the competencies of the different areas.

Finally, the reflective exercise of discussion with teachers is the culminating edge of the scenario of actions that lead to the construction of subject plans that focus on environmental education as a metacognitive process that addresses problems characteristic of each dimension of environmental awareness from the different areas of knowledge through performance indicators that derive in classroom practices that allow the student to gather information and obtain specific knowledge about the environment to build an ecocentric perspective that values environmental gravity and leads to assume a responsibility for the environment. performance indicators that derive in classroom practices that allow the student to collect information and obtain specific knowledge about the environment to build an ecocentric perspective that values environmental gravity and leads to assume an environmental responsibility of collective and individual participation in high and low cost activities that improve the environment.

Based on the above, the orientation of an integral and interdisciplinary environmental education is made possible, leading to classroom practices that develop processes that

provide solutions to the different problems addressed in the dimensions of environmental awareness.

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