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# Dimensión socioambiental en los contenidos del currículo del nivel medio superior de la Universidad Autónoma de Guerrero

## *Socio-Environmental Dimension in the Contents of the Curriculum of the Universidad Autónoma de Guerrero's High School*

## *Dimensão socioambiental no conteúdo do currículo do nível médio superior da Universidade Autônoma de Guerrero*

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**Resumen**

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La presente investigación atiende a los requerimientos del nuevo modelo educativo. Se trata de un análisis de los contenidos del currículo del nivel medio superior de la Universidad Autónoma de Guerrero (UAGro), ubicada en Acapulco, Gro., México. Las cualidades o criterios que se utilizaron para el análisis de las variables fueron la vinculación con la educación ambiental, justificación, investigación sobre cuestiones ambientales, contenido científico ambiental, así como terminología específica ambiental. Los resultados obtenidos muestran que son cuatro las unidades de aprendizaje, a saber: Química I, II, III; Biología I, II; Geografía, y Ecología, las que presentan cuestiones ambientales con mayor profundidad y cuyos contenidos están relacionados con la sustentabilidad. La asignatura con más contenidos ambientales y educación ambiental es Ecología, con un porcentaje de 62.5 %; a continuación se encuentra Geografía, con un porcentaje de 40.62 %; seguida de la asignatura de Biología con un porcentaje de 12.5 % de vinculación con temas ambientales y educación ambiental; por último, la asignatura con menor vinculación ambiental es Química, con tan solo 3.12 %. De acuerdo con lo anterior, los programas del nivel medio superior deben ser revisados y rediseñados de tal manera que atiendan de forma integral las necesidades educativas actuales.

**Palabras clave:** análisis curricular, contenidos curriculares, educación media superior, modelo educativo, transversalización.

## Abstract

This research addresses the requirements of the new educational model. It is an analysis of the contents of the curriculum of the higher level of the Universidad Autónoma de Guerrero (UAGro), located in Acapulco, Gro., Mexico. The qualities or criteria that were used for the analysis of the variables were the link with environmental education, justification, research on environmental issues, environmental scientific content, as well as specific environmental terminology. The results obtained showed that there are four learning units (Chemistry I, II, III; Biology I, II; Geography, and Ecology) that present environmental issues with greater depth and related in their contents with sustainability. The subject with the least environmental connection to the contents of the subjects is Chemistry, with only 3.12%; followed by the subject of Biology, with a percentage of 12.5% linked to environmental issues and environmental education; Geography with a percentage of

40.62%, and finally the subject with the most environmental content and environmental education is Ecology, with a percentage of 62.5%. According to the above-mentioned analysis, the programs of the upper secondary level must be revised and redesigned in such a way that they address in a comprehensive manner the current educational needs.

**Keywords:** curricular analysis, curricular contents, high school education, educational model, mainstreaming.

## Resumo

Esta pesquisa atende aos requisitos do novo modelo educacional. É uma análise do conteúdo do currículo do nível médio superior da Universidade Autônoma de Guerrero (UAGro), localizada em Acapulco, Gro., México. As qualidades ou critérios utilizados para a análise das variáveis foram o elo entre educação ambiental, justificativa, pesquisa sobre questões ambientais, conteúdo científico ambiental e terminologia ambiental específica. Os resultados obtidos mostram que existem quatro unidades de aprendizagem, a saber: Química I, II, III; Biologia I, II; Geografia e Ecologia, que apresentam as questões ambientais em maior profundidade e cujos conteúdos estão relacionados à sustentabilidade. A disciplina com maior conteúdo ambiental e educação ambiental é a Ecologia, com um percentual de 62,5%; Abaixo está a Geografia, com um percentual de 40,62%; seguido pelo tema Biologia com um percentual de 12,5% de conexão com questões ambientais e educação ambiental; Por fim, o assunto com os menores vínculos ambientais é a Química, com apenas 3,12%. De acordo com o acima exposto, os programas de nível médio superior devem ser revisados e reprojetados de tal forma que atendam plenamente às necessidades educacionais atuais.

**Palavras-chave:** análise curricular, conteúdo curricular, ensino médio, modelo educativo, mainstreaming.

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# Introduction

This research is inserted within the framework of the construction of a new Autonomous University of Guerrero (UAGro), based on Vision 2021, which is based on institutional principles and policies that allow to guide the course of the university's work, focusing mainly in the improvement of sustainability (Universidad Autónoma de Guerrero [UAGro], 2017). Due to the importance of upper secondary education in its liaison functions between the basic and professional levels, the present of this educational level cannot go unnoticed by the UAGro. The new trends, opportunities and possibilities, and its strategic situation in the training process, give the university baccalaureate great potential.

Following the current educational reform, the school curriculum must be focused on the development of skills and abilities that allow a better quality of personal, professional and social life and not simply be a means to acquire information (Delors, 1996; Pozo, 1997; Millar and Osborne, 1998; Burden, 2005; Chamizo, 2013).

This interest has been evidenced in several studies and didactic proposals aimed at the improvement of teaching-learning that include from the recognition of the students' previous ideas, the strategies to achieve conceptual change, the design of diverse didactic units, the use from learning progressions (Talanquer, 2013), inquiry and problem solving (Posner, 2005; Chamizo, 2013) until the incorporation of information and communication technologies (ICT). Also, proposals have been made that speak of the need to include not only conceptual issues, but also aspects related to the nature of science.

Studies carried out on the curricular subject - such as those of Lledó and Cano (1994), Novo (1996), Nieto (1999), Arbat and Geli (2002), Posner (2005), Serrano and Serrano (2007), Coll (2013) , Watson, Lozano, Noyes and Rodgers (2013), Abero, Berardi, Capocasale, García and Rojas (2015), Yus (2015) and Colombo and Carvalho (2017) - realize a deep interest and degree of reflection. In his studies the importance of the integration and incorporation of contents on environmental sustainability in the curricula stands out.

Within the common curricular framework (MCC) of higher secondary education, general and particular objectives are established for the development of fundamental competences that allow graduates to develop in all their dimensions. This includes the necessary tools for family and citizen life, socio-emotional learning, lifelong learning and the exercise of personal autonomy. (Secretaría de Educación Pública [SEP], 2016b).

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## Problem Statement

The contents of the current curriculum of the upper middle level do not contemplate the current environmental problems. Similarly, they do not reflect cross-cutting issues to promote the social-ecological-environmental balance that society and the educational institution itself lacks so much from formal education.

## Justification

In March 2016, an approach was presented for the update of the educational model (Ministry of Public Education [SEP], 2016a). This approach consisted of the following three documents:

1. *Letter on the Purposes of Education for the 21st Century: Briefly exposes which Mexicans seek to form with the new educational model.*

*2. The 2016 Educational Model: It explains, in five main axes, the model that derives from the educational reform, that is, the way in which it is proposed to articulate the components of the system to achieve the maximum learning achievement of children and young people.*

*3. Curricular Proposal for Compulsory Education 2016: A curricular approach to basic and upper secondary education, and encompasses both the structure of the educational content and the pedagogical principles that support it.*

## New graduate profile of upper secondary education

The graduate profile of upper secondary education was strengthened from the MCC. It now includes socio-emotional skills and 21st century competencies so that young people can successfully face the challenges of today's society (Secretariat of Public Education [SEP], 2016b).

Within the new profile of graduation of the student of the upper middle level, the field “Environmental care” is established. From this, the student "understands the importance of sustainability and assumes a proactive attitude to find sustainable solutions"; "Think globally and act locally"; “It values the social and environmental impact of innovations and scientific advances” (Ministry of Public Education [SEP], 2016a).

The vision of the UAGro for 2020 is that there is a curricular transformation: a flexible curriculum, systematically evaluated and corrected by the collegiate instances of the institution; renewed programs, in accordance with the advances of science and social needs, with updated content, backed by textbooks in each subject, which will be the product of a collective work of the academies (Universidad Autónoma de Guerrero [UAGro], 2017) .

However, the concept of environmental education appears in cultural and technological development contexts; arises from the awareness of the effects that the development of human communities produces in the natural environment, and also arises from the awareness of the scope, in the short and long term, of these effects on the balance of the biosphere, which is the sustainer of the physical survival of humans.

The term environmental education appears for the first time in its English version (environmental education) in 1948 during a meeting of the World Conservation Union (IUCN) organization. It is an area of knowledge that develops a conceptual body encompassing multiple disciplines not only related to the scientific world, but also to the social, geographical, economic and political world, having to evolve continuously and in an accelerated way. In this evolution they have incorporated contents as they have appeared in the physical environment in recent decades (holes in the ozone layer, climate change, high doses of pollutants). In addition, it has had to develop didactic methodologies that enable the acquisition of behaviors and inductive values of a different action in the face of environmental problems.

In the 1980s, the United Nations Educational, Scientific and Cultural Organization (UNESCO) promoted the incorporation of environmental education into curricula and curricula worldwide, as well as promoting the renewal of national programs of school education and strengthen international, national and regional networks with the purpose of exchanging experiences related to pedagogical innovations in the fields of education and training in the environment.

## Objective

Analyze the contents of the curriculum of the upper middle level of the UAGro and the relationship of the subjects with sustainability and environmental issues.

## Methodology

The present investigation was developed in two stages. The first stage was to carry out a diagnostic exploration of the curriculum of the upper middle level with the purpose of investigating the level of social impact having as reference the MCC, which establishes the skills that young people require to face the new conditions of the 21st century . These skills were the basis of the analysis. An analysis, it should be noted, essentially qualitative that gave way to theoretical methods: analytical-synthetic, which allowed the analysis of the theoretical sources and the contents of the curricular mesh of the subjects that are carried at this level; inductive-deductive, thanks to which reflections were obtained about the competences and the graduation profile that a graduate of the higher level must possess.

For the review and analysis of the curriculum and curricula, the design called content analysis, a technique for studying and analyzing communication (television or radio programs, press articles, regulations, curriculum) and, from there, was used , make valid and reliable data inferences regarding their context (Hernández, Fernández and Baptista, 2014).

The population or universe studied corresponds to the set of all cases that match a series of specifications (Hernández, Fernández and Baptista, 2014). In this case, it is the curriculum and the study program of the subjects of Ecology, Biology, Geography, and Chemistry of the upper middle level.

The analysis units correspond to the segments or parts of the content of the messages that are characterized to place them in categories (Hernández, Fernández and Baptista, 2014). For this investigation, the units of analysis studied were the clarity and precision of the information contemplated by the programmatic contents of the subjects.

The second stage was to establish the level of linkage between the competences established by the MCC and the environmental content of the subjects through the following levels of linkage: high, medium, low, and very low (see table 1). Thus, the percentages corresponded to the following

scale: high linkage of 75% to 100%, average of 50% to 75%, low of 25% to 50% and very low of 0% to 25%.

**Tabla 1.** Nivel de vinculación entre la educación ambiental y los contenidos de asignaturas

| **Porcentaje de vinculación entre los contenidos de la asignatura y la educación ambiental (%)** | **Nivel de vinculación** |
|---|---|
| 0 a 25 | Muy Baja |
| 25 a 50 | Baja |
| 50 a 75 | Media |
| 75 a 100 | Alta |

Fuente: Elaboración propia

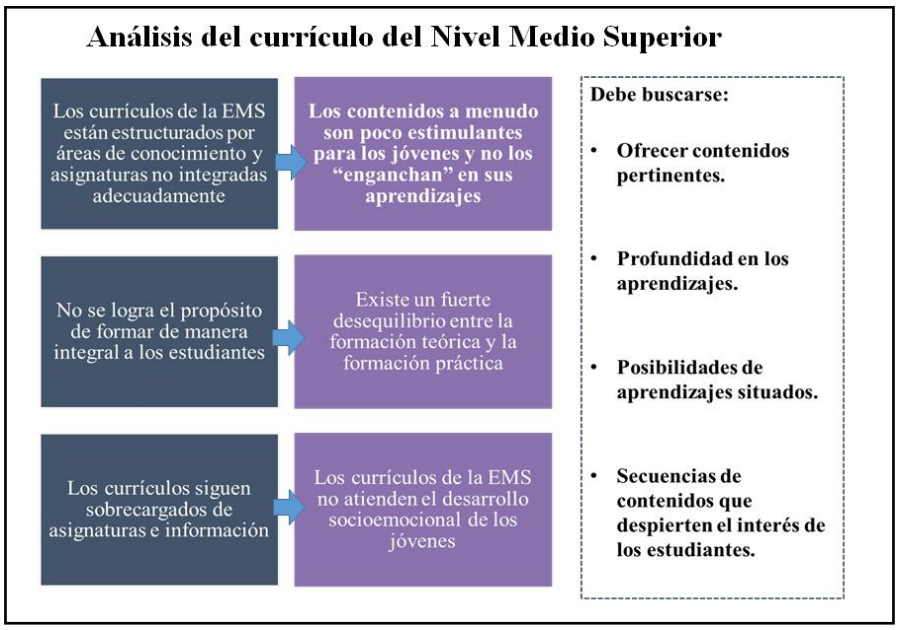
The qualities or criteria that were used for the analysis of the variables were the following:

- Linking with environmental education.
- Justification.
- Research on environmental issues.
- Environmental scientific content.
- Specific environmental terminology.

# Results

Based on the analysis of the study programs, it was observed that there is a certain problem of relevance and relevance, as well as dispersion and rigidity, regarding the contents of the study program (see figure 1).

**Figura 1**. Pertinencia y relevancia de contenidos del programa de estudio




Fuente: Elaboración propia con base en (Secretaría de Educación Pública [SEP], 2016b).

The analysis shows that the contents focus on the students and their learning processes. They also propose different strategies to generate appropriate learning environments: collaborative work is promoted with the purpose of building learning with special emphasis on skills development; the achievement of expected learning, as well as the proposal to implement the use of educational materials that favor learning and continuous evaluation; inclusion to address diversity; social interest topics are incorporated, as well as the inclusion and active participation of parents in the teaching-learning process; The importance of leadership in students was reoriented and special emphasis was placed on tutoring and academic advice.

## The environmentalization of the curriculum

The results of the analysis of the relationship of the subjects of the curriculum of the upper middle level with environmentalization, environmental issues and impact on student training, are presented as a percentage in Table 2.

**Tabla 2.** Concentrado de resultados por asignatura: Relación de diferentes temáticas con la educación ambiental.

**Indica el peso (%) que consideras tienen las asignaturas del plan de estudio en relación con la ambientalización, o temas de corte ambiental, así como el impacto que ha tenido en tu formación universitaria estudiar cuestiones relacionadas con el ambiente.**

| Asignatura | Mucho | Regular | Poco | Escaso | Nada | Asignatura | Mucho | Regular | Poco | Escaso | Nada |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Desarrollo biológico y adolescente | 15 % | 28 % | 23 % | 20 % | 14 % | Historia Universal | 11 % | 19 % | 19 % | 22 % | **29 %** |
| Etimologías | 6 % | 12 % | 17 % | 32 % | 33 % | **Química** | 13 % | **24 %** | 25 % | 22 % | 16 % |
| Matemáticas | 8 % | 14 % | 15 % | 22 % | 41 % | Economía | 12 % | 16 % | 20 % | 23 % | 29 % |
| Orientación Psicopedagógica | 15 % | 20 % | 19 % | 22 % | 24 % | Física | 12 % | 19 % | 20 % | 22 % | 27 % |
| Taller de Arte | 12 % | 18 % | 20 % | 24 % | 26 % | **Geografía** | 20 % | **25 %** | 21 % | 16 % | 18 % |
| Educación Física | 19 % | 16 % | 15 % | 22 % | 27 % | Estadística | 15 % | 16 % | 17 % | 21 % | 31 % |
| Inglés | 8 % | 14 % | 15 % | 24 % | 40 % | Historia de México | 12 % | 18 % | 19 % | 20 % | 31 % |
| Psicología | 13 % | 18 % | 22 % | 22 % | 25 % | Metodología y técnicas de investigación | 14 % | 17 % | 20 % | 21 % | 28 % |
| Taller de lectura y redacción | 9 % | 16 % | 18 % | 23 % | 34 % | Taller de Cómputo | 13 % | 14 % | 13 % | 19 % | 41 % |
| **Biología** | 31 % | **33 %** | 19 % | 10 % | 7 % | Derechos Humanos | 13 % | 19 % | 18 % | 19 % | 31 % |
| Filosofía | 9 % | 19 % | 21 % | 26 % | 25 % | **Ecología** | **40 %** | 25 % | 18 % | 9 % | 8 % |
| Literatura | 10 % | 17 % | 19 % | 23 % | 31 % | Seminario de taller interdisciplinario | 10 % | 14 % | 13 % | 21 % | 42 % |
| Sociología | 11 % | 19 % | 20 % | 26 % | 24 % | | | | | | |

Fuente: Elaboración propia

The results position the subject of Ecology with a regular environmentalization even when the lack of thematic contents in relation to environmental problems and environmental education was observed, as well as in the organization and approach of these. Some environmental issues were found that are addressed in isolation, in addition to some content on the topic in question; In the last unit it contains environmental education topics.

In the case of Chemistry, no contents related to environmental education or environmental problems were found. Within this subject, the topics are outside the specific environmental problems experienced by the students. With regard to the subject of Geography, a low link was observed. However, the evaluation of the study programs allowed us to see that this subject could play a fundamental role in the development of environmental education. Through the study of the places that make up the physical and human processes and the people who live in them, physical geography studies the framework of human activities, the reciprocal influences of man and his environment; while the human geography intends to study the social space, as well as the use and

management of the geographical space, with a view to solving the needs of men. Therefore, geography would help the student to have more contact with the near world. The contents of this subject have an area of opportunity, such as the study of the quality of the environment in a locality, where it is proposed that students express their likes and dislikes about the studied environment, learn how the environment is changing, think about how quality of the environment should be preserved or improved. The proposal of the subject is that the student should be called to reflect on "the environmental solutions that give to the problems of the locality studied, while reflecting on how people affect the environment" (Serrano y Serrano, 2007).

The History program considers some objective themes of environmental education, such as the structuring of the notion of space, the transition from the study of the local environment to the planet and the notion of time, of the region, of man and the environment that surrounds it, of the great urban agglomerations, of an industrial region; These are topics from which the main problems of the environment can be studied. According to Esteban (2001), students acquire certain attitudes that allow them to place themselves in a complex world, understand the problems posed, exercise their rights and respect their duties as future citizens.

Once the analysis of the programs was carried out, the subjects of Chemistry I, II, III, Biology I, II, Geography and Ecology were those that presented greater depth in their environmental contents.

## Chemistry program analysis

It was identified that the subjects of Chemistry I, II, III have the lowest rate of environmentalization, with a percentage of 3.12% (see table 3).

**Tabla 3**. Nivel de vinculación entre los contenidos de las asignaturas de Química I, II, III y la educación ambiental en cuanto a claridad y precisión

| Variables independientes | Indicadores |
|---|---|
| Tendencias de la educación ambiental en el nivel medio superior en la materia de Química. | ➢ Vinculación<br>➢ Justificación<br>➢ Investigación<br>➢ Contenido científico<br>➢ Terminología específica |
| Profundidad de los aprendizajes sobre el medio ambiente. | 25 % |
| Conocimientos sobre la crisis ambiental actual. | 0 % |
| Conocimientos sobre la dimensión social de la problemática ambiental. | 0 % |
| Análisis de cuestiones legales sobre el ambiente. | 0 % |
| Aplicación de los conocimientos sobre ambiente al contexto próximo. | 0 % |
| Estudio de la realidad ambiental a nivel mundial. | 0 % |
| Estudio de la problemática ambiental en México. | 0 % |
| Estudio de la realidad ambiental en Acapulco. | 0 % |
| Porcentaje total de vinculación entre los contenidos de la Asignatura y la educación ambiental | 3.12 % |

Fuente: Elaboración propia

The rationale for introducing the subject of Chemistry I into the curriculum is to propose it as a "basic culture" that allows the student to observe, understand and explain the chemical phenomena that occur at all times and incessantly in nature.

In the case of Chemistry III, the rationale for the subject to be included in the curriculum is that it focuses on the study of some chemical components of foods especially important for their nutritional role. Through this approach the student will appreciate that there are essential chemical compounds for the structure and functioning of living organisms and that life processes have their origins in a series of chemical reactions. You will also gain knowledge that will help you maintain a balanced diet.

From what was observed, there is no direct link with the current environmental problem, there is no practical link and application to solve real problems with the environment.

The concepts are strictly technical, without any relation to the near context, there is no talk of applying environmental issues with the knowledge acquired regarding chemical elements, nor are issues related to the care of natural resources that are studied in some sections. of the respective units.

There is another subject of chemistry in an optional way, which is an introduction for students who are profiling to further studies in chemical matters.

## Analysis of the Biology program I and II. Category: Clarity or precision

Biology, because it is a science that studies living beings, contemplates a more attached approach to environmental issues. However, it was observed that practically the thematic content of this subject is directed towards the appropriation of biological terms and use of the experimental method.

The justification of the subject within the curriculum is that, with the programmatic contents of Biology I that will be developed in the second semester, it is intended that students: a) appropriate the fundamental biological concepts and become familiar with the use of the experimental method as the most appropriate way to achieve significant knowledge in this scientific discipline; b) develop a scientific conception about the origin of life and the universe, based on the analysis and discussion of the different theories that try to explain these phenomena, and c) understand the structure and functions of the cell so that, through The postulates of cell theory can explain the organization and complexity of living beings. As observed in the justification, strictly biological technical aspects are contemplated, so it is far from approaching what environmental education is.

The result of the analysis of the program shows that in the variables "Information on the environment in past events" and "Knowledge about the current environmental crisis" only environmental issues are considered at 25%; With regard to the other indicators, their link is practically nil. With a total, in terms of trends in the subject of Biology with respect to environmental education, of 12.5%.

From the above, it is asserted that the contents of this subject are more related to the issues of the pure environment, without involving the social dimension, how they affect, that is, without

considering the environmental problem, and less considering the application of the knowledge acquired in this subject in everyday life. Its application is more focused on technical issues of biology, and in general they are knowledge that is rarely applied to solve the environmental problem at national or local level. Table 4 shows the results of this analysis.

**Tabla 4.** Nivel de Vinculación entre los contenidos de la asignatura de Biología I y II, y la educación ambiental en cuanto a la categoría claridad y precisión

| VARIABLES INDEPENDIENTES | INDICADORES |
|---|---|
| Tendencias de la educación ambiental en el nivel medio superior en la asignatura de Biología I y II. | ➢ Vinculación<br>➢ Justificación<br>➢ Investigación<br>➢ Contenido científico<br>➢ Terminología específica |
| Información sobre el medio ambiente en sucesos pasados. | 25 % |
| Conocimientos sobre la crisis ambiental actual. | 25 % |
| Conocimientos sobre la dimensión social de la problemática ambiental. | 0 % |
| Análisis de cuestiones legales sobre el medio ambiente. | 0 % |
| Aplicación de los conocimientos sobre ambiente al contexto próximo. | 50 % |
| Estudio de la realidad ambiental a nivel mundial. | 0 % |
| Estudio de la problemática ambiental en México. | 0 % |
| Estudio de la realidad ambiental en Acapulco. | 0 % |
| Porcentaje total de vinculación entre los contenidos de la asignatura y la educación ambiental. | 12.5 % |

Fuente: Elaboración propia

## Geography program analysis. Category: Clarity or precision.

Table 5 shows the general features of the subject of Geography. This subject is taught only one semester of the six that includes the curriculum and is taught in the fifth semester.

The results of this subject regarding the trend that exists with environmental education are 40.62% in its environmental contents. The variable "Depth in learning about environmental issues" stands out with 75%. In relation to the variable "Knowledge about the current environmental crisis" the indicators show 25%, a low percentage. However, with regard to issues on the social dimension of environmental issues, the indicators show a figure of 75%, which shows that there is a strong link between the social and the environmental. Regarding the variable related to legal issues on the

environment, 50% of the links in the contents on this topic were observed. On the other hand, the application of environmental knowledge to the near context showed only 25%. In the same way, the variable "Study of the environmental reality at world level", as well as the one of national and local level, register a linkage index of 25% within the contents of the subject.

The trend of the Geography subject in relation to environmental education and environmental problems is 40.62%.

**Tabla 5.** Nivel de vinculación entre los contenidos de la asignatura de Geografía con la educación ambiental en cuanto a claridad y precisión

| VARIABLES INDEPENDIENTES | INDICADORES |
|---|---|
| Tendencias de la educación ambiental en el nivel medio superior en la materia de Geografía. | ➢ Vinculación<br>➢ Justificación<br>➢ Investigación<br>➢ Contenido científico<br>➢ Terminología específica |
| Profundidad de los aprendizajes sobre el ambiente. | 75 % |
| Conocimientos sobre la crisis ambiental actual. | 25 % |
| Conocimientos sobre la dimensión social de la problemática ambiental. | 75 % |
| Análisis de cuestiones legales sobre el medio ambiente. | 50 % |
| Aplicación de los conocimientos sobre ambiente al contexto próximo. | 25 % |
| Estudio de la realidad ambiental a nivel mundial. | 25 % |
| Estudio de la problemática ambiental en México. | 25 % |
| Estudio de la realidad ambiental en Acapulco. | 25 % |
| Porcentaje total de vinculación entre los contenidos de la asignatura y la educación ambiental | 40.62 % |

Fuente: Elaboración propia

## Analysis of the Ecology program. Category: Clarity or precision

The program includes the subject as Principles of Ecology, which is taught in the sixth semester and is the only one where this subject of the six that includes the curriculum is presented.

The results obtained show that it is the matter with the highest environmental content. According to the indicators, the trend towards environmental education is 62.5% (see table 6).

Regarding the variable “Information about the environment in past events”, it shows a 50% level of linkage in its programmatic contents. The variable "Information on the social environmental dimension of the environmental problem", meanwhile, has a level of contents of 75%, the same percentage as in the variable "Knowledge about the social dimension of the environmental problem". The variable "Analysis of legal issues on the environment" has no linkage; in clear contrast to the variable “Application of knowledge about the environment to the near context”, whose contents established in unit 3 register 100% of links with activities on environmental education and application in the near context. In addition, "The global environmental reality" is addressed in 50% of its contents; and the environmental content and its problem is addressed in 75% at the national and local level, that is, that special emphasis is being given to environmental issues at the national and local level, even more so than worldwide.

**Tabla 6.** Nivel de vinculación entre los contenidos de la asignatura de Ecología con la educación ambiental en cuanto a claridad y precisión

| VARIABLES INDEPENDIENTES | INDICADORES |
|---|---|
| Tendencias de la educación ambiental en el nivel medio superior en la materia de Ecología. | ➢ Vinculación<br>➢ Justificación<br>➢ Investigación<br>➢ Contenido científico<br>➢ Terminología específica |
| Información sobre el medio ambiente en sucesos pasados. | 50 % |
| Conocimientos sobre la crisis ambiental actual. | 75 % |
| Conocimientos sobre la dimensión social de la problemática ambiental. | 75 % |
| Análisis de cuestiones legales sobre el medio ambiente. | 0 % |
| Aplicación de los conocimientos sobre ambiente al contexto próximo. | 100 % |
| Estudio de la realidad ambiental a nivel mundial. | 50 % |
| Estudio de la problemática ambiental en México. | 75 % |
| Estudio de la realidad ambiental en Acapulco. | 75 % |
| Porcentaje total de la vinculación entre los contenidos de la asignatura y la educación ambiental | 62.5 % |

Fuente: Elaboración propia

The justification for introducing the subject to the curriculum is that, through the course, the consequences of development based on the irrational exploitation of natural resources will be identified and these negative consequences will be compared with the advantages of the sustainable development model. Consequently, awareness of the value of natural resources and the ecological processes that maintain them and how they can contribute to improving their management will be promoted.

The analysis of the results showed that the subject whose thematic contents show a lower link with environmental aspects is that of Chemistry, with 3.12%, followed by the subject of Biology, with a percentage of 12.5% related to environmental issues and education environmental. Geography appears, in that sense from least to greatest, in third place, with a percentage of 40.62%, and finally the subject with more environmental content and environmental education is that of Ecology, with a percentage of 62.5% (see table 7).

**Tabla 7.** Concentrado de resultados de la vinculación ambiental con relación a los contenidos temáticos en los programas de las cuatro asignaturas analizadas

| ASIGNATURA | Vinculación entre los contenidos de la asignatura y la educación ambiental (%) | | Clasificación del nivel de vinculación |
|---|---|---|---|
| | Intervalo | Promedio | |
| Ecología | 50-75 | 62.5 | Media |
| Geografía | 25-50 | 40.62 | Baja |
| Biología | 0-25 | 12.5 | Muy baja |
| Química | 0-25 | 3.12 | Muy baja |

Fuente: Elaboración propia

According to the analysis of the results, the approach to the problem at the beginning of the present study was corroborated: "The curriculum and programs of the upper middle level do not respond to the needs of current environmental problems and do not contribute to integral environmentalization sustainable of the educational institutions of the upper middle level of the UAGro ". The statistical result indicates a negative trend.

It is considered an area of opportunity to introduce training with a comprehensive approach that involves the consistent social-environmental dimension through the inclusion of programmatic content that includes elements such as: systemic vision, complexity, interdisciplinarity, transdisciplinarity, flexibility, sensitivity, relativism , among others, and that must include the incorporation of environmental contents, understood as concepts, procedures, attitudes and values.

## Discussion

Castellanos (2000) recognizes that the fact of incorporating a subject as Ecology is not enough for the environmental problem to be integrated into the curriculum. The vision that could be achieved from this matter is partial, since only biological aspects are considered, but an understanding of the complexity of the environmental problem is not achieved. On the other hand, Isaac-Márquez, Salavarría, Eastmond, Ayala, Arteaga, Isaac-Márquez, Sandoval and Manzanero (2011) consider ecology to be one of the most useful sciences for environmental education; but you should not confuse the one with this one. They are complementary, but very different. Mrazek (1996), Sauvé (1999) and Gough (2000) assume that the importance of ecology in environmental

education programs is unquestionable in the constitution of its contents. While Foladori and González (2001) and Flor (2006) point out that ecology in environmental education programs is necessary because it accounts for the flows of materials and energy between living beings and the abiotic environment; to be able to understand the cycles of carbon, nitrogen, water and others, nowadays strongly affected by the anthropic action; However, as long as it does not focus on the study of local problems and their respective solutions, it will only remain in information without any application.

Another aspect that was observed was the lack of an integrative approach that considers the social, economic and historical aspects of the state, the locality and the region and is addressed in a transversal way. In this regard, González (2003) considers that if only the conservation of nature is sought, the concern regarding human beings is being left in the background. Hence, it is considered that talking about environmental education implies the formation of an educational project that incorporates not only physical and ecological factors, but also social, political and cultural aspects.

Peña, Gámez, Carralero, Sainz, Almaguer and García (2018) consider the social dimension as a curricular axis and as a support for the integration of the different disciplines from each other, from the academic, labor and research point of view, as considered in The present study. Likewise, Espejel, Flores and Castillo (2012) address the scope and limitations of the practice of environmental education to promote and build an ecological awareness among high school students, stimulating pro-environmental initiatives, through the subject of Ecology in the universities of Puebla and Tlaxcala. As in the present investigation, this subject is considered a training and strategic part to integrate environmental education in the curriculum.

On the other hand, Bello, Alatorre and González (2017) present an analysis of the way in which the environmental dimension has been incorporated in the curriculum of the technological baccalaureate in Mexico. They analyze from which pedagogical approach the environmental dimension has been integrated into the study programs and how the environmental dimension is addressed in them. The results coincide in some points of the present study. While Espejel, Flores and Castillo (2012) consider it necessary to implement a methodological model to promote environmental awareness among students who consider school factors and extracurricular factors.

# Conclusions

The study shows that there are certain areas of opportunity that should be capitalized on the eve of the new curricular proposal proposed by the SEP through the new educational reform. Some areas were identified where you can work and apply the new curricular guidelines of the upper middle level. It is important to consider various investigations that have been carried out on the subject in question, inside and outside the country, where it is urged to explicitly or implicitly recognize the intentions of environmental training in the school curriculum.

Within the system of upper secondary education, and as part of the proposal of the current educational reform, the main objective is that public education, in particular of the upper middle level, be of quality and inclusive, that provides significant, relevant learning and knowledge and useful for students' life, that offers relevant content, depth in learning, and that appeals to the interest of the students.

The programs of the upper middle level must integrate the new competences of the current educational model, which considers critical thinking and problem solving, creativity and innovation, collaborative work, global awareness as well as the skills of the graduation profile communicative and technological skills of high school graduates, flexibility and initiative, leadership and responsibility; All of them, in the light of the results, should be incorporated into the plans and programs at the time of updating them. Undoubtedly, these competences will be very useful to train free, participatory, responsible and informed citizens who actively participate in the social, economic and political life of the country.

The curriculum, finally, must respond to the needs of the 21st century; It must guide and direct the efforts of teachers, students, educational authorities and society as a whole in order to ensure the achievement of the aims of an integral education.

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