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Artículos científicos

Conocimientos, actitudes y prácticas socioambientales en estudiantes de la Universidad Autónoma de Guerrero, México

Knowledge, attitudes and socio-environmental practices in students of the Autonomous University of Guerrero, Mexico

Conhecimentos, atitudes e práticas socioambientais em alunos da Universidade Autônoma de Guerrero, México

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Resumen

Esta investigación analizó el nivel de educación ambiental que poseen estudiantes del nivel medio superior de la Universidad Autónoma de Guerrero, se consideraron las variables sobre el conocimiento y formación ambiental, saber actuar ante los problemas socioambientales, prácticas de carácter ambiental, percepción sobre la complejidad de problemas socioambientales, grado de ambientalización en el currículo, actitudes y conductas proambientales desarrolladas durante el proceso de enseñanza-aprendizaje. El objetivo de esta investigación fue explorar el conocimiento, la formación, las actitudes y conductas proambientales que tienen estudiantes de preparatoria, con base en la enseñanza-aprendizaje adquirido durante su estancia en el centro educativo de la Universidad Autónoma de Guerrero. El método utilizado fue eminentemente cuantitativo, y las

variables fueron analizadas a través de la escala de Likert el cual es un método de investigación de campo que permite medir la opinión sobre un tema a través de una encuesta que identifica el grado de acuerdo o desacuerdo de cada pregunta, empleando 5 categorías para esta investigación. Los resultados indicaron que sus conocimientos y prácticas sobre temáticas ambientales van de "escasos" a "regular"; habitualmente saben actuar ante las problemáticas socioambientales que los rodea; se observó que poseen escasa percepción sobre la complejidad de los actuales problemas ambientales, el estudio demostró, que los estudiantes tienen escaza conciencia para actuar, cuidar y proteger su entorno socioambiental, con un bajo interés para resolver las problemáticas ambientales a nivel local, lo que se refleja en los resultados de la variable ambientalización en el currículo, que va de "escaso" a "regular". Se concluyó que la percepción de los estudiantes no impacta en acciones positivas a favor del ambiente y que estas acciones beneficien a los centros educativos y a su comunidad. Los datos de este estudio coinciden con otras investigaciones similares a ésta, donde se ha llegado a la misma conclusión, el conocimiento y la conciencia no han sido suficientes para desarrollar actitudes proambientales, es necesario poner y llevar a la práctica acciones responsables, con una adecuada metodología para proponer actividades que ayuden a la resolución de los problemas ambientales vigentes y que estas acciones se vean reflejadas en beneficio del entorno en el que los estudiantes se desenvuelven.

Palabras clave: ambientalización, centros educativos, educación ambiental, currículo, transverzalización.

Abstract

This research analyzed the level of environmental education that students have in the high school of the Autonomous University of Guerrero, were considered variables on environmental knowledge and training, how to act on socio-environmental problems, environmental practices, perception of the complexity of socio-environmental problems , degree of environmentalisation in the curriculum, attitudes and pro-environmental behaviors developed during the teaching-learning process. The objective of this research was to explore the knowledge, training, attitudes, and pro-environmental behaviors that high school students have, based on the teaching-learning acquired during their stay at the educational center of the Autonomous University of Guerrero. The method used was eminently quantitative, and the variables were analyzed through the Likert scale, which is a field research method that allows measuring the opinion on a topic through a survey that identifies the degree of agreement or disagreement of each question, using 5 categories for this

research. The results indicated that their knowledge and practices on environmental issues range from "scarce" to "regular"; they usually know how to deal with the socio-environmental problems that surround them; it was observed that they have a little perception about the complexity of current environmental problems, the study showed that students have limited awareness to act, care and protect their socio-environmental environment, with a low interest in solving environmental problems at the local level, which is reflected in the results of the environmentalization variable in the curriculum, which ranges from "scarce" to "regular". It was concluded that the students' perception does not impact on positive actions in favor of the environment and that these actions benefit the educational centers and their community. The data from this study coincide with other research similar to this one, where the same conclusion has been reached, knowledge and awareness have not been enough to develop pro-environmental attitudes, it is necessary to put and implement responsible actions, with an adequate methodology to propose activities that help to solve current environmental problems and that these actions are reflected in the benefit of the environment in which the students work.

Keywords: environmentalization, educational centers, environmental education, curriculum, transverzalization.

Resumo

Esta pesquisa analisou o nível de educação ambiental dos alunos do ensino médio da Universidade Autônoma de Guerrero, foram consideradas as variáveis sobre o conhecimento e a formação ambiental, saber agir perante os problemas socioambientais, práticas de caráter ambiental, percepção sobre a complexidade dos problemas socioambientais, grau de ambientalização no currículo, Atitudes e condutas pró-ambientais desenvolvidas durante o processo de ensino-aprendizagem. O objectivo desta investigação era explorar os conhecimentos, formação, atitudes e comportamentos pró-ambientais dos estudantes do ensino secundário, com base no ensino-aprendizagem adquirido durante a sua estadia no centro educativo da Universidade Autónoma de Guerrero. O método utilizado foi eminentemente quantitativo, e as variáveis foram analisadas através da escala Likert que é um método de pesquisa de campo que permite medir a opinião sobre um tópico através de um inquérito que identifica o grau de concordância ou desacordo de cada questão, utilizando 5 categorias para esta pesquisa. Os resultados indicaram que os seus conhecimentos e práticas sobre questões ambientais variam de "escassos" a "regulares"; normalmente sabem como lidar com os problemas socioambientais que os rodeiam; observou-se

que têm pouca percepção da complexidade dos problemas ambientais actuáis, o estudo mostrou que os estudantes têm pouca consciência para agir, cuidar e proteger o seu ambiente sócio-ambiental, com um baixo interesse em resolver problemas ambientais a nível local, o que se reflecte nos resultados da variável de ambientalização no currículo, que varia de "baixa" a "regular". Concluiu-se que a percepção dos estudantes não tem impacto nas acções positivas a favor do ambiente e que estas acções beneficiam os centros educativos e a sua comunidade. Os dados deste estudo são coerentes com outras investigações semelhantes a este, onde se chegou à mesma conclusão, o conhecimento e a sensibilização não foram suficientes para desenvolver atitudes pró-ambientais, é necessário pôr em prática acções responsáveis, com uma metodologia adequada para propor actividades que ajudem a resolver os problemas ambientais actuais e que estas acções se reflictam no benefício do ambiente em que os estudantes trabalham.

Palavras-chave: ambientalização; centros educativos; educação ambiental; curriculum; transverzalização.

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Introduction

In various world conferences organized by the United Nations to deal with topics such as education for sustainable development, environmental education or education for world citizenship, there has been consensus on the importance of these topics to train people with the attitudes and knowledge necessary to face challenges related to socio-environmental problems (United Nations Educational, Scientific and Cultural Organization [Unesco], 2014, 2015). In fact, different environmental policies and agendas have been established where strategies and recommendations are provided to world leaders on the importance of having an environmental agenda based on the needs and problems of each country.

At the educational level, the universities of Mexico have not been oblivious to these guidelines, in such a way that they have adhered to meet the recommendations of Unesco to contribute to the reorientation of substantive processes and the strengthening of institutional capacities in the development of technology and the application of knowledge with the firm commitment to maintain these commitments over time (Inter-American University Organization-Inter-American Organization for Higher Education [OUI-IOHE], 2011).

The Ministry of Public Education (SEP), within the legal foundations of the current educational reform at the upper secondary level (NMS) in Mexico, has established as a primary objective to ensure that the student receives regardless of their socioeconomic background, ethnic origin or gender , an education that provides meaningful, relevant and useful learning and knowledge for life. The intention is to train citizens who have the motivation and ability to achieve their personal, work and family development, willing to improve their social and natural environment (Ministry of Public Education [SEP], 2017). For this reason, a new graduation profile is defined, made up of eleven areas that establish the competencies that must characterize all EMS graduates, such as caring for the environment, for which it is necessary to "understand the importance of sustainability and assume a proactive attitude to find sustainable solutions. Think globally and act locally. Assess the social and environmental impact of scientific innovations and impacts" (Secretaría de Educación Pública [SEP], 2017).

In this sense, it should be clear that environmental education addresses social relations with the environment as an object of study, delimiting those elements that form it and building its objectives. This delimitation gives rise to educational actions, mediated by the spheres of personal and social relationships and with the biophysical environment, which are traversed by the axes of unfavorable "negative" and favorable "positive" environmental impact (Calixto, 2018).

In effect, the existing environmental problems worldwide, which have worsened in all social and economic fields, and are affecting the planet with desertification, water scarcity, overexploitation of natural resources, excessive consumerism, among others, it has originated the search for answers from teaching. Calixto (2019), proposes didactic strategies in educational institutions for the mitigation of existing environmental problems.

Environmental education not only includes knowledge about environmental problems, but also awareness, acquisition of awareness, skills and behaviors that are closely related to the values and attitudes of the human being. Universities as trainers and modelers of behaviors and attitudes have the responsibility of guaranteeing meaningful learning in students on the subject that is addressed here.

Therefore, this research explores the level of knowledge, attitudes and behaviors that students have in favor of caring for the environment. The present research has been based on different studies carried out at different times and times on university campuses, and whose results have served as a basis for promoting relevant changes in the curriculum of universities in Mexico and around the world.

In Mexico, academic programs related to environmental education, policies for the sustainability of higher education institutions, and the importance of training environmental educators in Mexico, began approximately twenty years ago (González-Gaudiano and Arias-Ortega, 2017; Martínez-Fernández and González, 2015). In this regard, Benayas del Álamo, Alba and Sánchez (2002) infer that the greening of university campuses requires the necessary resources for their correct implementation, that they transfer a process of change in university students and that it functions as a replicating effect in society.

Research such as those carried out by Leff (2006), Tovar-Gálvez (2012), Medina and Páramo (2014), Peza (2014), Gervacio and Castillo (2019), have contributed to educational processes in the socio-environmental field; Similarly, in the Latin American region, various investigations and studies have been carried out on the subject and its integration in universities as a trend in the contribution to environmental sustainability (Carrasco and Vásquez, 2016; Zúñiga-Sánchez and Marúm-Espinosa, 2016).

In such a way that, the objective of this research has been the exploration of knowledge, training, attitudes and pro-environmental behaviors of high school students, based on teaching-learning and the knowledge acquired on socio-environmental issues, their possible solutions or proposals that allow maintaining a balance between anthropogenic impacts and harmony with the environment that surrounds them.

Methodology

The methodological design processes depend on the epistemological perspective with which the diagnosis to be made is approached, as well as the established purposes (Yazan, 2015). In this sense, the methodology used for the present research was through surveys applied to students from four high schools of the Autonomous University of Guerrero (UAGro), located in Acapulco, Guerrero (Mexico).

Study area

We worked with high schools 2, 7, 17 and 27 of the upper secondary level of the Autonomous University of Guerrero located in the city of Acapulco, Guerrero (figure 1).

Figura 1. Mapa de ubicación de las preparatorias encuestadas de la UAGro

Fuente: Elaboración propia

Experimental part

The surveys were administered in the classrooms to 1,104 sixth semester students distributed in the four high schools in the morning and afternoon shifts; surveying only third-year students was considered because they had already taken virtually all subjects in the curriculum; This made it possible to identify the knowledge and environmental training they acquired during their journey through high school.

The survey was considered the most appropriate method because the two variables had to do with "the degree of…", which is an eminently quantitative question. These variables, in turn, are ordinal in nature. In other words, it was not the researcher's predispositions that determined the research design (Weigel and Weigel, 1978; Wences, 2005).

To analyze the data obtained, the possibilities offered by descriptive statistics were applied to the variables. The data emptying and the construction of the survey scales was carried out using the SPSS statistical package (Statistical Package for Social Sciences, v. 15) (Pérez, 2009).

The variables were analyzed using Likert scales (Hernández-Sampieri, Fernández & Baptista, 2014). This software was applied for the debugging of items, as well as the formation of scales, according to the Cronbach's alpha method, the following variables were considered:

- Knowledge of environmental training received at school.
- Know how to act in the face of socio-environmental problems that arise in life.
- Practices of an environmental nature carried out with the teachers.
- Perception of the complexity of socio-environmental problems.
- Greening in the curriculum.

To analyze the greening of the curriculum variable, the survey applied to the students included a block referring to the degree of greening of the curriculum; for this, all the subjects taken up to the sixth semester were included. Five scales were used for the analysis, ranging from "excellent" to "null".

Results

The first analysis corresponds to the preparatory variable as an independent variable, and the environmental training variable received at school as a dependent variable. In this case, it is interesting to know what the students of each of the high schools think in relation to the environmental knowledge and training obtained in the schools.

In this sense, it was observed that the highest percentage of student responses was in the "regular" category. The analysis showed that statistically there is no association between both variables (Chi-square = 11.427; P = 0.493), with a very weak relationship (Somers d = 0.030, P = 0.242), so regardless of the high school that is try, environmental knowledge and training is regular with a tendency to be good (table 1).

Tabla 1. Preparatorias de la UAGro con relación al conocimiento y formación ambiental

	Conocimiento y formación ambiental recibida en la escuela[2]					Total	
Preparatorias de la UAGro del municipio de Acapulco, Guerrero.[1]	Nula %	Escasa %	Regular %	Buena %	Excelente %	%	n
Preparatoria nro. 2	2	21	**50**	26	1	100	268
Preparatoria nro. 7	2	23	**49**	24	2	100	315
Preparatoria nro. 17	2	19	**49**	28	1	100	290
Preparatoria nro. 27	2	23	**56**	17	1	100	231

Chi-cuadrado de Pearson (x2) = 11.427, gl = 12, Sig = .493, d = .030, Sig = .242

[1] Variable independiente & [2] Variable dependiente.

Fuente: Elaboración propia

The analysis of gender as an independent variable, and knowledge and environmental training received at school as a dependent variable was carried out in order to know what women and men think. The results show that for both genders the environmental knowledge and training received in schools is "regular"; The statistical tests showed that there is no association between these variables (Chi-square = 5.487; P = 0.241) with an extremely weak relationship (Somers d = 0.024, P = 0.394). Therefore, regardless of gender, the training and environmental knowledge received is regular, with a tendency to be good (table 2).

Tabla 2. Opinión de género con relación al conocimiento y formación ambiental recibida

		Conocimiento y formación ambiental recibida en la escuela[2]										Total	
		Nula		Escasa		Regular		Buena		Excelente		%	n
		%	n	%	n	%	n	%	n	%	n		
Género[1]	Hombre	2	10	20	97	**52**	252	24	114	2	10	100	483
	Mujer	2	14	23	140	**50**	311	25	152	0	4	100	621

Chi-cuadrado de Pearson (x2) = 5.487, gl = 4, Sig = .241, d = .024, Sig = .394

[1] Variable Independiente & [2] Variable dependiente

Fuente: Elaboración propia

The analysis of high schools as an independent variable, and knowing how to act in the face of socio-environmental problems that appear in daily life as a dependent variable was carried out in order to know to what extent the students of the different high schools act in the face of environmental problems, and which high school stands out more in this regard.

The results showed that "frequently" they know how to act in the face of socio-environmental problems that arise in daily life, although statistical tests showed that there is no association between these variables (Chi-square = 9.472; P = 0.662) with an extremely weak relationship (Somers d = 0.050, P = 0.44); therefore, regardless of the high school in question, students usually know how to act in the face of socio-environmental problems that arise in their daily lives (table 3).

Tabla 3. Preparatorias de la UAGro con relación a saber actuar ante problemas socioambientales

		Saber actuar ante problemas socioambientales que se presentan en la vida diaria[2]					Total %
		Nunca %	Raramente %	Algunas veces %	Frecuentemente %	Siempre %	
Preparatorias de la UAGro del municipio de Acapulco, Guerrero. [1]	**Preparatoria nro. 2**	2	10	30	**41**	17	100
	Preparatoria nro. 7	2	11	33	**36**	18	100
	Preparatoria nro.17	3	12	33	**38**	14	100
	Preparatoria nro. 27	4	10	35	**39**	12	100

Chi-cuadrado de Pearson (x2) = 9.472, gl = 12, Sig = .662, d = .050, Sig = .044

1 Variable Independiente & 2 Variable dependiente

Fuente: Elaboración propia

The analysis of the gender variable in relation to the variable knowing how to act in the face of socio-environmental problems that arise in daily life, it was shown that men stated that according to their training and knowledge their performance is from "good" to "fair" , while women considered having a "good" performance in the face of socio-environmental problems. The statistical tests revealed that there is no association between the variables (Chi-square = 7.866; P = 0.097) with a weak relationship (Somers d = 0.044, P = 0.102), so that, as in other cases, both genders of students, considered to have a "good" performance in the face of socio-environmental problems that arise in their daily lives (table 4).

Tabla 4. Opinión de género con relación al saber actuar ante problemas socioambientales

		Saber actuar ante problemas socioambientales que se presentan en la vida diaria[2]										Total	
		Nula		Escasa		Regular		Buena		Excelente			
		%	n	%	N	%	N	%	n	%	n	%	n
Género[1]	Hombre	4	18	10	46	**36**	172	**38**	181	14	66	100	483
	Mujer	2	12	11	70	**31**	191	**39**	244	17	104	100	621

Chi-cuadrado de Pearson (x2) = 7.866, gl = 4, Sig = .097, d = .044, Sig = .102

[1] Variable Independiente & [2] Variable dependiente.

Fuente: Elaboración propia

The analysis of high schools as an independent variable and environmental practices as a dependent variable was carried out in order to know to what extent environmental practices are carried out that expand knowledge and strengthen the training of students from the different high schools.

The students answered that "sometimes" they get to do practices. Statistical tests showed that there is an association between the variables (Chi-square = 22.107; P = 0.036) with a strong relationship (Somers's d = 0.062, P = 0.014), so those students who study in high schools 2 and 7 they considered that the practices are carried out "sometimes" or "rarely", while the students from high schools 17 and 27 considered that "sometimes" or "frequently" they develop practices of an environmental nature (table 5).

Tabla 5. Preparatorias de la UAGro con relación a las prácticas de carácter ambiental

	Prácticas de carácter ambiental[2]					
Preparatorias de la UAGro del municipio de Acapulco, Guerrero. [1]	Nunca %	Raramente %	Algunas veces %	Frecuentemente %	Siempre %	Total %
Preparatoria nro. 2	8	35	**36**	17	4	100
Preparatoria nro. 7	9	33	**38**	17	4	100
Preparatoria nro. 17	7	24	**37**	26	7	100
Preparatoria nro. 27	10	28	**38**	21	4	100

Chi-cuadrado de Pearson (x^2) = 22.107, gl = 12, Sig = .036, d = .062, Sig = .014

1 Variable Independiente & *2* Variable dependiente.

Fuente: Elaboración propia

The analysis of high schools as an independent variable in relation to the perception about the complexity of socio-environmental problems as a dependent variable was carried out in order to know to what extent the students of each of the high schools have an ideal perception about the current complexity of the socio-environmental problem.

With a percentage below the average, the surveyed students indicated being perceptible about the complexity of environmental problems. The statistical tests revealed that there is no association between the study variables (Chi-square = 7.884; P = 0.794) with a very weak relationship (Somers d = 0.007, P = 0.792), therefore, regardless of the high school where Study, the perception of the complexity of socio-environmental problems ranges from “sometimes” to “frequently” (table 6).

Tabla 6. Preparatorias de la UAGro con relación a la percepción de problemas socioambientales

	Percepción sobre la complejidad de los problemas socioambientales [2]					
Preparatorias de la UAGro del municipio de Acapulco, Guerrero [1]	Nunca %	Raramente %	Algunas veces %	Frecuentemente %	Siempre %	Total %
Preparatoria nro. 2	4	13	31	**39**	13	100
Preparatoria nro. 7	3	13	**37**	36	12	100
Preparatoria nro. 17	3	12	32	**39**	15	100
Preparatoria nro. 27	4	13	34	**40**	9	100

Chi-cuadrado de Pearson (x2) = 7.884, gl= 12, Sig = .794, d = .007, Sig = .792

[1] Variable Independiente & [2] Variable dependiente.

Fuente: Elaboración propia

The analysis of the gender variable in relation to the perception variable about the current complexity of socio-environmental problems was carried out in order to find out to what extent men and women in schools know or are informed about current socio-environmental problems. Both men and women stated that they have sufficient knowledge about the complexity of socio-environmental problems.

The statistical tests determined that there is no significant association between the variables (Chi-square = 4.79; P = 0.290) with a weak relationship (Somers d = 0.026, P = 0.335), so that regardless of gender, students “frequently ”Perceive the socio-environmental problems they are experiencing at the time (table 7).

Tabla 7. Opinión de género con relación a la percepción de los problemas socioambientales

		Percepción sobre la complejidad de los problemas socioambientales[2]					
		Nunca %	Raramente %	Algunas veces %	Frecuentemente %	Siempre %	Total %
Genero[1]	Hombre	4	12	36	**37**	11	100
	Mujer	3	14	32	**39**	12	100

Chi-cuadrado de Pearson (x2) = 4.979, gl = 4, Sig = .290, d = .026, Sig = .335

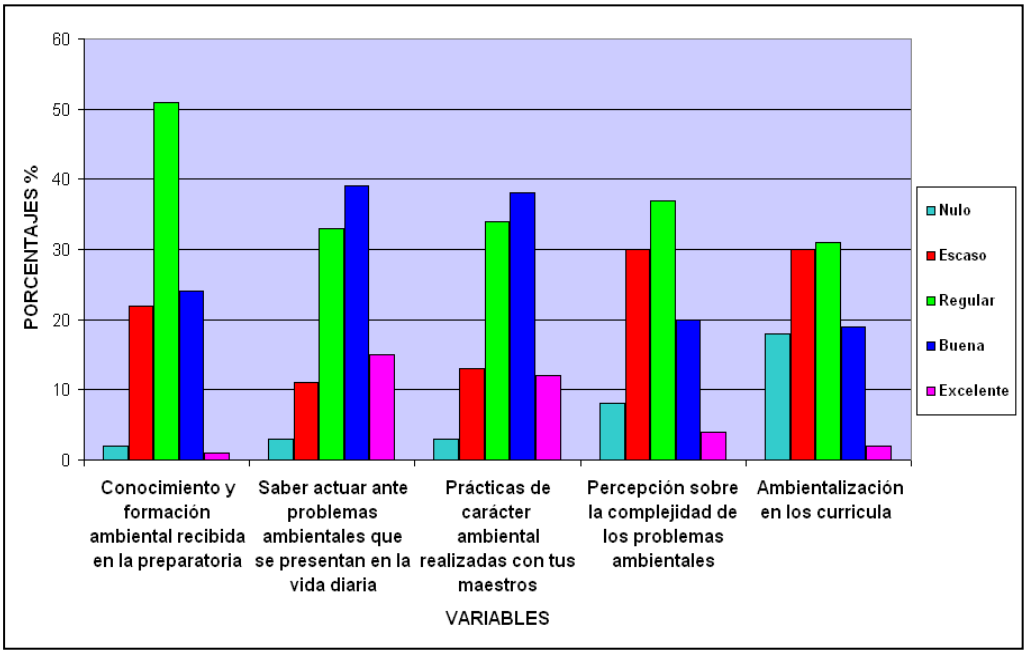
[1] Variable Independiente & [2] Variable dependiente

Fuente: Elaboración propia

Regarding the analysis of the greening variable in the curriculum, the results obtained showed that regardless of the high school in question, 30% of the surveyed students considered the curriculum with little greening, while 32% considered it regularly green; 18% considered a good curricular greening, while 16% considered it with zero greening in the curricular contents; finally, 5% considered the contents of the curriculum excellently environmentalized.

In figure 2 the percentages of the results presented here can be observed; Furthermore, the behavior of the five variables studied in the present study is graphically illustrated.

Figura 2. Porcentajes de variables de las preparatorias encuestadas de la UAGro



Fuente: Elaboración propia

Discussion

The analysis of the results of the present research showed that, regardless of gender, shift and the high school in question, the frequencies and percentages were determined between the scales of "scarce", "fair" and "good", with percentages below average, which has made it possible to identify the areas of opportunity to carry out a methodological intervention that allows changing the perception that students have about current and daily socio-environmental problems. With respect to environmental knowledge and training, 52% of 1,104 students surveyed considered having regular environmental knowledge and training, while 25% said it was "good" and 22% "scarce", which is justifiable due to the low greening in the high school curriculum; contrasting with the analysis carried out by Gervacio and Castillo (2019) on the curricular contents of the UAGro NMS, they found that only ecology, biology, geography and chemistry contain themes related to the environment. In the variable knowing how to act in the face of socio-environmental problems that arise in daily life, 38% indicated that they know how to act in the face of socio-environmental problems that arise in their daily life, which means that 62% of the students are not being aware of the environmental problems in which they are immersed in their daily life, which has to do with a low activity in their environmental practices that they carry out with their teachers.

In the variable perception about the complexity of socio-environmental problems, 38% indicated that they have a “regular” perception, while for 30% it is “scarce”; These results make it possible to infer how students perceive local and global environmental problems.

Even though the results indicated that students often know how to act in the face of environmental problems that arise in their daily lives, these have not been reflected in environmental actions that benefit their schools, according to what Castillo and Gervacio (2019) cited.) in an Eco-audit study applied in the schools of the NMS of the same University, they detected the lack of an environmental culture and the scarce implementation of strategies for correct environmental management within the preparatory schools under study.

Environmental education is action, it is putting into practice daily activities in favor of nature and human well-being, it is synergy with the activities that are carried out day by day, at school, at home, or in the workplace, it must There is a commitment, with an appropriate methodology, to be carried out and reflected in concrete actions, to give it follow-up and must be considered as part of the individual's daily life; as stated by Martín-Molero (1999); Wences (2005), who concluded that knowledge is not enough: something more is needed, such as being aware of environmental problems and projecting it into actions for the benefit of the environment.

Studies such as those of Coya (2001); Moreno (2005) at the higher level, Ignacio and Wences (2006); Calixto (2018) with high school students, agreed with the results of the present study; where it was shown that students who come from official secondary schools have significant environmental knowledge when they arrive at high schools, this information is not shown in the results of this research, since in high school they should have increased their environmental knowledge. Another no less important factor that affects environmental knowledge and training is the family, Wences (2005); Ignacio and Wences (2006) concluded that the households that receive more environmental information from the media, civil society organizations, political organizations, family members and friends are those whose children participate more in the defense of the environment.

Regarding the environmentalization variable in the curriculum, the results showed that they are "regular" to "scarce", in this regard Gervacio and Castillo (2019), in their research on contents related to the socio-environmental dimension in the curriculum of the upper secondary level of UAGro, its results coincide with the perception that students have about the greening of the university curriculum; Similarly, Minor and Ledezma (2011) acknowledge that despite the progress made in inserting environmental education into the curriculum of basic education in Mexico, there is still a lack of advocacy with determination and will from all the actors involved in decision-making of the educational system. According to Peza (2014), environmental education for sustainable development constitutes an effective tool that "humanizes" school coexistence to the extent that it exalts appreciation for life and context.

Likewise, Martínez-Fernández and González (2015), through a comparative study of institutional environmental plans in 35 universities in Mexico, found that understanding and socialization with environmental strategies are lax, with a low impact on the substantive processes of the universities, while the study by Alfie-Cohen and Martínez-Fernández (2015) showed that the strategy of environmental sustainability in their study plans and programs has not been able to consolidate due to the lack of a correct articulation between institutional policies and their strategies.

Finally, it should be emphasized that the search for alternatives to solve a problem requires the articulation of knowledge, which also happens in the environmental field; For this reason, a transversal reading of conceptualizations, methods and contents may be favorable, since the environment is the daily scene of construction of life, and it is there where the student interacts as an individual and as a group to recognize themselves and their world, as It is pointed out by Simões,

López and Álvarez (2019). In short, Gervacio and Castillo (2019) recommend making permanent reviews of the study programs to promote teaching-learning that allows solving current and future socio-environmental problems.

Conclusions

Based on the results presented here, it is considered that the students of the upper secondary level of the Autonomous University of Guerrero (UAGro) have little environmental knowledge and training, even when they consider that they regularly know how to act in the face of environmental problems, the results showed a low pro-environmental attitude, they are unaware of current socio-environmental problems, there is little awareness to act, care for and protect their environment.

To achieve significant changes in students, it is necessary to influence their moral formation, their values and principles. In this task, parents must be the managers of these values, educating their children from home; the school must do what is conducive through the study plans, which must be redesigned based on new times, new realities, new socio-environmental problems that humanity currently suffers, the curriculum must be updated, flexible and contextualized to the new reality that is being lived at a global level; Teachers in all areas must be the facilitators of knowledge, values and attitudes in the formation of socially committed students, formed in values, morally and ethically responsible with the care of nature, it is essential that students are instructed on the importance and protection of the environment in any subject that is taught; The themes that are addressed in the plans and programs must take an integrative, multidisciplinary and transversal approach, that the learning is meaningful, that helps to solve real problems, of daily life, in such a way that the students put the theory learned into practice in class and become useful learning for life; In this sense, teachers have a relevant function, a professional and moral responsibility, an important task in the design of didactic-pedagogical strategies that allow to involve most of the subjects and work collaboratively between teachers with different profiles to have a program successful. The contents must be with a socio-environmental focus; In other words, environmental information must be offered with sufficient guarantees of veracity and scientific rigor, moving from observation to action solving existing problems in the school itself and in its closest environment. Schools must be provided with the methodological and logistical tools to join environmental movements, it is necessary the participation of the entire educational community, parents,

surrounding communities and government entities so that it is a joint effort and the results are as desired.

On the other hand, the curricular design and development proposal must consider the prevailing elements in the international, national and regional context in order to adjust them to the context in which the students are immersed. In short, it is essential that students learn to think critically, reflectively in crisis situations and propose viable alternatives to improve and transform their reality. For this reason, all the elements of curricular innovation that point to the establishment of links between the school and society acquire meaning, as a binomial that should project their efforts to help insert the students in the socio-environmental context, based on the analysis and understanding of the complex relationships that are established and before which they are expected to act creatively and purposefully as autonomous subjects. The ideal would be to generate a comprehensive and holistic curriculum focused, of course, on the graduation profile of the high school student.

Finally, there would be a solid revision to integrate clear and well-defined environmental axes into the study programs, which serve as a basis for working on environmental education in schools, although “caring for the environment” is considered as a new graduation profile from the high school student, the strategy to achieve this competence is not specified, since the indication is "think global and act local", a maxim that does not help at all if you do not have a well-defined methodological strategy.

References

Alfie-Cohen, M. y Martínez-Fernández, C. N. (2015). La UAM Cuajimalpan: reflexiones en su décimo aniversario. *Revista de la Educación Superior*, *44*(176), 37–61 Recuperado de https://www.elsevier.es/es-revista-revista-educacion-superior-216-pdf-S0185276015001181

Benayas del Álamo, J., Alba, D. y Sánchez, S. (2002). La ambientalización de los campus universitarios. El caso de la Universidad Autónoma de Madrid. *Ecosistemas*, *11*(3). Recuperado de https://www.revistaecosistemas.net/index.php/ecosistemas/article/view/601

Calixto, F. R. (2018). *Representaciones en torno al cambio climático de los estudiantes de una escuela secundaria.* Ciudad de México: Universidad Pedagógica Nacional.

Calixto, F. R. (2019). *Estrategias didácticas sobre el medio ambiente y el cambio climático.* CD de México: Universidad Pedagógica Nacional.

Carrasco, L. M. E. y Vásquez, R. E. (2016). La educación ambiental: un saber necesario en la formación universitaria. *Primer Congreso Nacional de Educación Ambiental para la Sustentabilidad.* Eje: EAS en las instituciones educativas. Academia Nacional de Educación Ambiental ANEA. Recuperado de http://www.anea.org.mx/CongresoEAS/Docs/332P-INST-CarrascoLozanoV2(corr).pdf

Castillo, E. B. y Gervacio, J. H. (2019). Ecoauditoria ambiental aplicada a centros escolares del nivel medio superior de la Universidad Autónoma de Guerrero. *REMEA- Revista Eletrônica do Mestrado em Educação Ambiental*, *36*(2), 319-341. Doi: https://doi.org/10.14295/remea.v36i2.9139

Coya, G. M. (2001). *La ambientalización de la universidad*: *un estudio sobre la formación ambiental de los estudiantes de la Universidad de Santiago de Compostela y la política ambiental* (tesis doctoral). Facultad de Ciencias de la Educación, Departamento de Teoría e Historia de la Educación de la Universidad de Santiago de Compostela.

Gervacio, J. H. y Castillo, E. B. (2019). Dimensión socioambiental en los contenidos del currículo del nivel medio superior de la Universidad Autónoma de Guerrero. *RIDE-Revista Iberoamericana para la Investigación y el Desarrollo Educativo*, *10*(19), 1-25. Doi: https://doi.org/10.23913/ride.v10i19.500

González-Gaudiano, É. J. y Arias-Ortega, M. Á. (2017). La formación de educadores ambientales en México: avances y perspectivas. *Educar em Revista*, (63), 53-66. Doi: https://doi.org/10.1590/0104-4060.49136

Hernández-Sampieri, R., Fernández, C. C. y Baptista, L. P. (2014). *Metodología de la investigación* (6.ª ed.). México: Editorial Mc. Graw Hill.

Ignacio, G. B. y Wences R. (2006). Aprendizaje de la problemática ambiental en las escuelas secundarias. En Gasca Zamora, J. (coord.), *La construcción de perspectivas de desarrollo en México desde sus regiones*. Mérida Yucatán, (México): Asociación Mexicana de Ciencias para el Desarrollo Regional A.C. (AMECIDER).

Leff, E. (2006). La universidad y la formación ambiental. Diez líneas de acción. *Revista Educación Superior y Sociedad*, *3*(1), 21-25. Recuperado de http://ess.iesalc.unesco.org.ve/index.php/ess/article/viewFile/165/129

Martínez-Fernández, C. N. y González, G. E. J. (2015). Las políticas para la sustentabilidad de las instituciones de educación superior en México: entre el debate y la acción. *Revista de la Educación Superior*, *44*(174), 61–47. Recuperado de http://publicaciones.anuies.mx/pdfs/revista/Revista174_S3A3ES.pdf

Martín-Molero, F. (1999). *Educación ambiental*. Madrid: Editorial Síntesis S.A.

Medina, A. y Páramo, P. (2014). La investigación en educación ambiental en América Latina: un análisis bibliométrico. *Revista Colombiana de Educación*, *66*, 19-72. Recuperado de http://www.scielo.org.co/pdf/rcde/n66/n66a03.pdf

Minor, C. y Ledezma, A. (2011). La educación básica a la luz de Tbilisi +31 en Visiones Iberoamericanas de la educación ambiental en México. En Súcar, S. (coord.), *Memorias del Foro Tbilisi + 31*. Universidad de Guanajuato.

Moreno, L. E. (2005). *La formación inicial en educación ambiental de los profesores de secundaria en periodo formativo* (tesis doctoral). Escuela Universitaria del Departamento de Didáctica de las Ciencias Experimentales y Sociales de la Universidad de Valencia.

Organización de las Naciones Unidas para la Educación, la Ciencia y la Cultura [Unesco] (2014). *Declaratoria de Aichi-Nagoya sobre la educación para el desarrollo sostenible*. Organización de las Naciones Unidas para la Educación, la Ciencia y la Cultura (United Nations Educational, Scientific and Cultural Organization). Recuperado de https://unesdoc.unesco.org/ark:/48223/pf0000231074_spa

Organización de las Naciones Unidas para la Educación, la Ciencia y la Cultura [Unesco] (2015). *Educación para la ciudadanía mundial: temas y objetivos de aprendizaje.* Organización de las Naciones Unidas para la Educación, la Ciencia y la Cultura (United Nations Educational, Scientific and Cultural Organization). Recuperado de https://unesdoc.unesco.org/ark:/48223/pf0000233876

Organización Universitaria Interamericana - Organización Interamericana para la Educación Superior [OUI-IOHE] (2011). *Declaración de las Américas: por la sustentabilidad de y desde la universidad*. Recuperado de http://www.uv.mx/cosustenta/files/2012/09/declaracion.pdf

Pérez, L. C. (2009). *Técnicas estadísticas con SPSS (Statistical Package for the Social Sciences V16).* Prentice Hall Pearson.

Peza, H. G. (2014). *Educación para el desarrollo sustentable: problemas ambientales, estrategias pedagógicas y recursos didácticos.* México: Instituto de Investigación, Innovación y Estudios de Posgrado para la Educación (IIEPE), Secretaría de Educación del Gobierno del Estado de Nuevo León y Secretaría de Medio Ambiente y Recursos Naturales.

Secretaría de Educación Pública [SEP] (2017). *Los fines de la educación en el siglo XXI.* Recuperado de https://www.planyprogramasdestudio.sep.gob.mx/descargables/biblioteca/basica-educ-fisica/II-LOS-FINES-DE-LA-EB.pdf

Simões, A. S, Yanes López, G., y Álvarez Díaz, M. (2019). Transversalidad de la educación ambiental para el desarrollo sostenible. *Universidad y Sociedad, 11*(5), 25-32. Recuperado de http://rus.ucf.edu.cu/index.php/rus

Tovar-Gálvez, J. C. (2012). Fundamentos para la formación de líderes ambientales comunitarios: consideraciones sociológicas, deontológicas, epistemológicas, pedagógicas y didácticas. *Revista Luna Azul*, (34), 214-239. Recuperado de https://www.redalyc.org/articulo.oa?id=3217/321727348013

Weigel, R. H. and Weigel, J. (1978). Environmental concern. The development of measure. *Environment and Behavior* 10(1):3-15

Wences, R. R. (2005). Opinión, conciencia y acción ambientalistas de los acapulqueños. En *Memorias del X Congreso Nacional y IV Congreso Internacional de Ciencias Ambientales.* Academia Nacional de Ciencias Ambientales. Chetumal, Quintana Roo, México.

Yazan, B. (2015). Three Approaches to Case Study Methods in Education: Yin, Merriam, and Stake. *The Qualitative Report*, *20*(2), 134-152. Recuperado de https://nsuworks.nova.edu/tqr/vol20/iss2/12

Zúñiga-Sánchez, O. y Marúm-Espinosa, E. (2016). La educación ambiental para la sustentabilidad en las instituciones de educación superior. Una aproximación conceptual. En *Memorias del 1er Congreso Nacional de Educación Ambiental para la Sustentabilidad.* Asociación Nacional para la Educación Ambiental (ANEA). Recuperado de http://www.anea.org.mx/CongresoEAS/Docs/337P-INST-EspinosaV2(corr).pdf

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