Sustainability at the Sociology Educative Program as a basis for the design of a methodological proposal for a Non-Formal Socio-Environmental Education Program (NFSEEP)

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ABSTRACT

Environmental crisis has impacted on the environmental, social, and economic. This affects sustainable development. Education is a strategy to face this crisis. This education has to consider the environment as a work matter so that it contributes to promoting socio-environmental Knowledge in people. Universities must incorporate sustainability into their curricula. This study integrated two phases. The first considered the analysis of the sustainability into the curriculum through a rubric, a green audit to the institution through a check list and a survey to 115 students and 7 teachers, also a structured interview to 110 students and 7 teachers. The elements of sustainability were the dimension. The second phase focused to the methodological proposal of NFSEEP. Results: The rubric evaluation registered 4, the maximum was 10, it expressed a little link between curriculum and sustainability. The green audit registered "bad" and "regular" aspects related to socio-environmental. The interview and survey showed similar results, they indicated sustainability minimally is integrated in the curriculum and at teaching-learning process. In relation to the second phase, it was designed a methodological proposal on a NFSEEP. It was a mixed study, had two aims, identify the sustainability at sociology program and the design of the NFSEEP.

Keywords: sustainability; environmental crisis; study plan, environmental education

Introduction

The 2013 Educational Model of the Autonomous University of Guerrero (AUG-Mexico) establishes as general principles, social responsibility, training and sustainable development. In this order of ideas, it also establishes that, in the transversal axes, transversal issues must be present, such as, human rights, culture of peace, equity, interculturality, plurality, knowledge society, gender perspective, environment, etc. It is also essential that institutions adopt the culture of sustainability. Higher Education Institutions (HEIs) play a central role, since they constitute a strategic sector for the development of societies. Traditionally, HEIs have stood out for their important contribution to sustainable development (Bohne et al., 2019). The 2030 Agenda invites all actors, both public and private, to work together to solve the social, environmental and economic problems that threaten and pose in danger the sustainability of the planet. The University plays a fundamental role (De la Rosa et al., 2019). The term "sustainability" when applied institutionally within a university, is the development of a process or management system that helps to create a vibrant campus economy and high quality of life while respecting the need to

sustain natural resources and protect the environment (Ingaldi,2015). Higher Education Institution HEIs, as agents responsible for knowledge creation and dissemination, must play an active role in the development, diffusion and promotion of sustainability (Madeira et al., 2011).

The concept of sustainable development involves a properly and consciously shaped relationship between economic growth, care for the environment and life quality (Ingaldi,2015). Planning in sustainable development is believed to be an important element in allowing higher education institutions to set their goals and to commit themselves towards under-taking concrete actions and measures at all levels in order to implement sustainability (Leal et al., 2018). Sustainability as a policy concept has its origin in the Brundtland Report of 1987. The concept has been re-interpreted as encompassing three dimensions, namely social, economic and environmental (Kuhlman & Farrington, 2010). Sustainability is usually seen as a guide for economic and social policymaking in equilibrium with ecological conditions (Seghezzo, 2009). The notions of sustainable development and sustainability are often related to ideas introduced by economists, philosophers, scientists, and writers from the eighteenth, nineteenth, and early twentieth centuries, as described in (Holland, 2003; Lumley & Armstrong, 2004; Pepper, 1996 as cited in Seghezzo, 2009b). The Sustainable Development Goals set out by the United Nations advocate that all learners will have the knowledge and skills needed to promote sustainable development. Development education, education for sustainable development and global citizenship education are deliberate educational interventions, which all address global justice and sustainability issues (O'Flaherty & Liddy, 2018).

Sustainability involves harmonious actions consistent with nature, ecology oriented towards future generations (Kapecki, 2020). Different political agendas have been developed to promote sustainability and make it a political goal worldwide. As stated in Agenda 21, the political debate seems to agree that education has to play a key role in achieving sustainability (Burmeister & Eilks, 2013). The terms sustainability and sustainable development as synonymous and there are

others which don't (Sartory et al., 2014). Creating behavior change to mobilize transitions toward sustainability is a significant challenge of our time (Zelenika et al, 2017). The 2012 United Nations Conference on Sustainable Development emphasized that every state has the responsibility "to respect, protect and promote human rights," and that "democracy, good governance and the rule of law . . . are essential for sustainable development" in each of its three dimensions: economic growth, social development, and environmental protection, United Nations Conference on Sustainable Development, 2012 (Knox, 2015). A higher sustainability education is an initial phase as ever in many universities (Jeong & Gonzalez, 2020). Sustainability assessment (SA) is a complex appraisal method. It is conducted for supporting decision-making and policy in a broad environmental, economic and social context, and transcends a purely technical/scientific evaluation (Sala et al., 2015). Sustainability assessment is a methodology "that can help decision-makers and policy-makers decide what actions they should take and should not take in an attempt to make society more sustainable"; or the goal of sustainability assessment is to pursue that "plans and activities make an optimal contribution to sustainable development" (Devuyst, 2001; Verheem, 20002 as cited in Sala et al, 2015). The evaluation of the sustainability of a system must derive and agree with an adequate planning in which those involved have agreed on their vision of how they want to relate to the environment, considering the needs of the environment, their own and those of future generations. Based on this, the establishment of coherent and clear, unambiguous objectives is essential to address the assessment of the dimensions of sustainability (Pastor et al., 2016). Cebrian et al., (2019) based on the review conducted for some authors about the assessment methodology and tools of sustainability competencies suggest to develop specific rubrics for each sustainability competence and adapt them to different programmes and contexts.

This study has two aims. The first one refers to assess the sustainability at the school and 2012 study plan of sociology (current) in relation to environmental, social and economic aspects or (socio-environmental issues linked with

training skills established in the curriculum in a disciplinary or transversal way). The second one focuses on the design of a methodological proposal of a Non-Formal Socio-Environmental Education Program (NFSEEP) as a proposal to promote sustainability with students in this institution in an extracurricular way.

Literature review

Socioenvironmental impact

Regarding how we understand socio-environmental problems, it should be noted that some authors make distinctions between environmental problems and socio-environmental problems, referring in the first case to issues related to the use and tear those natural resources are suffering and expanding this question in the second case to the incorporation of these issues to the communities directly affected by the impacts derived from a specific project. (Orellana, 1998, as cited in Moreno & Moreno, 2015). Anthropogenic activities contributed towards climate change through the following means: (1) Burning of fossil fuels and Greenhouse gas emissions; (2) Deforestation and enhanced forest fires; (3) Increasing aerosol concentration in the atmosphere; (4) Industrialization, urbanization , and vegetation pattern shifts (Gulzar et al., 2021), these authors also consider that The belongings of climate variation foliage great impacts on human being health by ever - increasing adverse reheat waves, the venture of vector - borne diseases that changes the ecology of vectors like ticks, bedbugs , etc. Each company, through manufacturing processes, produces a certain amount of waste, and at the same time in this way has an impact on the natural environment (Ingaldi,2015). The economic transformations towards the intensive exploitation of non-renewable natural resources have produced environmental impacts and negative social rights, which violate the collective rights of local communities (Hincapié & López, 2016). Applying human rights thinking to environmental crisis is an example of humans attempting to solve the crisis they have created (Oksanen, 2021).

Environmental Education for Sustainability

Environmental Education (EE) and is seen as a com-prehensive programme for global action in all areas of Sustainable Development (SD). The Rio Declaration on Environment and Development consists of a series of principles defining the rights and responsibilities of countries (UNEP1992 cited in Leal et al., 2018). A notable observation of the Earth Summit is that it focuses on the role of Education for Sustainable Development (ESD) as an educational response to the environmental crisis (Leal et al., 2018b). Sustainable education is an educational culture change for human's potential realization and economic, social and ecological interdependence, which will conduct into transformative learning (Sterling, 2001, as cited in Jeong & Gonzalez, 2020b). Environmental education for sustainability intervenes in different dimensions and levels: political dimension, ecological dimension, epistemological and scientific dimension, pedagogical dimension, ethical dimension, economic and cultural dimension. Environmental education for sustainability must contribute to the construction of just, socially equitable, democratic societies that are committed to caring for the environment (Maldonado, 2009).

Inclusion of sustainability in the higher education institution and curriculum

Sustainability is a major issue for all organizations in the twenty-first century. Institutions of higher education are exploring means to integrate sustainability into curricula (Cusick, 2009; Rusinko & Sama, 2009, as cited in Rusinko, 2010). Sustainability education is becoming crucial, mainly for young generation so that they have an understanding of concepts such as economic prosperity, resource equity, energy uses, and environmental health and concerns. While educating them on sustainability begins in institutions of education, it is important that sustainability education is well entrenched in the curriculum and everyday practice of their lives (Sengupta et al., 2020). (Sammalisto & Lindhqvist, 2008, as cited in Mishra & Mishra, 2020) observed the integration of sustainability in higher

education based on different sustainability dimensions such as environmental, economic, social and/or cultural. In this respect, identifying key competencies in sustainability can be the first step towards sustainability inclusion in higher education. Multiple studies have found that major challenges in the incorporation of sustainability in university education are in the field of teaching, (Lazzarini et al., 2018, as cited in Mishra & Mishra, 2020).

According to the aforementioned documents approved by the General Assembly of the Conference of Rectors of Spanish Universities (CRUE in Spanish), integrating sustainability into the curriculum is essential. It is therefore crucial to transfer sustainability competencies to the teaching profession by developing competencies in education for sustainability, linking the teaching of sustainability to student learning (Ull et al., 2014, as cited in Fuertes et al., 2019).

Higher Education Institutions (HEIs) played a role in "transforming societies and serving the greater public good, so there is a societal need for universities to assume responsibility for contributing to sustainable development" (Waas et al., 2010, as cited in Bautista et al.,2021) and HEIs "should be leaders in the search for solutions and alternatives to current environmental problems and agents of change" (Hesselbarth & Schaltegger, 2014, as cited in Bautista et al., 2021).

Therefore, the incorporation of environmental education as a transversal theme is assumed, a methodological resource that helps the integration, in the pedagogical process, of necessary environmental elements, as well as the readjustment of the study programs, under the curricular conception itself adopted (greening). In this way, it is possible to integrate environmental content as a transversal theme instead of developing segregated courses related to the subject (Simões et al., 2019).

Formal and non-formal environmental education (Non-Formal Socio-Environmental Education Program). Socio-constructivism and competence approach.

Environmental education can be delivered in a formal, non-formal and informal way. Formally imparted environmental education is that which is provided through programs that have a curricular value in schools. Non-formal environmental education is that which can be imparted through planned, programmed and structured activities, with clear objectives and goals but without having a curricular value; many times, it serves as extracurricular support. Informal environmental education is what is built in the environment. One way to put into practice what environmental education seeks in theory is through programs. Programs are an instrument to organize and plan action educational, (Novo, 2003, as cited in Reyes, 2010). It is understood then, that a formal environmental education program is included in the school curriculum, while non-formal ones are complements and independent of the curriculum. Bedolla et al., (2016) considered a Sustainable Environmental Education Program (SEEP) must have a structure defined and organized, which includes theoretical foundations attached to the context and therefore pedagogical, as well as a general program on what is involved and activities specific to implement. The cited authors presented a methodology to develop a SEEP and considered that (Analysis of the context, theoretical and pedagogical foundations, program and sequence didactics) are the main phases. They also considered that a SEEP is based on pedagogical foundations such as the Environmental Education, socio-constructivism and competences approach, among others. Non-formal environmental education programs manage to put into practice the most basic principles and concepts of environmental education, so that people know more and become more aware of their own problems (Reyes, 2010). Within modern theories, one of them is socio-constructivism, which is an evolution of Vygotsky's constructivism. In this model, the person plays an active role that seeks gradual learning. The act of learning depends on the relationship between learning and life. Collective learning is part of the central axis of teaching that will enhance the ability to solve contextualized problems through investigative practice (Mesén, 2019). Socio-constructivism proposes the participation of the student within a collective learning project, where it will enhance their ability to solve contextualized problems, which will

allow them to develop a process of social construction of knowledge, supported of course, in the media and technological tools at their disposal. scope (Robles & Barreno, 2016). The competencies build in the students the best performance to respond to the demands of the environment, (Cuevas et al, 2011, as cited in Bedolla et al. 2016). It is necessary to understand in this section the evolution and development of Environmental Education (EE), since it currently raises a critical approach to develop this process. According to Nieto, EE is a field that revolves around education and the environment, requires contributions from other disciplines and has built its own specificity and importance as a field of production of knowledge and concrete social practices, (Nieto, 2008, as cited in Bedolla et al. 2016). To work on the competencies, the application of various parameters and processes is required. One of these processes is evaluation, which includes moments and functionalities that guide the teacher and the student, as well as the other actors of the school community; This evaluation is integrated in three moments: diagnostic, formative and summative (Valero, 2016).

Aim and research questions

This study has two aims. The first one refers to analyze the sustainability at school and study plan of school of sociology (current) in relation to environmental, social and economic aspects or (socio-environmental issues linked with training skills established in the curriculum in a disciplinary or transversal way). (1) The following questions guided the analyses: Does the sociology curriculum integrate the elements of sustainability in the graduate profile competencies? (2) Does the school of sociology promote the principles of sustainability? (3) Do students promote environmental competencies? (4) How do teachers promote environmental competencies in the classroom when teaching a subject?

The second one focuses on the design of a methodological proposal of a Non-Formal Socio-Environmental Education Program (NFSEEP) as a proposal to promote sustainability with students in this institution in an extracurricular way and this guided to the following question (1) What actions are needed

to promote sustainable skills in students? (2) A Non-Formal Socio-Environmental Education Program (NFSEEP) contributes to sustainability and forming sustainable competencies in students?

Method

The curriculum of the institution mentioned in this work is offered by the higher school of sociology (higher level) dependent on the Autonomous University of Guerrero (Mexico). It imparts the degree in Sociology of Communication and Education. This bachelor's degree is taught in a normal 4-year period. It was developed under the competence approach and it is currently in the process of restructuring and internal changes. The purpose of this study plan and graduate profile competencies are aimed at contributing to the resolution of regional, state and national problems related to the areas of communication and education from a sociological perspective. The statistical yearbook of the Autonomous University of Guerrero (AUG) 2019-2020 established that in this period the Higher School of Sociology had a teaching staff of 11 full-time teachers (10 men and one woman), a teacher (man) of 3/4 of time and 6 hourly teachers (5 men and one woman), making a total of 18 teachers. With regard to students, there was an enrollment of 232, with a total of 56 first-entry (22 men and 34 women) and 176 re-entry (70 men and 106 women).

It was a mixed study, focused on action research and was employed a convenience sampling. Mixed methods (MM) combine the quantitative (quanti) and qualitative (quali) perspective in one study aiming to give depth to the analysis when the research questions are complex (Hamuy, 2013). Non-probability sampling strategies are any methods of sampling that do not utilize some form of random selection. By far the most common non-probability sampling strategy used within developmental science is convenience sampling (for review see Bornstein et al., 2013), which is a sampling strategy where participants are selected in an ad hoc fashion based on their accessibility and/or proximity to the research. One of the most common examples of convenience sampling within developmental science is the use of student volunteers as study

participants (Jager et al., 2017). Students and teachers were taken account in the sampling process.

They were two phases developed in the process of this study. Sustainability is a very capacious word; it contains all the aspects related to social well-being and the proper relationship between man and nature (Kapecki, 2020). Both phases took into account the sustainability dimensions.

Phase a): The study plan of the school mentioned was analyzed. It was developed in three moments. a) T analyze the sustainability in the study plan, it was necessary to design a rubric. This instrument contemplated the dimensions of sustainability (social, economic and environmental) and these dimensions were linked to graduate profile competencies established in the curriculum in a disciplinary or transversal way.

b) To identify some environmental problems in the institution a green audit was done and it was needed a check list. In order to relate the sustainable aspect with the institution, the mentioned instrument also took into account the social, economic and environmental aspects.

c) A survey and an interview were designed and applied to teachers and students in order to identify the presence or absence of the principle of sustainability in the study plan and the teaching-learning process.

Case analysis

The rubric was qualitative and quantitative, measured with the legends "highly linked" with a value of 2 points, "little linked" 1 point, and "not linked" 0 points, the relationship that exists between the graduation profile or graduation competencies in the curriculum under study with the elements of sustainability (social, economic and environmental). It was necessary to have the study plan on hand to do the evaluation. The 2012 curriculum was reviewed and it is in force so far. To design a rubric of sustainability competencies (SC), it was defined a structure that started from the four competencies related to sustainability. Each competence was divided into the three dimensions of sustainability (economic, environmental and social), plus a holistic

dimension, and for each dimension one or more units of competence were defined in the three levels of mastery of the acquisition of competence following the simplified Miller pyramid (1990) (doing, demonstrating, knowing how and knowing) (Albareda et al., 2019).

To identify some environmental problems a green audit was done in the institution, for that reason a check list was used. In order to relate the sustainable aspect with the institution, the mentioned instrument also took into account, elements of the environment and the social, economic and environmental aspects. The space where the school is located and its building was visited, and what was observed was recorded in the check list. In the check list, the elements of the environment (water, air, soil, energy) were considered in relation to the aspect of sustainability and with this, records were described about what was observed. The registered was marked with good, Regular, Bad and Observations. In the course of environmental auditing, we must adequately consider the three elements of sustainable development, namely, economic growth, environ mental conservation and social progress. This means a further expanding of traditional financial audit method (Lewis, 2000, as cited in Rongbing, 2011). Green audit, also referred as environmental audit should be implemented by higher education institutes. To nurture environmental friendly management in academic institutions following aims and objectives were formulated: To recognize, diagnose and resolve the environmental problems, to reduce energy consumption, to minimize the consumption of water and monitor its quality, etc. (Patil et al., 2019).

The interview for students and teachers

A structured interview was designed for students and considered as dimension, the elements of sustainability. It was an interview that included around 17 open questions. The objective of the interview was to identify sustainable competencies. It was applied in the academic groups of the institution in the morning and evening. It took place at the end of 2018. It was applied to 110 (42 men and 68 women) students of the Higher School of

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Sociology among them, 20, students of group 201 in the morning, 13 of 202 in the afternoon, 14 of group 401 in the morning, 13 students of group 402 in the afternoon, 18 from group 601 in the morning, 10 of the 602 in the evening, 7 of the 801, morning and 15 of the group 802 in the evening. The interview was analyzed qualitatively, and the results are presented in the results section. In relation to interview for teachers, the aim of this technique was to know how they link their teaching work and the curriculum with the sustainable part. It was a structured interview, with 14 open questions and also considered as dimension, the elements of sustainability. It was applied to seven teachers (5 men and two women). The teachers who answered the interview developed their teaching practice in groups 201, 202, 401, 402, 601, 602, 801 and 802 (morning and evening groups) and their job category ranges from full-time, part-time, interim and other. The interview was analyzed qualitatively, and the results are presented in the results section.

The survey for students and teachers

A survey was applied to 115 students (70 women and 45 men) from the Higher School of Sociology, 23 students from group 201 in the morning, 13 of 202 of the afternoons, 14 of 401, morning, 13 of 402 in the evening, 18 of group 601 in the morning, 10 of the 602 of the afternoons, 10 of the group 801 in the morning and 14 of the group 802 of the evening, 3 of them, did not specify a group, however, they belong to this institution. The survey was analyzed quantitative by IMB SPSS Statistics 22, and the results are presented in percentage in the results section. With respect to teachers, this was applied to 7 teachers, 5 men and 2 women from the Higher School of Sociology. The age range of teachers is between 30 and 60 years old. Most of them are from Acapulco and some from other municipalities in the state. Most are married and one of them is single. Respondents work in the different degrees of this institution, that is, between groups 201, 202, 401, 402, 601, 602, 801 and 802 (morning and afternoon group) of these semesters, their job category ranges from full-time, part-time, interim and other. The survey was analyzed quantitative by IMB SPSS Statistics 22, and the results are presented in percentage in the results section.

Phase b): Based on sustainability and the need to include this dimension in the curriculum, it is necessary in a complementary way to implement non-formal educational programs that contribute to the sustainability to be achieved. The non-formal education relies on the objectives and the contents of activities structured and organized in an institutionalized framework, with an optional character, complementary to school (Moldovan & Bocos-Bintintan, 2015). In this sense, it was designed a methodological proposal of a Non-Formal Socio-Environmental Education Program (NFSEEP) as a proposal to promote sustainability with students. The design of this proposal contemplates a methodology based on (Nieto & Buendia, 2008) and grounded in Environmental Education for Sustainability, socio-constructivism and the competence approach.

The NFSEEP was designed in four phases (contextualization, structuring, programming and evaluation). The design and implementation of a Project in Environmental Education and for Sustainability suggests taking into account four phases: contextualization, structuring, programming and evaluation (Nieto & Buendia, 2008). The literature on the planning of an educational project indicates four basic linear moments: diagnosis, content organization, instructional design and evaluation. However, when the purpose of these projects is related to processes of social transformation, change of practices, discourses and paradigms, it is essential to overcome the linear treatment and assume each stage as a complex process that is rebuilt to the extent that it advances. From this perspective, there are four processes for designing educational projects: contextualization, structuring, programming and evaluation (Buendia et al, 2020).

Results

Evaluation of sustainability in the study plan

The study plan was requested and with the support of the rubric, the elements of competence (graduation profile) related to the elements of sustainability were evaluated to identify the level of linkage they present. The

maximum score indicating a high degree of link between the graduation profile and sustainability was 10 points.

The results obtained reflected 4 points, well below the average, indicating that

the curriculum is little linked to aspects of sustainability.

Table 1.

Evaluation of sustainability in the study plan.

Elements of the competences (graduation profile).	Elements of sustainability (Social, economic and environmental)	2 points Highly linked with graduation profile or graduation competencies	1 point little linked with graduation profile or graduation competencies	0 point not linked with graduation profile or graduation competencies	Total
Knowledge			X		1
			X		1
Skills				X	0
			X		1
Values			X		1
				Evaluation	4

Evaluation of sustainability in the institution

An environmental audit was done in the institution using a check list to record some environmental aspects in the institution, for which, it was recorded with (good, regular and bad), what was observed, likewise,

observations were noted. The results obtained were oriented to the "bad" aspect, to a lesser average in "regular" and nothing was registered in "good". This reflected an insufficient approach to the sustainability that is desired to be achieved and consequently, it needs to reinforce measures to contribute to it. Table 2.

Table 2.

Evaluation of sustainability in the institution.

Elements of environment	Elements of sustainability (Social, economic and environmental)	Good	Regular	Bad	Observations
Water	The water consumption.		X		It was observed that there is a lack of awareness about saving and sustainable consumption of water.

	wastewater	X		Wastewater was observed, it does not go to drainage system and it is irrigated at some areas of school.
Air	Unpleasant odors.		X	In some cases, odors from wastewater and toilets are perceived.
	Fossil fuel contamination.		X	Environmental pollution is perceived from car exhausts.
Soil	Urban Solid Waste.		X	The presence of Urban Solid Waste was observed inside the building and in the school areas.
	Management and disposal of Urban Solid Waste.	X		A deficient management and disposal of Urban Solid Waste was observed, neither disposal strategies nor reuse or separation strategies are applied.
Energy	The consumption of electrical energy is controlled.		X	An uncontrolled consumption of electrical energy was perceived.
	Workers and students turn off the light, the air conditioning, disconnect electrical devices, etc. when they are not occupied.		X	Air conditioners and lights on were perceived when there were no people, also connected appliances.

Result of student interview

With the student's interview, it was possible to identify the dimension of sustainability in the study plan, likewise, to identify that dimension in the learning process and with it, to know the influence of the principles of sustainability on the competencies they promote. The results showed that the three aspects of sustainability (social, economic and related to the environment) are minimally contemplated in the study plan, the transversality of the social, economic, environmental or, in other words, the socio-environmental is not transversely related in the contents or competencies established in the plan, therefore, it is stated that students perceive this disconnection. In relation to the competences that the students promote, with the information they provide, it is perceived that this focus only on

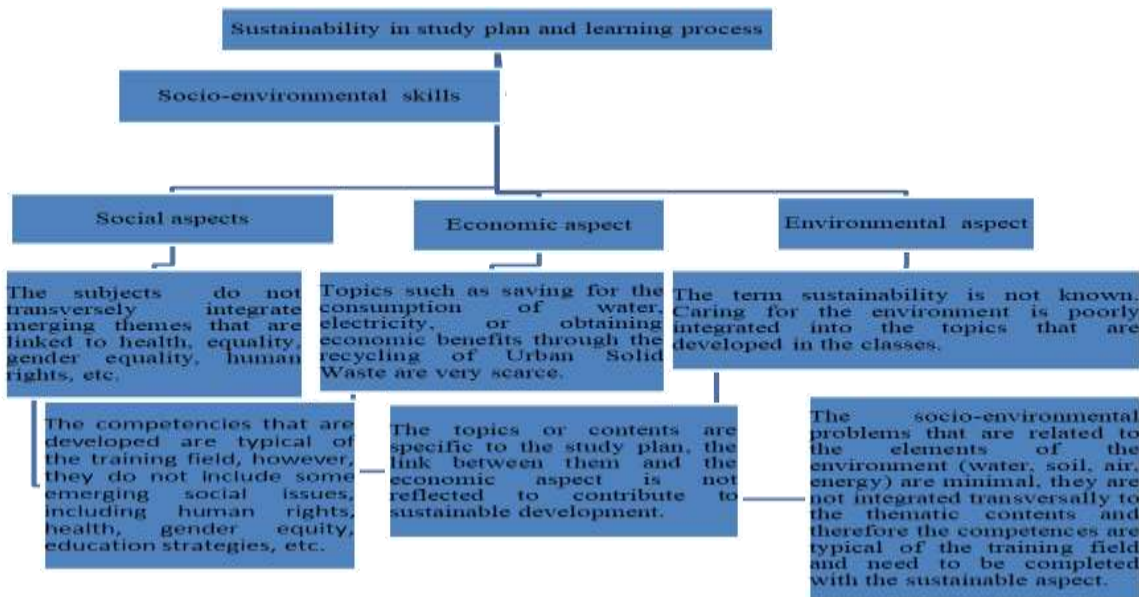competencies of the field of their training.   Figure 1.

Figure 1. Result of students´ interview to know the dimension of sustainability in the study plan and the environmental skills they promote.

Result of students' survey

Result of students' survey to identify the dimension of sustainability in the study plan and the learning process. They were four indicators (curriculum, teaching-learning strategies, teacher competencies and student competencies) all of them were linked to sustainability in order to achieve the aim. The results showed that the percentages were located in the levels (never, rarely and occasionally), this led to the understanding that the sustainability dimension in the study plan and in learning process is insufficient. Table 3.

Table 3.

Result of students' survey to identify the dimension of sustainability in the study plan and the learning process

Indicator: Sustainability in the curriculum						
N: Never	N	R	O	F	V	NO
R: Rarely						
O: Occasionally						
F: Frequently						
V: Very often						
NO: Not answered						
The sociology study plan integrates Environmental Education (socio-environmental dimension) and disciplines or subjects related to socio-environmental issues are addressed.	29.6%	23.5%	24.3%	13.0%	7.0%	2.6%

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The study plan integrates Environmental Education as a transversal theme.	26.1%	27.0%	25.2%	12.2%	7.0%	2.6%
The sociology study plan integrates transversely in its elements the protection and care of biodiversity, the environment, and emerging economic and social issues.	24.3%	29.6%	27.0%	13.0%	2.6%	3.5%
The study plan establishes the strategies for sustainable teaching and learning that students must form.	7.0%	18.3%	30.4%	30.4%	11.3%	2.6%
The study plan establishes the strategies to achieve sustainable learning.	29.6%	22.6%	23.5%	18.3%	3.5%	2.6%
The study plan integrates health topics among its transversal themes.	25.2%	34.8%	24.3%	10.4%	2.6%	2.6%
The study plan establishes among its elements the prevention of obesity and overweight.	49.6%	25.2%	13.9%	6.1%	2.6%	2.6%
The study plan establishes human rights among its transversal axes	22.6%	33.0%	25.2%	11.3%	3.5%	4.3%

Indicator (teaching-learning strategies with a focus on sustainability

Projects or tasks that are linked to the socio-environmental are developed.	31.3%	31.3%	21.7%	11.3%	.9%	3.5%
The development of learning units considers activities that are linked to aspects of sustainability.	33.9%	31.3%	23.5%	4.3%	1.7%	5.2%
The development of the subjects includes activities that are linked to health or environmental health.	34.8%	34.8%	18.3%	8.7%	.9%	2.6%
The development of learning units includes activities that are linked to Human Rights or some other emerging social issue.	27.8%	35.7%	18.3%	11.3%	3.5%	3.5%

Activities are done and are related to issues as saving electricity and water consumption, control, disposal and management of solid waste, air pollution and its impact on human activities.	19.1%	28.7%	28.7%	12.2%	7.8%	3.5%
Development of activities that are related to health and these are linked to socio-environmental aspects.	22.6%	34.8%	20.9%	11.3%	7.0%	3.5%
Development of activities that are related to human rights and their socio-environmental link.	17.4%	31.3%	29.6%	11.3%	7.8%	2.6%
Development of activities through strategies that promote sustainable learning.	4.3%	24.3%	27.8%	20.9%	20.0%	2.6%
Indicator (teacher competencies and sustainability)						
I perceive that the teacher has environmental knowledge or skills.	7.0%	20.9%	35.7%	21.7%	12.2%	2.6%
The teacher has the ability to relate the subjects of the subject that he teaches with socio-environmental aspects.	9.6%	28.7%	33.9%	21.7%	3.5%	2.6%
The teacher has the ability to relate the topics of the subject that he teaches with health or environmental health from a sustainability approach.	18.3%	24.3%	31.3%	18.3%	4.3%	3.5%
The teacher has the ability to relate the subjects of the subject that he teaches with Human Rights with a focus on sustainability.	15.7%	29.6%	25.2%	19.1%	7.8%	2.6%
The teacher has the ability to form study habits and learning strategies in students in a sustainable way.	5.2%	19.1%	27.8%	29.6%	15.7%	2.6%
The professor mentions in the group that the garbage must be classified, the air must be turned off, the plants and animals must be taken care of, the water consumption reduced, the electricity consumption reduced, and actions taken to obtain economic benefits from urban	29.6%	29.6%	22.6%	9.6%	6.1%	2.6%

solid waste.

The professor mentions in the group that it is important to take care of health with preventive programs, such as to avoid overweight and obesity with a sustainable approach.	32.2%	32.2%	19.1%	9.6%	4.3%	2.6%
The professor mentions that it is important to understand and put into practice respect for human rights from the perspective of sustainability.	13.9%	26.1%	31.3%	16.5%	9.6%	2.6%
Indicator (student competencies and sustainability)						
Students have competencies (knowledge, skills and values) to preserve and care for the environment with a sustainable development approach.	12.2%	22.6%	27.8%	20.9%	10.4%	6.1%
Students have the competence to form study habits and use learning strategies with a sustainable approach.	4.3%	23.5%	34.8%	20.0%	12.2%	5.2%
Students have the competence to take care of their health and mainly the problem of overweight and obesity.	20.9%	25.2%	20.9%	16.5%	11.3%	5.2%
Students have the competence of human rights from the perspective of sustainability and put that knowledge into practice.	11.3%	26.1%	22.6%	24.3%	10.4%	5.2%

Result of teachers' interview

The interview with teachers that focused on identifying the dimension of sustainability in the study plan and in the teaching-learning process, evidenced that the sustainability in the study focuses on forming specific or specific competencies of the training field, the social and economic aspects are minimally linked to environmental aspects and therefore, development. With this, teacher training must attend to the principles of sustainability so that it contributes to unsustainable skills and strategies in their teaching work. Figure 2.
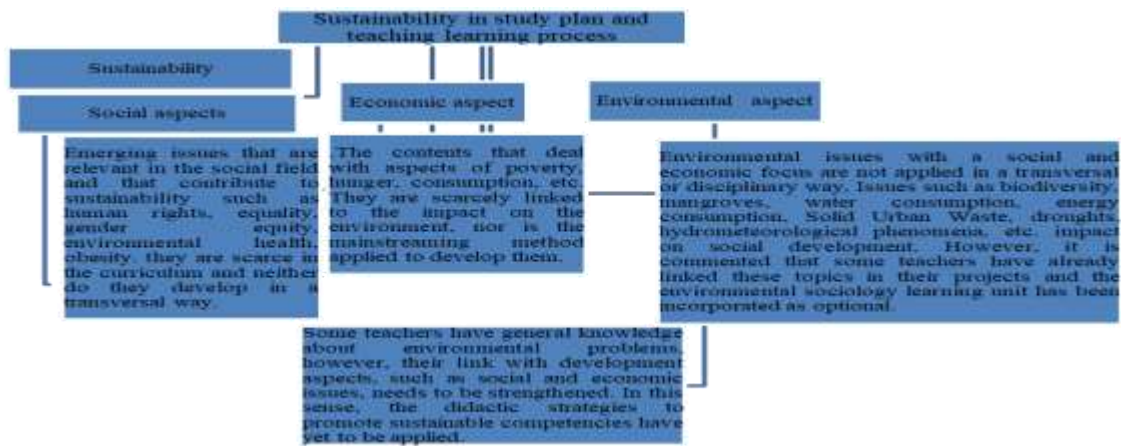
Figure 2. Result of teachers interview to know the dimension of sustainability in the study plan and the teaching-learning process.

Result of teacher survey

Result of teachers' survey to identify the dimension of sustainability in the study plan and the teaching-learning process presented. They were four indicators (curriculum, teaching-learning strategies, teacher competencies and student competencies) all of them were linked to sustainability in order to achieve the aim. The results showed that the percentages were located in the levels (never, rarely and occasionally), this led to the understanding that the sustainability dimension in the study plan and the teaching-learning process is insufficient. Table 4.

Table 4.

Result of teachers' survey to identify the dimension of sustainability in the study plan and the teaching-learning process

Indicator: Sustainability in the curriculum	N	R	O	F	V	NO

N: Never

R: Rarely

O: Occasionally

F: Frequently

V: Very often

NO: Not answered

Curriculum and sustainability						
The sociology study plan integrates Environmental Education (sustainability dimension), disciplines or subjects related to socio-environmental issues are addressed.	14.3%	42.9%	42.9%			
The study plan integrates Environmental Education (sustainable dimension) as a cross-cutting theme.	28.6%	28.6%	42.9%			
The sociology study plan integrates the	28.6	28.6	28.6%	14.3		

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protection and care of biodiversity and the environment into the graduate profile and competencies.	6%	%		%	
The study plan establishes teaching and learning strategies with a sustainable approach that students must develop.		42.9%	57.1%		
The study plan establishes the teaching and learning strategies for an Environmental Education.	28.6%	57.1%			14.3%
The study plan integrates among its transversal elements emerging and social issues such as health or environmental health.	14.3%	85.7%			
The study plan establishes among its elements the prevention of obesity and overweight.	85.7%	14.3%			
The study plan establishes human rights among its transversal axes	14.3%	42.9%	42.9%		

Indicator (teaching-learning strategies with a focus on sustainability)

Projects or tasks that are linked to the socio-environmental are developed.		42.9%	57.1%		
The development of the subjects includes activities that are linked to Environmental Education (socio-environmental) activities.		57.1%	28.6%	14.3%	
The development of the subjects includes activities that are cross-linked with Health and environmental health activities.	28.6%	71.4%			
The development of the subjects includes activities that are cross-linked with Human Rights activities.	42.9%	57.1%			
Development of activities that address the issues of water, soil, energy and air and their link with social and economic activities.		57.1%		42.9%	

Development of activities related on health or environmental health issues and their connection with social activities.		85.7%		14.3%	
Development of activities related on human rights issues and their link with social activities.	28.6%	42.9%		28.6%	
Development of activities where they address teaching-learning strategies that are useful for students.		28.6%	71.4%		
Indicator (teacher competencies and sustainability)					
The teacher has environmental knowledge or skills.		57.1%	14.3%	28.6%	
The teacher has the ability to relate the topics of the subject that he teaches with the environment or Environmental Education for Sustainability.		57.1%	28.6%	14.3%	
The teacher has the ability to relate the subjects of the subject that he teaches with the elements of sustainability (social, economic and environment).		42.9%	57.1%		
The teacher has the ability to relate the topics of the subject that he teaches with Human Rights.	14.3%	57.1%	28.6%		
The teacher has the ability to form a study habit and develop sustainable learning strategies in students.		28.6%			
The teacher mentions in the group that garbage must be classified, turned off the air conditioning, taken care of plants and animals, and reduced the consumption of water and electricity.	42.9%	14.3%			42.9%

The professor mentions in the group that it is important to take care of health with preventive programs, such as to avoid overweight and obesity.	57.1%	28.6%	14.3%
The teacher mentions that it is important to understand and put into practice respect for human rights.	42.9%	14.3%	42.9%

Indicator (student competencies and sustainability)

Students promote skills (knowledge, skills and values) to preserve and care for the environment or socio-environmental.		57.1%	28.6%	14.3%
Students promote competencies to form study habits and learning strategies in a sustainable way.	28.6%		71.4%
Students have the skills to take care of their health and mainly the problem of overweight and obesity.	14.3%	57.1%	28.6%
Students have the competence of human rights and put them into practice.	42.9%	57.1%	

Result (Phase 2). Design of a methodological proposal for a Non-Formal Socio-Environmental Education Program (NFSEEP). Figure 3.
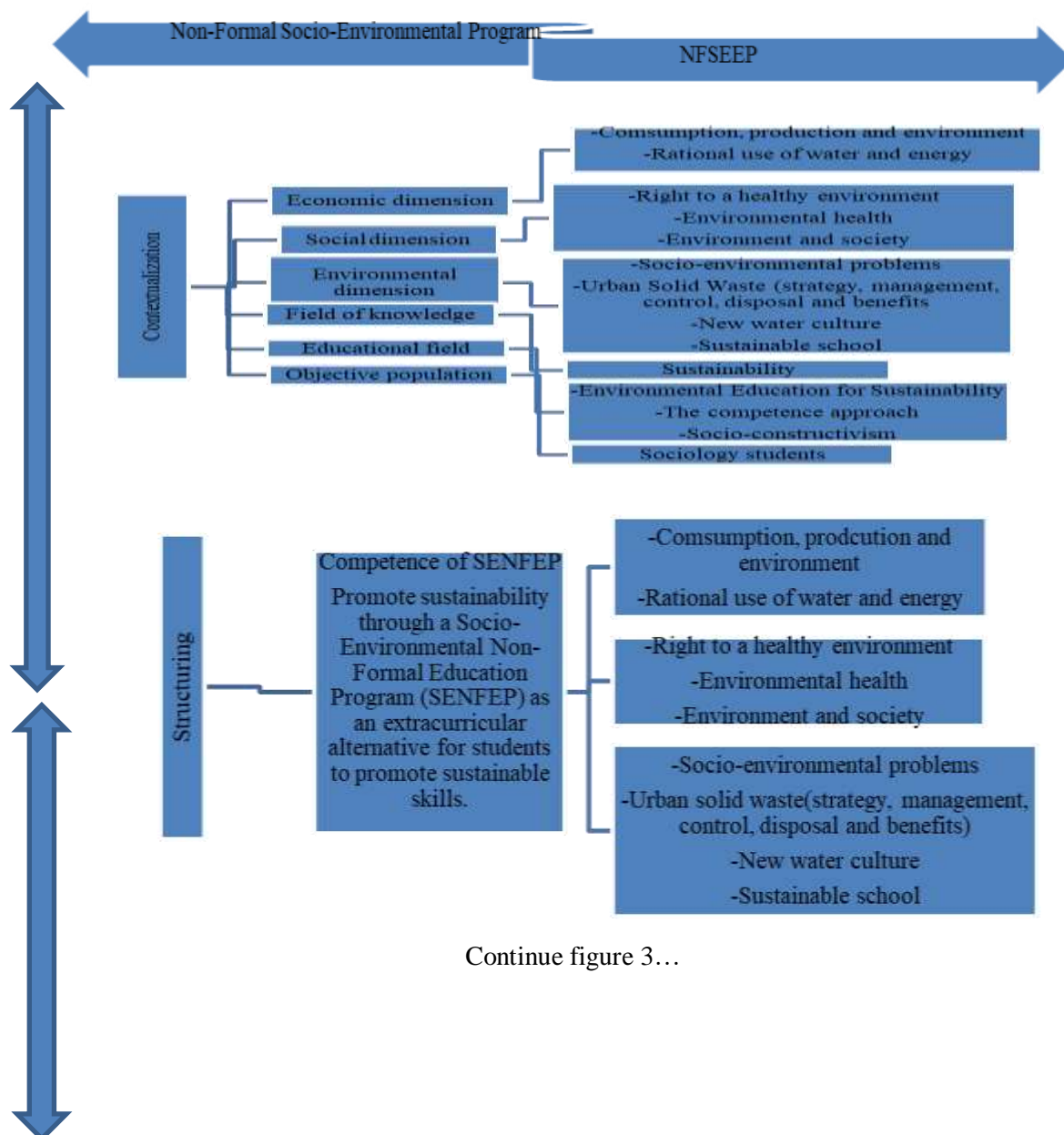
In phase 2, the Methodology of a Non-Formal Socio-environmental Education Program is presented in Figure 3, which is proposed so that students who attend the educational program where the study was carried out acquire sustainable competencies extracurricularly, considering that the curriculum barely links this dimension. The design of this methodological proposal took into account the elements of sustainability and non-formal education. Its design is framed in four phases, contextualization, structuring, programming and evaluation, as established by Nieto & Buendia, (2008) and Buendia et al., (2020). In the first phase (contextualization) the Socio-environmental assessment of curriculum and institution situation is observed, this is due to the results obtained in the evaluation of the study plan and the institution. The results of the evaluation carried out are essential in the contextualization stage. The most relevant problems identified and framed in the economic, social and environmental dimensions are grouped together and become thematic axes of the NFSEEP. In this same phase, the field of knowledge in which the NFSEEP is circumscribed is registered, in this case, this program is inserted in the field of sustainability. Regarding the educational field, this NFSEEP is based on Environmental Education for Sustainability, the competence approach and Socio-constructivism. The target population to whom the NFSEEP is directed is also established, in this case it is mentioned that it is directed to students. In the structuring phase, the general planning of the NFSEEP is established, it is here, where the general competence is written. This competence is broken down into the elements of competences, which are related to the thematic axes that are

established in the contextualization phase (which are derived from the social, economic and environmental dimensions).

In the programming phase, the specific planning of what is established in the structuring phase is carried out. The identified competency and competency items now become NFSEEP topics. Here the planning of each of the elements of competence is carried out through didactic planning., In this section the time in which each of the elements of competence of the NFSEEP is implemented with the target population is established, therefore, establishes the number of sessions, the educational activities carried out by the student and the teacher, the didactic teaching and learning strategies, the evidence to be delivered, likewise, the way in which the learning evidence is evaluated and the resource is established bibliographic and educational material. The fourth phase has to do with the evaluation. In NFSEEP it is based on the competence approach, for this reason, the evaluation that it proposes to carry out evaluations in the processes, revolves in three moments, diagnostic, formative and summative. The diagnosis, to identify the previous knowledge or competences in relation to the NFSEEP, the formative one, is the evaluation that is made during the development of the process or the program and the summation is to corroborate the effectiveness of the competences acquired by the target population.
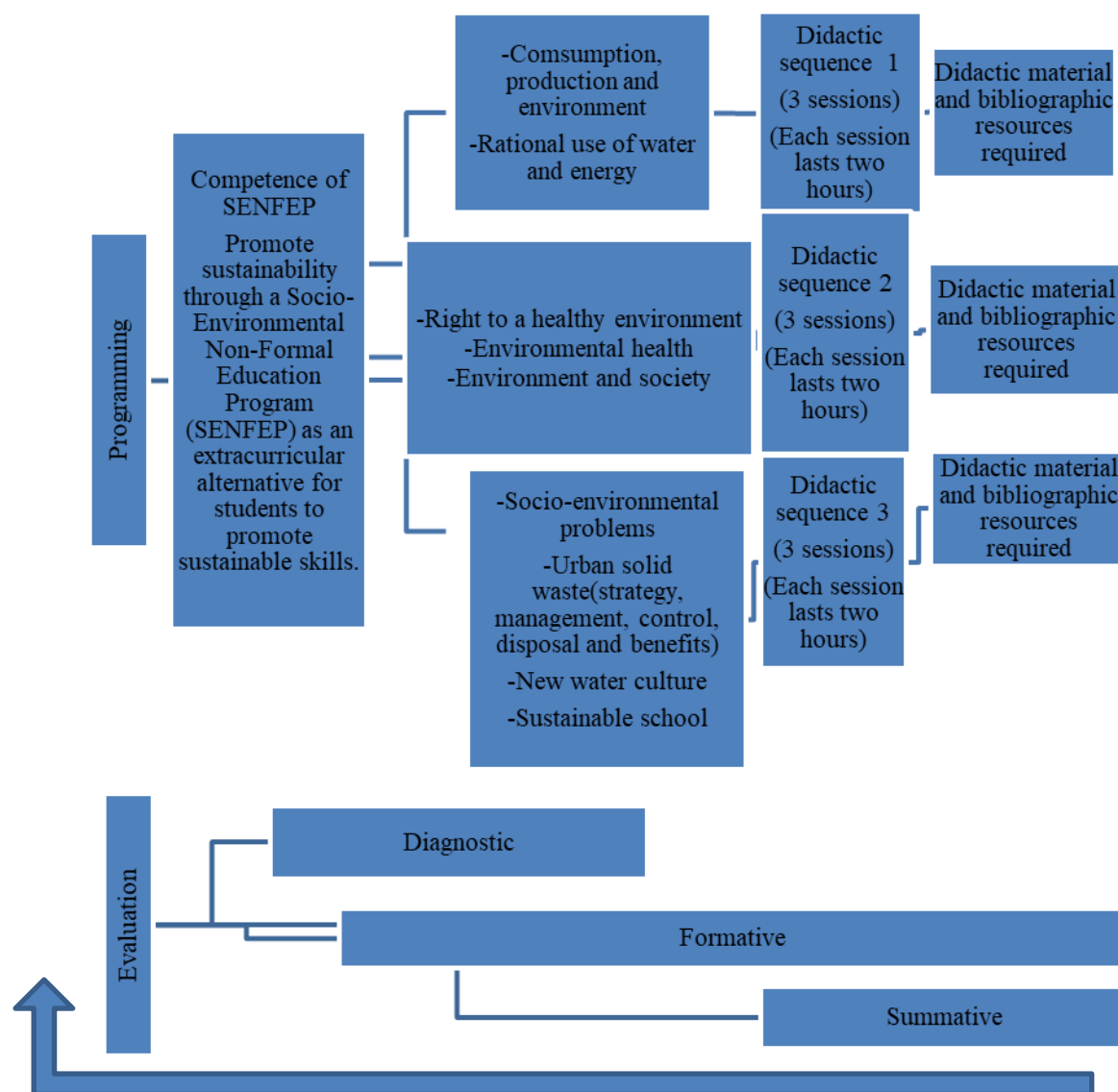

Continue figure 3…

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Figure 3. Design of a methodological proposal for a Non-Formal Socio-Environmental Education Program (NFSEEP).

Concluding remarks, contributions and limitations

Environmental and socio-environmental problems adversely impact the environment, society, communities, etc. and leads to the detriment of sustainability. The recommendations suggested by the 2030 agenda on the goals of sustainable development are in process and it is difficult for some parts of the world to give them the importance they should be. It is necessary the participation of all, government, society, organizations, institutions, universities, etc. to contribute to the long-awaited sustainability. The objectives of this agenda describe several actions that must be carried out to achieve sustainable development, one of them is aimed at 4 "quality education". It is an inclusive, equitable education that promotes learning for life. One of its goals is focused on promoting sustainable development that guarantees the balance between economic growth, caring for the environment and social well-being. The study carried out focused on evaluating sustainability in the curriculum and the high school belonging to a university in Mexico, as well as designing a proposal for an NFSEEP to promote sustainability in young students. Taking into account the goals of objective 4, the socio-environmental aspect was investigated to determine sustainability. Higher education has been widely accepted as a useful and significant channel to promote economic and social growth. The connotation of

sustainability was proposed by the United Nations (UN), which links sustainability with higher education; since then, the philosophy or the idea of sustainable higher education has gradually become an agreement (Romer et al., 1990, as cited in Geng et. al, 2020).

The evaluation of sustainability in the studied curriculum showed that it is little related to the aspects of sustainability, the rubric evaluated quantitatively and qualitatively, the maximum value to indicate sustainability was 10 points and 4 points were obtained, well below the mean (Table 3). The results of this research coincide with a study that aimed to analyze the sustainability directed at academic programs at a professional level for business schools in Mexico. The result of the research is on the lack of sustainability in the formal education of the Universities that will be solved with initiatives and projects that have emerged under principles of equity, respect for the environment and ethical reflection (Mancilla et al., 2019) and also with the study carried out by Rodríguez (2017) whose objective was to analyze the incorporation of generic competence for sustainability in the curriculum of the Matehuala Preparatory School of the UASLP, where it found that the competence for sustainability is present in a dispersed and isolated way because the same RIEMS establishes all the competencies in a fragmented way (Rodríguez, 2017). These statements about the lacking, ambiguous or scattered inclusion of sustainability in educational curricula and programs confirm that there are educational institutions that have not complied with the suggestions of the 2030 agenda to promote sustainable development, however, these results lead to universities identify the ideal strategies to intervene with sustainable actions.

Regarding the environmental audit carried out to review environmental aspects in the institution, the results obtained were oriented to the "bad" aspect, to a lesser average in "regular" and nothing was registered in "good". This reflected an insufficient approach to the sustainability that is desired to be achieved and consequently, it needs to reinforce measures to contribute to it. This result was similar to that found by Castillo & Gervacio (2019), in a study that aimed to identify the environmental situation of four

preparatory schools of the Autonomous University of Guerrero, located in Acapulco, Guerrero, Mexico, through an environmental eco-audit to know its operational processes and the internal and surrounding problems, as a strategy for environmental education and Sustainable Environmental Management and that I consider areas, water, energy, soil, noise, facilities and structure of buildings, urban solid waste, hazardous waste, Safety conditions for students and workers showed in its results the lack of environmental management by school authorities, lacking the integration of environmental education (Castillo &Gervacio, 2019). This assertion leads us to understand that some educational institutions, whether of upper or upper secondary levels, are not adapting sustainable practices in their functions.

With the interview and the survey applied to students and teachers to identify the link between the curriculum, the teaching-learning process in relation to the principle of sustainability, the results shown indicated sustainability minimally integrated in study plan and at learning-teaching process. The result of teacher and student survey was similar to the interview. The percentages mostly leaned, to never, rarely and occasionally, that is, there is not much relationship with the sustainability aspect. By not including the presence of the sustainable dimension or by not applying it, the work done by the teacher and the skills developed by the student or the teaching-learning process will be disarticulated from the principle of sustainable development.

The results sent indicating that the presence of a sustainable dimension in the curriculum, in the institution and in the teaching-learning process is minimal or insufficient to contribute to sustainable development, give space to the NFSEEP, as an alternative that seeks contribute to sustainable learning extracurricularly. Non-formal education supports and is a complement to formal education, for this reason, it is proposed mentioned. A qualitative research was undertaken in 2017 employing various data collection methods, including interviews, focus group discussions, observations and the examination of national policy documents and the non-formal ESD curriculum. The study found that the non-formal education sector

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provided significant support to the formal education system, leading to improved vertical integration from international guidelines to local-level implementation. The findings demonstrate the potential of the non-formal sector to augment ESD in developing contexts where the national government may lack policy or the ability to provide schools with adequate educational resources (Adams et al., 2021).

The non-formal environmental education model is an alternative to combat the deterioration of rural areas by promoting values-based learning that can become competencies to solve community issues daily life and understand the direct consequences in their environment (Lopez & Bastida, 2018).

Higher Education Institutions (HEI) play a fundamental role in the transition towards Environmental Education for Sustainability (EES) (Luna et al., 2021).

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Author contribution

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Conflicts of interest declarations in manuscripts

The authors declare that there is no conflicts of interest.

Research Transparency and Reproducibility

The manuscript is our own original work, and does not duplicate any other previously published work. This manuscript has been submitted only to this journal. It is not under consideration or accepted for publication. All authors agree and know the manuscript submitted to the journal. The content of the article focused on the study conducted. We hope that the contribution of this study impact on the implementation of socio-environmental knowledge from the university.

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