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# Technique to identify Environmental Education (EE) in three educational programs: Baseline for identifying proposals for (EE) in the new normality

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**Abstract:** This study refers to a technique to identify EE and EE proposal and had as objective to diagnose the integration of EE in bachelor's degree programs of three universities and to identify proposal of EE in the new normality. It is mixed research with a comparative approach, it covered the period 2015-2019, in 2021 EE proposals were elaborated in the new normality. In three educational programs of the Autonomous University of Guerrero (AUG) a survey was applied to students and teachers with the aim of identifying the environmental dimension in the curriculum, the dimensions of the instrument were, perception of the environmental problem, curriculum, environmental competencies of the student and the teacher. In the case of two educational programs of the Regional University of Blumenau (FURB) in Brazil, an opinion questionnaire was applied to teachers and students. The dimensions of the instrument were, general knowledge of the environmental problem, environmental perception in the curriculum, environmental pedagogical didactic *implementation*, environmental *knowledge* of teachers and environmental skills of students. With respect to two educational programs of the National University of Lujan (UNlu) in Argentina, a survey was applied to teachers and students that considered the variables environmental crisis and incorporation of the (EE) in the curriculum. The identification of EE proposals consisted of reviewing bibliography on the subject and based on this, proposals were made to act responsibly in the face of the COVID-19 pandemic. Results: The information of students and teachers of the educational programs in the AUG, allowed to know that the environmental dimension is minimal and that it is necessary to strengthen it or include it in the educational project. In the educational programs of FURB University in Brazil, it was appreciated that professors and students were evaluated between 70% and 100%, (percentages that indicate a high level of environmental incidence in the curriculum). In the case of the programs studied at the University (UNLu), Argentina, the results showed that about 50% of professors said that the environmental dimension if it is present in the curriculum, the other 50% did not consider it, while almost all students leaned into the parameters "Disagree" and "Totally disagree" indicating with it, that the curriculum does not include the environmental dimension. In relation to the design of EE proposals in the new normal, their elaboration was achieved and they were presented as alternatives to be included in the curriculum.

**Keywords:** Environmental dimension, Environmental Education (EA) curriculum, sustainability, new normal, Covid-19.

## Introduction

Environmental Education (EE) is a tool that was already considered as a viable measure to face the environmental problems that were identified since the middle of the last century. At present, the EA is present for this same purpose. Quiva and Vera (2010) state that "the declaration of principles is proposed to the EA as an alternative for international societies to promote the care and conservation of nature" (p. 381). This assertion is confirmed by Molero (1998) when establishing that in 1972 it is recommended that this type of education be applied at all levels; the university was evidently included here.

In the decade of the 60s and 70s began worldwide a great interest in planetary environmental protection. The United Nations Educational, Scientific and Cultural Organization (UNESCO), in the late 70s, made an effort to study ways to include the environmental issue as an educational resource. Therefore, it asked the International Bureau of Education (OBE) for a comparative study on how to address environmental issues in schools (Macedo and Salgado, 2007). At present, there is an imbalance between the development of the increasingly globalized world and the environment. This problem must be addressed by universities, which must assume responsibility and be committed through teaching, research and extension, with the aim of designing the future of both themselves and the society in which they are immersed (Quiva and Vera, 2010).

Environmental issues are linked to the emergence of epidemics. The crisis facing the world today has had its origin in the constant environmental disturbances, which has been reflected in the concerns expressed by the United Nations Organization in each celebration of World Environment Day (Gómez, 2020). Education actions for climate change, as well as health education actions on the pandemic, should not be weighed as a subsidiary addition to the main pedagogical activity; on the contrary, they must be part of the educational projects of the centers, of their aims and objectives. Avoiding the bombastic wording of the graduation profiles

from primary to university, it is necessary to point out what skills the student will develop and what type of situations he must be able to solve or overcome (González, 2020).

Environmental issues

The environment has been an issue that has concerned the whole world since shortly after the middle of the last century, proof of this are the summits and meetings that have been held in various parts such as the United Nations Conference on the Human Environment held in Stockholm, Sweden, in 1972, the Earth Summit in Rio de Janeiro, held in Brazil in 1992, for example. Currently, the problems that affect the environment become more intense, they become even more complicated, in some cases they translate into threats because their negative impacts have an impact on the extinction of species, affect human health, among other factors. The environment is actually a complex and dynamic system, composed of a natural subsystem and a human subsystem that are constantly interrelated. From the social system, it could also be considered that the natural one is fundamentally a provider of resources, while, conversely, from the natural system, the social one could be considered as an alteration of the ecosystem (Otero, 2001).

In this sense, man has made undeniable progress, but at the price of a degradation of the biosphere as a social and physical environment, since the capacity for spontaneous recovery available to nature is not finite (Sinha et al., 1995). The negative effects on the environment are illustrated by deforestation and desertification, the greenhouse effect; pollution of seas and oceans are some of its most alarming manifestations (Cortes et al., 2002). Environmental problems are reflected in different contexts (global, national and local) (Exposito et al., 2012). Micilio (2009) considers that environmental problems are due to the lack of protection suffered by the environment in the face of constant aggression by man for not having measured the consequences and not having attacked and strongly modified the causes that led to this present. According to UNEP GEO 5, Global Environment Outlook (2012), if humanity does not immediately change its habits, critical thresholds can be reached, from which the vital functions of the planet can undergo sudden and irreversible changes. Lara et al. (2010) reveal in research that environmental problems are mainly attributed to cultural causes —unconsciousness, lack of education and irresponsibility—; followed by economic causes —overexploitation—; policies — corrupt government; technology —factories and cars—; overpopulation and urbanization; social and natural, and that the passage through the university has little influence on the representation that students have about the causes of environmental problems. The environmental crisis, as part of the context, stimulates school curricula to incorporate it and for this reason the teacher must form competences of this nature and thereby influence the promotion of knowledge, skills, attitudes and environmental values in students. The way in which the teacher will influence in promoting environmental competences depends on the level of competences that he possesses in this matter, as well as the perception that he has of the environmental crisis that is lived, it is not enough only that this is established in the curriculum, but it is necessary to understand what happens to act properly.

Environmental Education and Education for Sustainable Development

Environmental Education was initially born from contact with nature and knowledge of the environment and began its journey in the seventies of the last twentieth century. Since its inception, it wants to promote attitudes of curiosity, respect and appreciation towards all the components of the natural heritage. Very soon it expands its field of action to all environmental problems (pollution, urban agglomerations, consumption, waste, climate change, among others), including socioeconomic aspects (eighties), but remains close to the mechanisms that govern natural ecosystems and continues to proclaim the value and affective and formative interest of contact with nature (Alcantara and Bourrut, 2006). Academic reforms linked to Environmental Education were promoted in the 1970s-1990s by environmental movements that arise in the face of serious environmental problems and the degradation and exploitation of natural resources. Other very important points of influence were the conclusions of the World Conference on Environmental Education (Tbilisi, 1977), related to the importance of incorporating the environmental dimension throughout the educational system from an interdisciplinary approach, an aspect that, in addition, was emphasized in 1981 by the United Nations Environment Program (UNEP) (Honduras, 2009; Chagollan et al., 2006). These points state that Environmental Education is not a field of study like chemistry, physics, biology, or ecology, but that EE is a process and that in reality the appropriate term would be Education for Sustainable Development, because it is more understandable and specific. Education for Sustainable Development (ESD) enables every human being to acquire the knowledge, skills, attitudes and values necessary to forge a sustainable future. Educating for sustainable development means incorporating the fundamental themes of sustainable development into teaching and learning, for example, climate change, disaster risk reduction, biodiversity, poverty reduction and sustainable consumption. ESD also calls for participatory teaching and learning methods that motivate and empower learners in order to change their behavior and facilitate action for sustainable development. ESD therefore promotes the acquisition of skills such as critical thinking, forward-looking hypothesis-making and collective decision-making. ESD requires far-reaching changes in the pedagogical methods currently applied (UNESCO, 2005). In the educational field, until the nineties of the last century, the EE focused on raising awareness among people and promoting activities that favored the conservation of the "natural" environment. On the other hand, today, with the term "Sustainable Development", which had its origin in the Earth Summit event –organized by the UN– held in Rio de Janeiro in Brazil in 1992, it went from EE to Education for Sustainable Development, which includes education, society, economy, environment, that is, it must be educated considering that the environmental can have an impact on some sector of society and not only on nature.

Environmental Education as a cross-cutting theme

The incorporation of the environmental into the school system: these are efforts to incorporate environmental content—knowledge, attitudes, values, and/or skills—into formal education, via curriculum, materials (e.g., textbooks), or teaching methods, from basic to graduate levels (Nieto, 2001: 2). The incorporation of the EE in the educational field is given in the light of what happens due to environmental problems and that adversely impact the world, in the social, economic and environmental issues. The incorporation of the environmental dimension into the curriculum of higher education derives from the broad discussion generated by the emergence of contemporary environmental problems, also known as ecological or socio-environmental crisis. Within the framework of these debates, the strategic proposal to incorporate the environmental dimension into higher education emerges, which was first raised in the context of the speech of the Tbilisi conference, but this proposal was maintained – with the new conceptualization of Environmental Education for Sustainability (EAS) in Johannesburg – under the orientation of the incorporation of sustainable development into higher education. This strategic line envisions how to permeate the environmental and sustainability perspective in each and every one of the central functions of universities: teaching, research and extension, as well as in their philosophy and daily dynamics. Specifically, it is proposed to integrate this perspective into the teaching function with the purpose that higher education institutions environmentally train today's students, future graduates, so that they are in a position to stop, limit, mitigate and / or prevent negative impacts on nature in the scope of their professional action (Bravo, 2012). Mainstreaming is a process that runs through the curriculum, they are contents that are present throughout the educational process. These contents are culturally relevant and necessary for life and coexistence, since they provide answers to social problems and contribute to forming in a special way the model of citizen that society demands. These are topics that do not necessarily have to form a particular subject or receive special treatment within the curriculum, but must be addressed in all the areas that make it up and in any specific learning situation (Palos, 1998; Honduras, 2009). EE is conceived not as a new discipline, but as a progressive integration of the environmental issue throughout the curriculum, according to nordic conceptions, which saw it as a "dimension". It focuses on the environment in its physical and social, cultural, economic aspects, among others. It is also recommended that the study of the environment begin in the immediate environment (Gonzalez, 1996). Integrating environmental issues within the educational context should not be considered as another addition to the official curriculum, already saturated with content. Its incorporation requires an adaptation that integrates the resolutive demands to the environmental problem as a social necessity and as a political action, which requires the scientific and transformative participation of the whole society (Acosta, 2000).

Environmental Education in the New Normal

Curricular environmentalization has been promoted from the field of environmental education for environmental training —with sustainability criteria. Given the appearance of the new coronavirus worldwide – and the future viruses that are announced (Carabias, 2020 cited in Bravo, 2021) – curricular environmentalization acquires new perspectives and urgent attention. It is of the utmost importance that current and new generations learn to cultivate relevant consumption and to acquire an awareness of prevention. Therefore, these topics must be present in the curriculum of higher education and / or in the extracurricular training of students and teachers, and, in general, in the educational community of each institution. If the causes of the appearance of this disease can be found in rapid urbanization, in changes in agricultural systems, in changes in ecosystems and in a greater globalization of the trafficking of animals and their products, it is necessary to fundamentally change our social practices, our consumption, our relationship with nature, which has already been mentioned for several years. This could be one of nature's last warnings. Universities in these areas have a broad panorama of action, training and education in a culture of sustainability (Bravo, 2021).

The pandemic crisis has impacted all sectors, especially education (Serrano, Guerrero and Zamudio, 2021).

Air pollution is typical of the lack of environmental education and constitutes one of the fulminating causes for the growth of the rate of morality due to COVID-19. The lack of environmental education causes the growth of environmental air pollution due to pollutants such as carbon monoxide (CO), nitrogen dioxide ($NO_2$), sulfur dioxide ($SO_2$), ozone ($O_3$) and hydrogen sulfide ($H_2S$). Research has determined that air pollution is the product of the lack of environmental education powered by people who produce toxic gases that make people who have low defenses prone to COVID-19 infections and are more fickle to mortality (Gonzales, Carrasco, Cavero and Bellina, 2021).

The coronavirus means for the world a type of disaster where environmental education in order of importance must contribute to mitigation as a proactive action in this new normal. (Ilyasa et al., 2020 cited in Arias, 2021). Munsell et al., (2020) cited in Arias (2021), say "stay at home" why it is safer, which means an emotional connotation and environmental education that allows the existence of citizenship throughout the world to avoid contamination. For this reason, citizens have been committed to having a behavior directed by the pandemic in aspects such as the rational use of food, the consumption of these according to nutritional values and immune strengthening to face the virus. In a context of Covid-19 pandemic measures, the incursion of new models of Public Management in the context of educational policy, practice and demand show a solid justification for educational change, such as the inclusion of issues of global development and sustainable development (Arias, 2021). López and Yañez (2020) cited in Prince (2021) point out that due to the forced exit of the confinements that have become unsustainable, it is that the return to a relative normality in the performance of activities is established, but that also implies a process of adaptation of old routines to

continue forward. However, to materialize it, it is necessary, according to these authors, to take certain measures, including protecting the environment to prevent other threats from being generated in addition to COVID-19, because even initially, this problem was caused by the breakdown of the natural balance that represents a barrier between humanity and some pathogens (Gómez, 2020 cited in Prince 2021). In this study, educational programs of three universities were considered to identify the integration of the environmental dimension. At the Autonomous University of Guerrero (AUG), Mexico, the Sociology, Economy and Derecho Programs in Acapulco, Mexico, were considered. At the Regional University of Blumenau (FURB) in Brazil the Programs of the Bachelor's Degree in Biology and Architecture and Urbanism and at the National University of Lujan (UNLu) in Argentina the Bachelor's and Teaching programs in Education Sciences.

It is a mixed study with a comparative and descriptive approach. It was carried out in the period 2015-2019. Between the years 2015-2016 we worked with the educational programs of the AUG in Mexico. In November 2017 we worked with the FURB programs and in August 2019 with the programs of the National University of Lujan. In 2021, EE's proposals in the new normal were elaborated. The objective of this study focused on diagnosing the integration of EE in bachelor's degree programs of three universities: Autonomous University of Guerrero (Mexico), Regional University of Blumenau (Brazil), National University of Lujan (Argentina) and identifying EE proposals in the new normal. Regarding the objective described in the methodology, it was limited to the following: A survey was applied to students and professors with the aim of identifying the environmental dimension in the educational programs of (Sociology, Economics, Law) of the Autonomous University of Guerrero (AUG). The dimensions of the instrument were, perception of the environmental problem, curriculum, environmental competences of the student and the teacher. In the case of the two educational programs of the Regional University of Blumenau (FURB) in Brazil (Course of Biological Sciences and Course of Architecture and Urbanism), an opinion questionnaire was applied to teachers and students. The dimensions of the instrument were, general knowledge of the environmental problem, environmental perception in the curriculum, environmental pedagogical didactic *implementation*, environmental *knowledge* of teachers and environmental skills of students. With respect to the educational programs of the National University of Lujan (UNlu) in Argentina, (Bachelor of Science in Education and Faculty in Education Sciences), a survey was applied to teachers and students that considered the variables environmental crisis and incorporation of the (EE) in the curriculum. The identification of EE proposals consisted of reviewing bibliography on the subject and based on this, proposals were made to act responsibly in the face of the COVID-19 pandemic. Results: The result in the three programs of the AUG showed in the analyzed dimensions minimum levels of inclusion of the environmental dimension. The results of FURB's educational programs showed that the environmental dimension is in the process of inclusion. The results in the educational programs of the UNlu showed shortages between curriculum and the environmental dimension. In this study, the EE identified some proposals to act responsibly in the face of the COVID-19 pandemic.

Context where the research was carried out (Mexico, Brazil, Argentina)

Socio-environmental conflicts in Mexico have multiplied in the last two decades. These revolve around industrial pollution, mining activities, land use change, deforestation, dam construction, the introduction of genetically modified seeds, poor solid waste management and the privatization of land, water and biodiversity, among others. Poor communities tend to be the most affected in this type of ecologically destructive activities, and face private and state promoters who hold power (Tetreault, Ochoa, and Hernández, 2012). In 1992 the Ibero-American Congress of Environmental Education was held in Mexico, where it was established that the EE "is eminently political and a very important instrument to achieve sustainability in the environmental and social spheres", referring not only to the question of ecology, but also to other dimensions of reality (Galindo, 2015). Brazil implies a history of environmental problems. These range from deforestation and natural disasters, through policies on natural resources and the minimization of pollution, to ecological studies involving questions about the well-being of present and future human generations (Nascimento, 2010). In a matter of EE, Zabala and García (2008) establish that, in 1992, in Rio de Janeiro, the conference known as *the Earth Summit* was held, in which agreements and legal instruments that had to do with the protection of the environment were proposed. In relation to EE, one of the agreements (Programme 21) makes special reference to EE as an ideal means of achieving the objectives set; in chapters 35 and 36 he points out the need to reorient education: to position science with a view to achieving sustainable development, through the promotion of training and the generation of awareness in the population. The degree of socio-environmental conflict in Argentina is increasing, the demands and citizen actions have made visible the most complex environmental problems of the country. Desertification processes, air and soil pollution, loss of biodiversity, the impact of climate change, forest monoculture, groundwater and surface pollution, uncontrolled landfills, gas emissions, illegal wildlife trade and overfishing, deforestation, indiscriminate exploitation of natural resources, among other indicators, they account for the environmental conditions that affect our quality of life. Environmental pollution in Argentina is greater than what might be expected in a country with so much environmental legislation, because the precariousness of environmental policy is as worrying as the state of the environment. The environmental debate is enriched and demands complex thinking; there environmental education has a fundamental role in theoretical exercise and practice (Telias, 2014).

**Method**

The research was developed through a mixed methodology with a comparative and descriptive approach. As already mentioned, it was carried out in educational programs of three universities: AUG, FURB and UNLu.

Population and sample

Table 1 describes the population and sample considered in this research process.

Table 1. Population and sample selected in the programs of the three universities

| Population | | Selected programs | Population (educational programs) selected for research and age | Sample | Sample selection approach and age of participants | Other subjects considered in the study |
|---|---|---|---|---|---|---|
| AUG | *Teachers: 1162: 383 women and 779 men<br><br>Students: 83 770<br><br>39 302 men and 43 468 women | Faculty of Sociology<br><br>Faculty of Economics<br><br>Faculty of Law | 15 professors and 287 students of sociology<br><br>15 professors and 259 economics students<br>48 teachers and 2044 law students | 4 teachers and 105 students<br><br>11 teachers and 91 students<br>4<br>44 teachers and 318 students from different bachelor's degrees. | Qualitative<br><br>The age of the students ranges from 18-23 years. | Only teachers and students considered in the sample. |
| FURB | **Teachers among 862 men and women<br><br>Students (the total number of the student population is not counted) | Biological Sciences Courses<br><br>Course of Architecture and Urbanism | 38 teachers and 86 students<br><br>41 teachers, no student enrolment data | 10 Teachers (6) men (4) women.<br>37 Students (17) men, (20) women.<br><br>Teachers: 11, 7 men and 4 women<br>Students: 36, 2 men and 34 women.<br>Different grades | Qualitative<br><br>The age of students ranges from 18-23 years | Only teachers and students considered in the sample. |
| National University of Lujan (UNlu). Argentina | Teachers<br>1014 women<br>872 men<br><br>Students<br>9652 men and 17,495 women (regular students)<br><br>6868 hombres y 12,475 women (active students) | Bachelor of Science in Education (C.E.).<br><br>Faculty in Education Sciences | 360 students<br><br>120 students<br><br>154 teachers (21% male, 79% female (both programs) | 20 teachers (2 men -18 women) and (51 students, five men, 46 women) were selected for convenience (both programs) | Qualitative | Only teachers and students considered in the sample. |

*Source: Own elaboration based on *Statistical Yearbook 2013-2014* and *Statistical Yearbook 2014-2015* of the AUG (2014a, 2015).

** Professor at FURB.

Source: Own elaboration with data from: 2018 Statistical Report of the General Direction of Academic Affairs of the UNLu and the Department of Education. Administrative Secretary.

Techniques and instruments used

In three educational programs of the Autonomous University of Guerrero (AUG), (Sociology, Economics, Law) a survey was applied to students and professors with the aim of identifying the environmental dimension in the curriculum, the dimensions of the instrument were, perception of the environmental problem, curriculum, environmental competences of the student and the teacher. In the case of the two educational programs of the Regional University of Blumenau (FURB) in Brazil (Course of Biological Sciences and Course of Architecture and Urbanism), an opinion questionnaire was applied to teachers and students. The dimensions of the instrument were, general knowledge of the environmental problem, environmental perception in the curriculum,

environmental pedagogical didactic implementation, environmental knowledge of teachers and environmental skills of students. With respect to the educational programs of the National University of Lujan (UNlu) in Argentina, (Bachelor of Science in Education and Faculty in Education Sciences), a survey was applied to teachers and students that considered the variables environmental crisis and incorporation of the (EE) in the curriculum. The identification of EE proposals consisted of reviewing bibliography on the subject and based on this, proposals were made to act responsibly in the face of the COVID-19 pandemic.

**Results**

The techniques and instruments applied in the university educational programs for this research allowed to understand to what extent the EE appears in the curriculum.

The results with teachers and students in Educational Programs at AUG.

A survey was applied to students and teachers, which was framed in the variable's perception of the problem, components of the environmental element, curriculum and competences, and was related to the elements of the environment (water, air, soil and energy). The questions considered the following parameters: "Deficient", "Barely acceptable", "Good", "Very good", "Excellent" and "Not applicable". The results could be grouped into "Poor", "Barely acceptable", "Good", "Very good" and "Excellent". Table 2 presents the results of the survey applied to students, obtained in the three educational programs under study corresponding to the AUG.

Table 2. Results of the survey applied to the students of the three educational programs (Sociology, Economics and Law), UAGro.

| Variables | School of Sociology | School of Economics | School of Law | Observation |
|---|---|---|---|---|
| Perception of the problem | Deficient | Good | Barely acceptable | They barely conceive of the environmental problem. |
| Currículo | Deficient | Good | Barely acceptable | The curriculum barely contemplates the environmental element and therefore the EE. Learning unit programs and educational activities are mostly not part of EE. |
| Competences in students | Barely acceptable | Good | Deficient | They hardly develop environmental competences. Teachers do not implement EE strategies. |

Source: Own elaboration

The results in table 2, show that the students of the educational programs of Sociology and Law is minimal the perception they make in relation to the environmental problem, likewise, they show a minimum relationship between the curriculum and environmental dimension, it is also the case of the environmental competences of the students. In the Economics program, the results differed from those of Sociology and Law. The students of Economics evaluated the environmental dimension well, however, it is appreciated that it is necessary to strengthen this dimension.

Table 3 presents the results of the survey applied to teachers of the three study programs of the AUG.

Table 3**.** Results of the survey applied to teachers of the programs of (Sociology, Economics and Law).

| Variables | School of Sociology | School of Economics | School of Law | Observation |
|---|---|---|---|---|
| Percepción del problema | Deficient | Barely acceptable | Barely acceptable | They barely understand the environmental problem. |
| Curriculum | Barely acceptable | Deficient | Barely acceptable | It barely contemplates the environmental element and therefore the EE in the curriculum. Curricula, learning unit programs and didactic sequence are scarcely linked to EE. |

| | | | | |
|---|---|---|---|---|
| Environmental competences of teachers | Barely acceptable | Good | Deficient | It is conceived to update teachers in environmental aspects. Many teachers do not have training in EE; therefore, they hardly implement didactic strategies of this specialty in the learning process. Students do not promote environmental competencies. |

Source: Own elaboration

The results in Table 3 show that the professors of the educational programs of Sociology, Economics and Law are minimal the perception they make in relation to the environmental problem, likewise, they show a minimum relationship between the curriculum and the environmental dimension. In the case of the environmental competences of teachers, in Sociology and Law these competences range from deficient to barely acceptable. The professors of Economics expressed in level of good, indicating with it, that some have these competences. In general, it can be seen that the variables used to identify the environmental dimension in the curriculum with teachers are insufficient and this dimension needs to be strengthened.

Results with teachers and students in educational programs at FURB

The results of the instrument applied to professors and students of the Bachelor's Degree in Biology and architecture and urbanism, as discussed above, this was an opinion questionnaire that contained 32 statements grouped into five dimensions: 1) General knowledge of environmental problems, 2) Environmental perception in the curriculum, 3) Environmental pedagogical didactic implementation, 4) Environmental competences of teachers and 5) Environmental competences of students. It was developed for teachers and students. Responses were answered with Strongly Agree (5), Agree (4), Moderately Agree (3), Disagree (2), and Strongly Disagree (1). The responses obtained were organized by dimensions and are presented in scales from 0 to 100%. Table 4 describes the results of teachers and students of both programs; they are listed as follows: Students of Biology (ECB) and teachers of this same program (PCB). Students of Architecture and Urbanism (EAU) and teachers (PAU).

Table 4. Results of teachers and students of the Biology and Architecture and Urbanism programs at FURB

| Dimensions | 0 % | 10 % | 20% | 30% | 40 % | 50% | 60 % | 70 % | 80 % | 90 % | 100 % |
|---|---|---|---|---|---|---|---|---|---|---|---|
| General knowledge of environmental problems | | | | | | | | | | ECB EAU | PCB PAU |
| Environmental perception in the curriculum | | | | | | | | | | ECB EAU | PCB PAU |
| Environmental didactic-pedagogical implementation | | | | | | | | EAU | ECB | PCB PAU | |
| Teaching environmental competences | | | | | | | | | ECB EAU | PCB PAU | |
| Students' environmental competencies | | | | | | | | ECB EAU PCB PAU | | | |

Source: Own elaboration

Table 4 shows that teachers and students of both programs were evaluated between 70% and 100%, this indicates that the dimensions used to evaluate the environmental dimension in the curriculum or educational programs allowed to know that the environmental dimension if it appears.

The results with teachers and students in the Educational Programs at UNlu

The Results of the instrument applied to teachers of the educational programs of the Bachelor's Degree and Professorship in Education Sciences at the UNlu, this instrument was a survey that was applied to 20 teachers, two of the male sex and the rest female in both programs studied, considering the aspects of environmental crisis and incorporation of the Environmental Education for Sustainability (EES) in the curriculum. The questions considered the parameters, "Strongly agree (5)", "Agree (4)", "Moderately agree (3)", "Disagree (2)", "Strongly disagree (1)" and "Does not apply (6)". As shown in Table 5.

Table 5. Result of the teacher survey

| Dimensions | **5 %** | **4 %** | **3 %** | **2 %** | **1 %** | 6 **%** |
|---|---|---|---|---|---|---|
| A) Knowledge about the environmental crisis | | | | | | |
| I understand Environmental Education in relation to Sustainable Development. | 60**%** | 10% | 20% | | 5% | 5% |
| Environmental problems are perceived in a local, national and global context. | 70**%** | 20% | 5% | | 5% | |
| Poverty and other issues relate to socio-environmental aspects. | 50% | 15% | 10% | | 20% | 5% |
| The care of the environment is through Environmental Education. | 25% | 10% | 30% | 25% | 10% | |
| B) Environmental issues in the curriculum | | | | | | |
| The educational program where he works considers the environmental dimension. | 20% | 10% | 25% | 5% | 20% | 20% |
| The curriculum integrates Environmental Education in a transversal way. | 5% | 5% | 40% | 26% | 20% | 4% |
| Some subjects in the curriculum are linked to the environmental dimension. | 25**%** | 10**%** | 20**%** | 5**%** | 15**%** | 25**%** |
| The contents of the environmental axis are proposed around (water, air, soil, and energy) | 30**%** | | 20**%** | 15**%** | 10**%** | 25**%** |

Source: Own elaboration.

Table 5 shows that teachers have knowledge about the environmental crisis, the parameters range from "Totally agree (5)", "Agree (4)", "Moderately agree (3)". Regarding environmental ethics in the curriculum, the results showed that about 50% said that the dimension if it is present in the curriculum, the other 50% did not consider it.

Regarding the results of the student survey. A survey was applied to 51 students from different semesters, five men and forty-six women, considering the two aspects or variables that were considered in the survey and interview of the professors. The questions considered the parameters, "Strongly agree (5)", "Agree (4)", "Moderately agree (3)", "Disagree (2)", "Strongly disagree (1)" and "Does not apply (6). As shown in Table 6.

Table 6. Student Survey Result

| Dimensiones | 5 % | 4 % | 3 % | 2 % | 1 % | 6 % |
|---|---|---|---|---|---|---|
| A) Knowledge about the environmental crisis | | | | | | |
| I understand Environmental Education in relation to Sustainable Development. | 43.1% | 43.1% | 9.8% | | 2% | 2% |
| Environmental problems are perceived in a local, national and global context. | 43.1% | 33.3% | 19.7 % | | | 3.9% |
| Environmental problems are linked to political, educational aspects, etc. | 41.1% | 31.4 | 25.5 % | | | 2% |
| The care of the environment is with Environmental Education to achieve sustainability. | 41.2% | 33.3% | 17.6 % | | 2% | 5.9% |

| | | | | | | |
|---|---|---|---|---|---|---|
| B) Tematica ambiental en el currículo | | | | | | |
| The educational program you take considers the environmental dimension. | 3.9% | 2% | 15.6 % | 9.8% | 37.3% | 31.4% |
| The curriculum integrates Environmental Education in a transversal way. | | | 7.8% | 9.8% | 47.1% | 35.3% |
| Some subjects are strongly linked to the environmental dimension. | 5.9% | 2% | 7.8% | 15.6% | 31.4% | 37.3% |
| The teachers who teach you have environmental skills. | 2% | 3.9% | 29.4 % | 9.8% | 23.5% | 31.4% |

Source: Own elaboration.

Table 6 shows that students do have knowledge about the environmental crisis, however, the parameters "Disagree (2)", and "Strongly disagree (1)" reflect that the curriculum does not include the environmental dimension.

Identifying EE proposals to act responsibly in the face of the COVID-19 pandemic

Articles referring to the influence of EE in the COVID-19 pandemic were consulted, and with it, proposals were identified that denote being responsible for the pandemic that the world is going through in the present century. The proposals that were identified and presented in this section were based on the results of the diagnosis of the environmental dimension in the educational programs of the three universities considered in this research. The study presented showed that the environmental dimension must be reinforced in the educational curriculum and mainly in the university curriculum. Given the aforementioned assertions, it is important to emphasize that EE occupies a very important place in the formation of knowledge, skills and values in the subjects, therefore, in curricula or curricula this dimension must be inserted through methods such as transversality, subject, project, etc. in order that the teacher and students acquire competences related to sustainability. The environmental dimension must address the socio-environmental, that is, relate to sustainable development. From the university or from the university curriculum, the environmental dimension from having a development approach and linking the theme of the COVID-2019 pandemic with the intention that teachers promote environmental knowledge and students promote environmental competencies to act in pandemic situations. Some of the articles reviewed and that served as a basis for identifying EE's proposals in relation to COVID-19 were the authors' contributions (Bravo, 2021; Serrano, et. al, 2021; Gonzales, et. al, 2021; Ilyasa et al., 2020, as cited in Arias, 2021; Munsell et al., 2020 as cited in Arias 2021; Arias, 2021; Lopez & Yañez, 2020, as cited in Prince (2021), Gomez, 2020 cited in Prince (2021).

The proposals identified in this study were:

- The curriculum designers of the universities must adhere the curricular designs to the context, in order to identify the problems that afflict and, therefore, identify the socially emerging issues to be included in the educational project. The issue of the environment is an issue that has been of concern since the mid-twentieth century, in this order of ideas, it has been suggested that EE be implemented inside and outside educational institutions, however, in some universities it does not appear as a discipline, or in a transversal way, or in another way.

- It is suggested that EE be included in a transversal way in the curriculum, that is, that all curricular components, such as graduation profile competencies, learning units, learning strategies, etc. link the environmental element transversally so that EE can be promoted.

- Promote environmental and socio-environmental knowledge in teachers, as well as promote competencies on the inclusion of the environmental element in the work they perform, such as, for example, how to transversally include the EE in the learning unit program that it teaches, in the didactic sequence, knowledge and skills of pedagogical and didactic strategies to carry out the EE, etc.

- Promote in students environmental or transversal competences of EE, so that they manage to graduate with sustainable competences, that is, that they form specific competences in their field of training and impregnated with the environmental ones in order that the students in the exercise of their training are critical and reflective before the care of the environment.

- It is a challenge for the EE to include the social effect, health, etc. of the COVID-19 pandemic and events like these in future situations, for this reason, it must intervene with its methods of risk prevention, to carry out actions or projects aimed at improving the conditions of the environment, to promote reflection, critical sense, promote skills, value and respect the environment, etc.

- Understand that EE is linked to the COVID-19 pandemic, by the fact that man alters the environment.

- The COVID-19 pandemic should be the main cause for educational institutions at all educational levels and mainly in universities to integrate EE in curricula or curricula, attending to the pedagogical and didactic principles, as well as the form of inclusion (disciplinary, transversal or project) and considering the principle of sustainable development.

- Universities in the face of the COVID-19 pandemic must strengthen the culture of sustainability. - Take into account that the crisis due to the pandemic adversely impacted all sectors, especially in education, given this, to prevent situations like these, it is necessary to strengthen the EE in the university.

- Research has determined that air pollution is the result of the lack of environmental education powered by people who produce toxic gases that make people who have low defenses prone to COVID-19 infections and are more fickle to mortality (Gonzales, et.al 2021). Given this assertion, the E must reinforce measures to make people aware of avoiding air pollution.

- The coronavirus has caused serious problems in the world, given this, it is essential that the EE is strengthened in educational programs to minimize its effects.

- EE must promote in people the culture of risk to prevent them from contracting the virus, for this reason, it must raise awareness among people to stay at home, have a healthy diet, etc.

**Discussion**

A comparative analysis of the programs of the three universities was carried out to identify the incorporation of the EE by students and teachers. From this, it was evidenced that the students of the educational programs of the university in Mexico such as the Sociology and Law program, the perception they make in relation to the environmental problem is minimal, likewise, they evidence a minimum relationship between the curriculum and environmental dimension, something similar also happened with the environmental competences of the students. In this same university, the Economics program, the results differed from those of Sociology and Law. The students of Economics evaluated the environmental dimension well, however, it is appreciated that it is necessary to strengthen this dimension in the three programs, see table 2. In the case of the professors in the Sociology, Economics and Law programs of this university, it was evidenced that the perception they make in relation to the environmental problem is minimal, likewise, they show a minimum relationship between the curriculum and the environmental dimension. In the case of the environmental competences of teachers, in Sociology and Law these competences range from deficient to barely acceptable. The professors of Economics expressed in level of good, indicating with it, that some of them have these competences. In general, it can be seen that the variables used to identify the environmental dimension in the curriculum with teachers are insufficient and this dimension needs to be strengthened. Generally, the information of students and teachers of the educational programs analyzed ay the AUG, Mexico allowed to know that it is necessary to strengthen or, rather, include the environmental dimension in their curricula. The inclusion of this dimension must be based on the sustainability approach and integrate knowledge or skills that allow coping with pandemics such as COVID-19, for example (See table 3). In the case of the educational programs of FURB University in Brazil, it was appreciated that teachers and students were evaluated between 70% and 100%, (percentages that indicate a high level of environmental incidence in the curriculum), this indicates that the environmental dimension in the curriculum or educational programs if it appears (see table 4). In this sense, it is affirmed that in educational programs such as FURB-Brazil the environmental dimension is present and in some cases it is appreciated that it is in the process of inclusion., However, if compared with the educational programs studied in Mexico, it would be understood that in the educational programs of FURB there is already progress, while in those of the AUG this dimension needs to be strengthened. Similarly, if FURB's educational programs make efforts to integrate the environmental dimension, that inclusion must be based on the principles of sustainable development. By integrating the environmental dimension with a focus on sustainability, socio-environmental knowledge would be promoted, that is, the themes would not only be oriented to environmental problems, but would also be linked to social, economic, cultural, health, pandemic, aspects etc. In the case of the results of students and professors at UNlu University (Argentina) it was appreciated that the professors have the knowledge about the environmental crisis, because the parameters that evaluated this dimension range from "Totally agree (5)", "Agree (4)", "Moderately agree (3)". Regarding environmental ethics in the curriculum, the results showed that about 50% stated that the dimension if it is present in the curriculum, the other 50% did not consider it (see table 5). With respect to the information provided by the students, it was appreciated that they do have knowledge about the environmental crisis, however, the parameters "Disagree (2)", and "Strongly disagree (1)" reflect that the curriculum does not include the environmental dimension. It can be said that both teachers and students perceive what happens with the environmental problem, however, the inclusion of the environmental in the programs or curricula is not present, this is confirmed with the information given by the teachers and with the information given by the students when this dimension was valued. The results found with professors and students at FURB had similarities with those found with professors in the university's studied programs in Mexico. This study allowed to know that with the information provided by the teachers, it is confirmed that in the programs studied at FURB is where efforts are being made to integrate the environmental into the university curriculum, however, currently, with the COVID-19 pandemic the dimension of the environmental must adhere to the principle or sustainable approach and therefore, consider the problems related to the pandemic, because COVID-19 surprised the world and through the university students must be prepared to face it. The results in this study that indicated the lack of environmental dimension in educational programs coincided with that carried out by Pérez (2015), who investigated the incorporation of the environmental within the Biology program of the University of Tolima in Colombia and concluded that the environmental component is not included there. In relation to the design of EE proposals in the new normal with

the COVID-19 pandemic, their elaboration was achieved and they were presented as alternatives to be included in educational programs as EE strategies that contribute in pandemic situations. It was concluded in general terms that it is important that the university reinforces the EE in the curricula or educational programs, that it is applied considering a method of inclusion, either disciplinary, through projects or in a transversal way, likewise, train teachers to significantly promote environmental competencies in students. Pandemics such as COVID-19 are associated with environmental issues and in this sense, the university must prepare students with skills or learning that allow them to face situations such as those derived from the COVID-19 pandemic.

**Conclusions**

Integrating the environmental dimension in curricula or educational programs is a viable strategy for educational institutions worldwide from the basic level to the higher level to promote EE and, therefore, the care of the environment with a focus on sustainable development. The information provided by professors and students allowed us to understand that in some educational programs of some universities in the world they do not incorporate the environmental dimension. In this section reference is made to the study presented where only in the educational programs of the (FURB) its incorporation is appreciated, however, it is necessary to consolidate because it is in process. In the educational programs of the AUG, the integration of the environmental is minimal, in this sense, the recommendation is to strengthen its inclusion. In the educational programs of the UNlu, the inclusion of the dimension in question is not present. It is worth mentioning that in some cases, teachers and students perceive the environmental problem, however, the perception is understood in a superficial way. Some educational curricula propose to integrate transversal issues such as the environment, health, human rights, among others, are emerging issues that should not go unnoticed. Environment or environmental dimension is a transversal issue (from a curricular approach), it is an issue that worries the world and, therefore, the inclusion of it in the curriculum would allow to launch EE activities. The environmental dimension implies developing issues that have to do with environmental problems and, therefore, linking them with other aspects, such as economic, social, etc. From the environmental dimension, various topics can be addressed as topics that are related to the COVID-19 pandemic. With the emergence of the COVID-19 pandemic, the EE must take a new direction and new challenges within its object of study and analysis, that is, the culture of risk prevention due to infections, as well as the strengthening of its procedures and actions to be carried out in the case of similar situations in the coming times. The proposals put forward by EE in the new normal are the basis for this education to be strengthened in educational curricula and mainly in university curricula.

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