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## Evaluation of undergraduate research projects on environmental education at university implementing the hypothesis of progression\*

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### Abstract

This project applies the hypothesis of progression in evaluating research projects prepared by undergraduate students of Environmental Education at the University. For such purpose, projects prepared by students of the bachelor's degree of Biology and Environmental Education, at del Quindío University, Colombia have been analyzed, which objective is training primary education teachers, secondary, and other education levels. The hypothesis of progression leads to assess the conceptual change presented in the graduation projects, not as a punctual process, but as a process of contents evolution.

**Key words:** Environmental Education, Hypothesis of Progression, Qualitative Research, Projects, University.

\*Research Project: International references of current status of higher education training on the area of tourism. Hunzahúa Research Group. Unad, FL.

## Introduction

In the context of a research line on “curricular adjustment” of higher studies, the purpose of this work is to present the “Evaluation of Graduation Projects on Environmental Education at the University, by applying the Hypothesis of Progression”. Case, bachelor’s degree of Biology and Environmental Education, at del Quindio University, Colombia.

- Problems of this work are related to questions resulting from the evolution process of professional and personal concerns, as well as those surged along the study and reflection. They are the center of our research, because they are recurrent and in concordance with interests and perspectives briefly expressed in the theoretic framework. As a consequence, in order to contribute to the improvement plan of teacher early formation, regarding inclusion of environmental dimension in the curriculum, this study approaches five proposals. The answer to each question corresponds to each research problems trying to be resolved. They are:

-¿What are the teacher conceptions on how and what to include from environmental dimension in the academic curriculum?

-¿What are the teacher conceptions on possibilities and conditions of including the environmental dimension in the curriculum?

- ¿What are the teacher conceptions related to treatment of environmental problems?

These proposals are faced through discussion postures with different “values” and teacher formation models, and their professional development regarding inclusion of environmental dimension in the curriculum in general, in order to establish which one may better meet environmental challenges increasingly serious of the planet at a global level.

Our research is a contribution to adaptation of the curricular proposal, by inserting in its context competences on education for sustainability, as a need of intervention in their practice to promote skills, attitudes, ability, values and actions which contribute increase students, and future professional participation in construction of sustainable societies. It may also improve their role as agents of change regarding social and environmental questions.

Given the complex characteristic of educative process, directionality and underlying linearity, it may be evaluated by the progression hypothesis that leads to explore the various trends of environmental education at the university, by explaining the problems posed by the statement level and complexity degree of contents and methodology considered in the projects.

For such purpose, projects including environmental dimension, (2009 to 2012), prepared by students of the bachelor’s degree of Biology and Environmental Education, at del Quindio University, Colombia have been analyzed, which objective is formation of teachers of primary education, and secondary, or another education level. The hypothesis or progression leads to evaluate the conceptual change presented in the graduation projects prepared by students, not as a punctual process but as a process of content evolution.

Drawn conclusions are not generalizable, since it is a research where the research paradigm is interpretative, with an approach of a qualitative analysis. But, in all cases, they may become a contribution to exploration of ideas of those students of the bachelor’s degree of Biology and Environmental Education in their graduation projects, on inclusion of environmental dimension in the curriculum of the Faculty of Education.

This may become the basis to orient qualification of early formation, as well as open research lines which continue to expand on those aspects not sufficiently analyzed herein, to be subsequently presented to another academic communities, where they raise reflections around it.

The stated research problem is within two scopes: Environmental dimension, and educative dimension. Likewise, and considering that the intervention ambit is higher education, it is also advisable to center the environmental dimension at the university, and its relationship to environmental problem, and sustainable development. Understood as curricular greening.

The definition of curricular greening of ACES network regarding higher studies (Arbat and Geli, 2002; Junyent, Geli and Arbat, 2003; Geli, Junyent and Sanchez, 2003, 2004), becomes an international referent on this field, and represents a supporting document for this kind of research projects. Therefore, we consider important to take it in order to define the concept.

A continuous process of cultural production aimed a formation of professionals committed to permanent search for better relationships between the society and nature, bearing in mind values of justice, solidarity, and equity, by applying ethic principles universally recognized, and respect for diversity.

It involves formation of professionals capable of experiencing real situations which promote reflection on affective, aesthetic, and ethic dimensions of interpersonal relationships and with nature. This fact requires preparation of projects which facilitate contact with socio-environmental problems at the same scenery where they take place. (Junyent, Geli, and Arbat, 2003:21).

Based on this definition, characterization of a greened study is given by integration of ten characteristics:

1. *Paradigm of complexity*: Integrating complexity as an interpretative paradigm of the reality and thought.
2. *Disciplinary Flexibility and permeability*: To allow opening to new disciplines, as well as disciplinary and permeability at various levels, either be transdisciplinary, interdisciplinary or pluridisciplinary.
3. *Contextualization*: In the space (Local and global) and in the time (historically, in the present, and with a vision of future).
4. *Taking into account the subject in construction of knowledge*: Consider the person, (the individual, or the community), as an active agent in knowledge construction.
5. *Consider cognitive, affective aspects and action of individuals promoting an integral development*.
6. *Coherence and reconstruction between theory and practice*. Promoting the relationship between the speech and action at institutional level, teacher, and research.
7. *Prospective orientation of alternative scenarios*. To support critic thought and responsible decision making, considering probable future scenarios.
8. *Methodological fitting*: To adapt methodology of the discipline to the one proposed by ES.
9. *Creation of spaces for reflection and democratic participation* that leads to action for change toward sustainability (at the institution and the classroom), involving all members of the university community.
10. *Commitment toward transformation of society – nature relationships*: Support commitment to social equity, economic development and ecological balance.

The stated characteristics of a curriculum greening, were achieved parting from the first ideas surged from groups of work, and a later participative dynamics of all members of ACES Network. The order shown does not mean any priority, since all of them hold the same importance. In the university ambit such process includes political decisions by the institution to create all of the necessary spaces, for democratic participation of the various internal elements, in defining institutional strategies, and promotion of cohabitation ways, which the above mentioned objectives and values.

In turn, when dealing with the educative dimension it is necessary to mention the paradigm within which teaching-learning process should be developed, therefore, it is worth to include those aspects which impact the process: constructivism, complex thought, and critical reflection. The constructivist as a special way of conceiving construction of knowledge, and the complex perspective shows a way of looking at the reality, and critic, a particular posture in front of the purpose of knowledge.

From this constructivist approach the hypothesis of progression is proposed as a fundamental instrument to organize and evaluate didactic contents. Known as the metaphor of the ladder, projects are placed on one and other step, taking into account their contents, and the didactic process should facilitate the transition toward upper steps.

We present the idea of the progression hypothesis according to Garcia (1998), as a strategy that leads us to organize systems of ideas according to their complexity degree. It is necessary to explain criterions under which we claim that any system is more complex than any other.

In this same context, we propose the critic thought as a fundamental instrument to overcome some didactic difficulties we could face when working contents in projects related to environmental education.

Instead of professionals of any type, we need to be human beings. More than information, we seek vital experiences on needs and interests of daily life in social and individual projects. Instead of abstractions and laborious study, we value friends, realities and feelings. Rather than foreign imported paradigms, we prefer to study elements of formation of personal, cultural and local identity, necessary to save dignity and integrity of individuals.

It is here where the school in general, and the university in particular should exercise the most important role in the essential development of the individuals we need. The universal character of the university is to expand and embrace the complexity of creative and ethic formation of teachers, as well as assist in organization of a society supported on comprehension and solidarity. There are more than three million of displaced individuals, twenty two million in poverty, nine million of miserable, capable and creative people who may be integrated into an arrangement of justice, equity, education, health and own job. Let's do school here. I will be the great opportunity to learn to support life, nature and culture.

### **Environmental problem and sustainable development (SD)**

Sustainable development is a concept that, as a minimum, should propose a double requirement: the environmental, which requires to preserve a base of finite natural resources; and the social or equity, which parts from the right of present and future generations to properly meet their basic needs (Caride and Meira, 2001). In Colom's terms, (2000): "Sustainable development intends, at the same time, to unite an economic standard (development) with other more behavioral and attitudinal (sustainability)" (p.21); therefore, sustainability involves ecologic, social and economic balance, in addition, it impacts, as well as development, differentiation regarding policies which only seek growth.

Therefore, sustainability should not be mistaken for conservation of nature, because sustainable development is pluri-dimensional, environmental variable being one more among other; then sustainability may be applied to so diverse problems like demography, ecological disasters, unequal distribution of resources, or peace in the world (Colom, 2000); and with various types of coordinated actions: technical (technologies, less impacting), politic-economic (investment prioritizing for a better

management of resources), and socio-educative (educative and cultural changes).

But there is no consensus in many other topics: ¿is it bet on individual change or on social change? ¿is it proposed a limited development which makes economic development and conservation compatible, not supposing changing the structures of the system? ¿is it intended to improve, without changing, current market system?

It seems clear that the model of sustainable development means advancement regarding preceding models based on non-limited growth, and on development; now a pluri-dimension posture is adopted, and more aspects are considered than in previous models; proposals of biocentric paradigm are admitted (environmental ethic, harmony between the human and the natural, diversity conservation, etc.); a more progressive social posture is assumed (the problem of unequal distribution of resources in the world), and citizen participation is promoted, this one turns into the fundamental agent of change.

As a consequence, it surges the need of introducing changes in the academic programs of the various disciplines and courses, that integrate the model of the higher education teacher, and his environmental dimension, taking into account the environmental problem, and sustainable development.

### **Teacher conception regarding environmental education**

Cano, Rojero, Torras & Verd, J. (1996), state that there are few studies related to thought of teachers involved in the environmental dimension. Among the various conceptions expressed in such studies, the following are worth to highlight:

- Beniez (1995), points at two great difficulties on teacher training on Environmental Education-EE: their previous conceptions on EE (they use to identify themselves with understanding the surrounding, or with research on the surrounding"), and their methodological conceptions ("with predominance of a transmitting methodology").

- Ham and Sewing (1988), mention various conceptions of teachers which difficult their professional formation. Although it deals with a research closer to a technological option

than constructivist and researching, the type of barriers is of interest, therefore we describe it as follows:

- First, conceptual barriers, over all, little explanation on the purpose and contents of EE. This information agrees with results obtained by Santisteban (1997), on teacher resistance to assume ideological commitments involved on EE, since teachers prefer neutrality and asepis of sciences of nature rather than what they consider as social aspects.

- Secondly, conceptual barriers are related to logistic barriers, related to lack of time to prepare and develop environmental education activities, as well as suitable teaching materials, financing and suitable spaces.

- In addition, a third barrier is the lack of confidence at dealing with environmental education topics; first, they are aware of their lack of preparation, and, secondly, they do not like to involve in such polemic topics. This problem is added with lack of control of education situations out of the classroom. Regarding beliefs on their formative shortages, the vision centered on the natural appears again.

- A fourth type of barriers are those related to attitude. Although many teachers are aware of EE importance, they accept not feeling comfortable with topics they identify as related to natural sciences. There is a positive attitude in what they declare, but not a commitment to action.

According to Tristan and Garcia (2009), strategies used to deal with environmental education, most teachers limit themselves just to touch environmental topics at the classroom, the school, and using resources of the school center (Internet, audiovisuals, laboratories). A minority perform actions out of the school (ecologic tours, etc.). Most teachers claim being familiar with strategies which involved methodologies of analysis of environment at the classroom.

Garcia (2000), states that teachers before transversality suppose various difficulties for their application at the classroom, because teachers do not know the approach for transversal topics. Far from considering transversal axles as new contents, they

should be proposed as an attempt by the education administration to be treated by teachers on voluntary and partial basis, and depending on teachers' sensibility (Gavidia, 2011).

Mora (2011), states that developing curriculums by standardized competences is in opposition to curriculums for resolution of socio-environmental problems, and development of human capabilities. It is required formative education projects which lead to reconnect nature with the human being, as a way of facing globalized socio economic problems, but not only to compete in standardized tests. Within the context of resolution of pertinent problems, the concept of competences as knowing how to do, should be overcome in favor of the socio environmental (Mora, 2009), and subordinated to the "human capabilities", and pertinence of globalized problems.

Many skills and encyclopedism are contrasted to criterions of selection and expansion: overcoming the encyclopedism expressed in the idea of taking an excessive number of courses and contents is opposed to the criterion of human, social and environmental development, which empower human capability regarding critical and complex reflection, collective participation, democracy and leadership; therefore it becomes necessary to privilege transversality, complex thought, and curricular depth, but not encyclopedism and superficiality, by highlighting contents, minimal and sufficient procedures and attitudes for formative research, and strict meaning of global problems.

Transmitting knowledge is contrasted to producing knowledge by dedicating time to formation: Giving class is a very poor challenge before abundance of information circulating in the various means, challenges of knowledge and globalized life in crisis require of a pedagogy and didactic which privilege socialization, the culturally desirable, design of various spaces for learning, in pro of a critical and researching formation, leadership and participation in contribution to resolution of problems.

Passive methodology contrasts to an active one: Not giving classes by teachers, and cease to take notes and memorize by the students, is difficult for the education community, and many times the same students and teachers are who oppose to change. Using teaching strategies oriented to design of learning spaces, formative research, analysis of case studies, simulations, seminars among other. It is



required to strengthen active learning in cooperation with all social actors, and TIC-assisted means, as a teaching complement.

## Materials and Methods

The research paradigm is interpretative, with an approach of qualitative analysis which includes the quantitative. As claimed by Junyent (2002), a paradigm in research and educative evaluation is interactive, implanted to the practice and in a context, methods are not pre-arranged, but emerging; individual constructions are taken and refined through interpretation and qualitative strategies.

Evertson and Green, (cited by Wittrock, 1986), state that the fundamental is not that the instrument is better, but which one is the most suitable for the question under study, and which one will properly represent the segment of the reality studied in reason to the type of stated problem, as well as the presented theoretic and conceptual framework.

We intend to complement the qualitative methodologies through a quantitative analysis of data by means of the descriptive method using the Mode.

According to Perez (cited by Quintana & Montgomery 2006), the main difference among quantitative and qualitative research approaches does not depend exactly on the use of numbers in the first case, and not using numbers in the second one. Epistemological and technical differences identifiable through those two ways of educating research come from two basic elements: the type of intention, and the type of reality which both researching approaches intend to approach.

Regarding intentionality, let's establish that quantitative approaches are centered on explanation and predication of a reality considered in their most universal aspects and seen from an external perspective (objective), while qualitative approaches are centered on comprehension of a reality considered from their particular aspects resulted from a historical process of construction, and seen parting from the logic, and feeling of its protagonists, that is, from an internal perspective (subjective). Qualitative researching methodology is understood as discovery actions of new concepts, within a holistic perspective, Perez (cited by Quintana & Montgomery 2006).

Regarding instruments and techniques used to obtain referred data, graduation projects prepared by students of Master of Biology and Environmental Education –BYEA, at del Quindio University, Colombia, have been used.

In preparing this study, written material of graduation projects of students since 2009 to 2012, of Master of Biology and Environmental Education, which included environmental dimension and environmental education as a central topic, were analyzed.

Therefore, we have analyzed the graduation projects mentioned above, in order to analyze what is reflected in the teaching professional practice. Graduation projects of selected students have been treated by categories and sub-categories of analysis, in order to see whether these projects show the what and how to incorporate the environmental dimension into the curriculum, possibilities and conditions of incorporating it in treatment of environmental problems, which could be defined as related to dealing with incorporation of the environmental dimension into the curriculum of the university.

The following steps were performed in the research: establishment of the category system, selection of projects and analysis of contents. 92 projects were reviewed and analyzed, using written material of projects presented by the students between 2009 and 2012, which central topic included environmental education. The following is an explanation of the category system:

### Category system

In the analysis of graduation projects, criteria have been established under which contents of such projects are evaluated. That is, a scale of categories and sub-categories, from simple knowledge to other more complex, is established.

As stated above, the methodology used is qualitative, but supported on the quantitative, and a procedure of qualitative techniques was used, which describes the complexity of the problem and interaction between categories (Bardin, 2002). This approach is important to understand the speech used in the projects parting from its development and results which facilitates an approach to interpretative subjectivity of the reality.

For the case of our study, the category system is build parting from the need on how and what to include

from environmental education, the possibilities or conditions of incorporating environmental education and treatment of environmental problems.

It is relevant that categories of analysis considered and worked in the graduation projects in general, no in each of their materials on separated basis, since in this manner meanings are better contextualized in order to identify the degree of integration of contents on environmental education registered in the graduation projects.

**Chart 1.** Category system

Categories	Subcategories
<b>A. Need on how and what to include of environmental education</b>	A.1. Need of incorporating environmental education
	A.2. How to incorporate environmental education
	A.3. Importance of including environmental education in terms of sustainable development
	A.4. Professional and teaching skills used in designing and placing contents into practice.
	A.5.Features that contents should have to produce meaningful learning by the students.
	A.6. Ideas of the students
	A.7. Activities and resources proposed
<b>B. Possibilities or conditions of including environmental education</b>	B.1. Importance of including environmental education
	B.2. Limiting issues to include environmental education
	B.3. Changes required to include environmental education
	B.4. Skills necessary for environmental education to be included
	B.5. Aspects of professional formation and teaching that could be improved to include environmental education
<b>C. Treatment of environmental problems.</b>	C.1. Characteristics of environmental problems surged at Global level and local.
	C.2. Philosophic, scientific and sociological principles necessary to approach environmental problems.

Source: The authors

Although it is a qualitative methodology, we have assigned numerical values which are not quantitative, but which serve to discriminate the assigned values. The idea of the various values per category and subcategory is defined in chart 2, which were assigned a numerical value of 1, 3 and 5, respectively, in prevision of existence of transition values. These are increasing to identify when any values is from minor to major complexity.

The first level (1) shows evaluation of the project within a non-desirable value, it supposed a dogmatic vision of knowledge.

The second level (3) refers to those project models which serve as a bridge between the non-desirable value and the desirable one; the project which presents a technical and activist speech, characterized by an adding speech and use of a didactic transmitting methodology.

Finally, the third level corresponds to what is considered as the profile of the desirable project: the project which presents a speech from research in the action, which supposes a relative, evolving and integrating vision to knowledge, with a constructivist speech of learning. Chart 2 shows a summary of assignation of values to analyzed projects, according to the categories.

**Chart 2.** Categories and values

Categories	Proposed values		
	Non-desirable level 1	Intermediate level 3	Desirable level 5
Category A: Project contents on how and what to include of environmental education.	Scarce arguments and incoherence in the way of presenting the speech in the Project.	Shows recognition of how and what of environmental education, but it is presented incomplete.	Project that show a vision of the integral speech, and presented on founded manner, according to the proposed desirable value.
Category B: Project contents on possibilities or conditions of including environmental education.	Is not within the proposed desirable value.	With an adding vision, the parts are not integrated, and relations are not justified.	proposed desirable value.
Category C: Project contents related to treatment of environmental problems.			

Source: Authors

Values assigned to each category and subcategory of the proposed chart of values, were established according to consulted bibliographic references. In this manner, diversity of contents of the projects may be easily understood in the analysis and explanation of information units of each project to defined categories and subcategories.

From this approach, the analysis of the speech is understood as an organized, hierarchized, process and relative knowledge, as a system of ideas which is continuously reorganized in the interaction with other systems of ideas referred to other ways of knowledge, which is defined in the curriculum, in progression hypothesis, referred both to a concrete content (gradual construction and progressive of certain idea), and to a group of contents connected among themselves in a scheme.

Therefore, although a hypothesis of progression may refer only to a possible solution of a determined content, it should be taken into account that contents acquire meaning only if considered in relation to other ones.

## Results and discussion

This analysis of information of graduation projects of the Master's degree of Biology and Environmental Education is qualitative, but supported on the quantitative, realized through the descriptive method using the Mode, a central trend measure representing the most frequent data of a distribution of data.

The comparison among graduation projects of the Master's degree of Biology and Environmental Education to each category A, B and C, has been made based on the Mode of each subcategory in each selected project. Likewise, the values assigned to identify contents exposed on the projects were analyzed; therefore, the Mode has been used as a standard for the analysis.

**Category A:** Need on how and what, to include the environmental dimension (IDA)

**Chart 3:** Graduation projects which consider the how and what to Include Environmental Dimension – IDA.

Projects	years	Subcategories							Value of the Mode per subcategory
		A.1.	A.2.	A.3.	A.4.	A.5	A.6.	A.7	
P.36	(2009)	3	3	1	3	3	3	3	3
P.15	(2010)	1	5	1	1	3	3	3	1 y 3*
P.6.	(2011)	1	1	1	3	3	1	3	1 y 3*
P.7.	(2012)	5	5	1	5	5	5	5	5
Value of the Mode per years		1	5	1	3	3	3	3	3

Source. Authors

According to results in chart 3, in Category A: in the graduation projects of the Master's degree of Environmental Education, it is seen that the predominant value is 3 (intermediate) for years 2009, 2010 and 2011, that is, projects have an additive vision, their parts are not integrated, and their relationships are not justified, and little foundations are made on how and what to Include Environmental Dimension – IDA.

For 2010 and 2011, the 1 (non desirable value) is taken as predominant value; this leads us to infer that projects show incoherence on the how and what to Include Environmental Dimension – IDA.

For 2012, the predominant value is 5 (desirable), that is, the project shows an articulated integral vision, and it is founded on the how and what, to Include Environmental Dimension – IDA. A different situation is shown from projects of 2009, 2010 and 2011, that is, favors the Including Environmental Dimension – IDA.

**Category B:** On possibilities and conditions of Including Environmental Dimension – IDA

**Chart 4:** Graduation projects that consider possibilities and conditions of Including Environmental Dimension – IDA

Projects	Years	Subcategories					Value of the Mode per subcategory
		B.1.	B.2.	B.3.	B.4.	B.5.	
P.36.	(2009)	3	3	3	3	3	3
P.15.	(2010)	3	1	3	5	3	3
P.6.	(2011)	1	1	1	1	3	1*
P.7.	(2012)	5	5	5	5	5	5*
Value of the Mode per years		3	1	3	5	3	3

Source. Authors

According to results in chart 4, in Category B: in the graduation projects of the Master's degree of Environmental Education, it is seen that the predominant value is 3 (intermediate) for years 2009, and 2010, that is, projects have an additive vision, their parts are not integrated, and their relationships are not justified, and Including Environmental Dimension – IDA possibilities and conditions are little supported.

For year 2011, a different situation is shown regarding 2009, 2010, and 2012, since graduation projects are located on value 1 (non-desirable), that is, the project shows incoherence on the topic of Including Environmental Dimension IDA possibilities and conditions.

For 2012, the graduation project shows a different situation regarding years 2009, 2010 and 2011, since it is located on value 5 (desirable), it is supposed to have an articulated and integral vision, and the topic on Including Environmental Dimension – IDA possibilities and conditions is supported.



### Category C: Treatment of environmental problems

**Chart 5:** Graduation projects of Master's Degree of Environmental Education which consider treatment of environmental problems.

Projects	Years	Subcategories		Mode value per subcategory
		C.1.	C.2.	
P.36.	(2009)	1	1	1
P.15.	(2010)	1	5	There is no Mode
P.6	(2011)	1	1	1
P.7.	(2012)	5	5	5*
Mode value per years		1	1 y 5	1 y 5

Source. Authors

According to results in chart 5, in Category C: in the graduation projects of the Master's degree of Environmental Education, it is seen that the predominant value is 1 (non-desirable value) for years 2009, 2010 and 2011, that is, projects show incoherence on treatment of environmental problems. For years 2010 and 2012 a different situation is shown since it shows values with a trend in value 5 (desirable), projects are supposed to show an articulated, integral and supported vision in treatment of environmental problems, in subcategory C.2 (2010), and subcategories C.1 and C.2 (2012).

It is worth to note that at intending to analyze the categories and subcategories on separated basis, in projects under study, it is seen that all of them are related, sometimes, even, merging them. In many cases it is necessary to see one to justify the other, or even, justifications of several of them coincide with the same elements. This fact shows how the system of categories and subcategories has been an instrument of analysis proposed for the research, within a speech of inclusion of environmental education at the university. Established categories and subcategories are traits or aspects which are related, which many times one implies the other, not given in separated basis.

### Conclusions

Results obtained refer to a very concrete sample, but because of being so, less valid, and we believe it may serve to promote debate on the topic, and guide future research in this matter.

We have decided to present the conclusions of categories and subcategories in the research,

review and analysis of graduation projects prepared by students of the Master's Degree of Biology and Environmental Education on: Including Environmental Dimension – IDA in the curriculum, as well on possibilities and conditions of the IDA, and on treatment of environmental problems. The following are the conclusions of each studied categories and subcategories:

Regarding category A: the need on how and what to include the environmental dimension. According to results in chart 3. In graduation projects of the Master's Degree of Biology and Environmental Education, it is observed that the predominant value is 3 (intermediate) for years 2009, 2010 and 2011, that is, projects show an *additive* vision, their parts are not integrated, their relationships are not justified, and little support is made on how and what Including Environmental Dimension (IDA). A different situation is shown by the projects, this fact favors inclusion of environmental dimension in the curriculum.

Therefore, it is suggested that strategies and contents for inclusion of environmental dimension –IDA in the curriculum, should be reoriented before questions raised by an integrated classroom curriculum, organized regarding treatment of socio-environmental problems, which include in theory and practice, a conception of a complex, open, political, dynamic, participative, critical and reflective curriculum.

Teachers should use pedagogic and didactic skills articulated with base disciplinary knowledge, with a teaching learning approach which leads to teach in the natural environment and social.

Contents should contain contextualized meaning for the students, various levels of depth, complexity and reflection should be approached.

Regarding category B: on possibilities and conditions of IDA, according to results in chart 4. In graduation projects of the Master's Degree of Biology and Environmental Education, it is observed that the predominant value is 3 (intermediate value) for years 2009 and 2010, that is, projects show an *additive* vision, their parts are not integrated, their relationships are not justified, and little support is made Including Environmental Dimension. A For 2012, the graduation project shows a different situation regarding years 2009, 2010 and 2011, since it is located on value 5 (desirable), it is supposed to have an articulated and integral vision, and the topic

on possibilities and conditions of IDA is realized in a supported manner.

The additive and dissociative trend is expressed in many ways: separation among the model, theory and practice, in such a manner that there is a divorce between thinking and doing; consideration of elements of the curriculum as separated aspects with no connection among them; contents, didactic methodology, evaluation and class activities are programmed with no link among themselves. This lack of a curricular organization makes difficult, at a great extent, understanding that election of certain contents involves using a determined methodology and vice versa. Therefore, it is important not to ignore principles of curricular adjustment according to the reality of the education institution. In this context, characteristics suggested by Aces Network should be considered.

Regarding category C: treatment of environmental problems according to results in chart 5. In graduation projects of the Master's Degree of Biology and Environmental Education, it is observed that the predominant value is 1 (non-desirable value), for years 2009, 2010 and 2011, that is, projects show incoherence in treating environmental problems. For years 2010 and 2012, the graduation project shows a different situation, since it shows values with a trend in value 5 (desirable), the projects are supposed to have an articulated, integral and supported vision on treatment of environmental problems, in subcategories C.2 (2010), and subcategories C.1 and C.2 (2012).

The study on evaluation of graduation projects which include environmental education at the university by applying hypothesis of progression, facilitates the approach toward evidence of networks of meanings which cross school daily activities, and guide the academic practice. Results lead to understand, not only the activities within the classroom, but also aspects of the same teaching training. In this comprehension of what and how the students consider environmental education at the university, it is necessary to rebuild, and build the relationships they establish between scientific knowledge and common sense knowledge.

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