

**THE VENEZUELAN ENVIRONMENTAL EDUCATION
TEACHER TRAINING PROGRAMME:
AN ANALYSIS OF PROFESSIONAL AND ENVIRONMENTAL COMPETENCIES**

by

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A thesis
presented to the University of Ottawa
in fulfillment of the
thesis requirement for the degree of
Ph.D.
in
Geography

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ISBN 0-612-15669-9

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UNIVERSITÉ D'OTTAWA
UNIVERSITY OF OTTAWA

Lovingly dedicated to

my husband,

Ed Honeywell

whose understanding and help were
of inestimable value in conducting
and writing this research.

ABSTRACT

The purpose of this research is to describe and analyze the environmental education teacher training competencies model in Venezuela. More specifically, the study concentrates on the Universidad Pedagógica Experimental Libertador (UPEL). This university is the leading institution of teacher training in Venezuela.

The UPEL environmental education teacher training model consists of twenty-one competencies associated with five environmental education areas. This model is examined using the UNESCO model as an international standard, the latter of which consists of twenty-eight competencies associated with professional and environmental education areas. Examination of the UPEL model also involves an assessment of the perceptions of Venezuelans concerned with environmental education with regard to the relevance of the UPEL model to Venezuelan environmental reality.

The methodology applied in this study is set in the context of a content analysis of major UNESCO and UPEL model documents, and a survey of key Venezuelan individuals, UPEL environmental education professors and UPEL teacher candidates who have already taken environmental education.

In this analysis a literature review also serves as an important source of information. Themes included in this review are associated with environmental education concepts and principles, the state of environmental education, the training of teachers in

environmental education, competency based teacher training, the Venezuelan experience, and the UNESCO and Venezuelan teacher training models.

The research stresses the description, analysis and interpretation of relevant aspects related to the UPEL competencies model and its relevance to Venezuelan reality. In light of major conclusions and implications of these aspects a set of recommendations is drawn. For example, this study reveals a critical need for research and evaluation of environmental education teacher training competency models. In the context of the comparison between the UNESCO and UPEL models, significant differences in their structure and content have been found. The UPEL model lacks a set of basic professional and environmental education competencies required for training effective environmental educators who are able to contribute to the prevention and solution of environmental problems. In the context of the assessment of perceptions it has been found that key individuals, as well as professors and students of environmental education, believe that the UPEL model is not relevant to the country's problems and needs. It appears that in addition to the deficiency in competencies, a lack of logistical support in the implementation of the model is also a serious weakness. Results of this study reveal an immediate and critical need for necessary adjustments to the UPEL environmental education teacher training model.

Finally, it is expected that this research, concerned as it is with the quality of environmental education teacher training, will provide the necessary incentives and information for Venezuelan decision makers to improve the UPEL environmental education teacher training model.

RESUME

Le but de cette recherche est de décrire et d'analyser les modèles de compétences de la formation des enseignants en environnement au Vénézuéla. Plus spécifiquement, cette étude est concentrée sur le Universidad Pedagógica Experimental Libertador (UPEL). Cette université est l'institut de tête pour la formation à l'enseignement au Vénézuéla.

Le modèle de la formation des enseignants en environnement de l'UPEL est constitué de vingt-et-une compétences associées à cinq domaines en formation environnementale. Ce modèle est analysé utilisant le modèle de l'UNESCO comme standard international, lequel est constitué de vingt-huit compétences associées au secteur de formation professionnelle et environnementale. L'étude du modèle de l'UPEL implique l'évaluation des perceptions des Vénézuéliens concernés par la formation environnementale en rapport au modèle de l'UPEL sur la réalité environnementale du Vénézuéla.

La méthodologie utilisée dans cette étude est basée sur le contenu analytique de plusieurs documents de l'UNESCO et de l'UPEL, ainsi qu'un sondage auprès des Vénézuéliens, des professeurs en formation environnementale et d'enseignants de l'UPEL.

Dans cette analyse, on s'est aussi servi de critiques littéraires comme source d'information importante. Les thèmes que nous retrouvons dans cette critique sont associés aux concepts et principes de la formation en environnement, la qualité de la formation en environnement, la formation d'enseignants en environnement, "competency based teacher training", l'expérience

au Vénézuéla, ainsi que les modèles de formation de l'UNESCO et du Vénézuéla.

Cette recherche met l'accent sur la description, l'analyse et l'interprétation d'aspects relatifs aux modèles de compétences de l'UPEL en rapport avec la réalité au Vénézuéla. A la lumière de ces conclusions et de ces implications, nous dressons une série de recommandations. Par exemple, cette étude dévoile un besoin critique au niveau de la recherche et de l'évaluation des modèles de compétences de la formation d'enseignants en environnement.

En ce qui a trait à la comparaison entre les modèles de l'UNESCO et de l'UPEL des différences significatives au niveau des structures et du contenu ont été établies. Le modèle de l'UPEL est dénué de compétences professionnelles de base et de la formation en environnement requis pour une formation efficace d'enseignants en environnement qui pourront contribuer à prévenir les problèmes environnementaux et à y trouver des solutions. Au sujet de l'évaluation des perceptions, il a été établi que les personnes-ressources, aussi bien que les professeurs et les étudiants à la formation en environnement, croit que le modèle de l'UPEL n'est pas approprié aux problèmes et aux besoins du pays. Il semble qu'en plus de la déficience des compétences, on note une faiblesse au niveau de la logistique pour l'implantation du modèle. Les résultats de cette étude dévoile un besoin critique et immédiat d'ajustements nécessaires au modèle de la formation d'enseignants en environnement.

Finalelement, nous espérons que cette recherche, très concernée par la qualité de l'enseignement en environnement, aidera les différents paliers gouvernementaux à améliorer le modèle de la formation des enseignants en environnement de l'UPEL.

RESUMEN

El propósito de esta investigación es describir y analizar el modelo de competencias para el entrenamiento de maestros en Educación Ambiental en Venezuela. Mas específicamente, el estudio está centrado en el modelo de la Universidad Pedagógica Experimental Libertador (UPEL). Esta universidad es el líder en la formación de maestros en Venezuela.

El modelo de la UPEL consiste de veintiuna competencias asociadas con cinco áreas de Educación Ambiental. Este modelo es analizado usando el modelo de UNESCO como un patrón internacional el cual consiste de veintiocho competencias asociadas con áreas de Educación Profesional y Ambiental. El análisis del modelo UPEL también implica una evaluación de las opiniones de Venezolanos envueltos en Educación Ambiental con respecto a la relevancia del modelo a la realidad ambiental de Venezuela.

La metodología aplicada en este estudio está enmarcada en el contexto de un análisis de contenido de los principales documentos de los modelos UNESCO y UPEL, y en una encuesta de individuos claves, profesores de Educación Ambiental de UPEL, y candidatos a maestros de UPEL quienes han cursado Educación Ambiental.

En este análisis una revisión de la literatura es también una importante fuente de información. Los temas incluidos en esta revisión están asociados con: conceptos y principios de Educación Ambiental, estado de la Educación Ambiental, formación de maestros en Educación Ambiental, formación de maestros basado en

competencia, experiencia Venezolana en materia de formación de maestros en Educación Ambiental, y modelos de formación de maestros de Educación Ambiental de UNESCO y UPEL.

La investigación enfatiza en la descripción, análisis e interpretación de aspectos relacionados con el modelo de competencias de la UPEL y su relevancia con la realidad Venezolana. A la luz de las principales conclusiones e implicaciones de estos aspectos una serie de recomendaciones son generadas. Por ejemplo, este estudio revela una necesidad crítica por investigación y evaluación de modelos de competencias de formación de maestros en Educación Ambiental. En el contexto de la comparación entre los modelos UNESCO y UPEL significantes diferencias en sus estructuras y contenido han sido encontradas. El modelo UPEL carece de una serie de competencias básicas de educación profesional y educación ambiental requeridas para entrenar efectivos educadores ambientales las cuales sean capaces de contribuir en la prevención y solución de problemas ambientales. En el contexto de la evaluación de opiniones ha sido encontrado que individuos claves del país, profesores y estudiantes de Educación Ambiental piensan que el modelo UPEL no es relevante a los problemas y necesidades de Venezuela. Allí aparece que además de la deficiencia en las competencias, carencia de soporte logístico en la implementación del modelo es también una fuerte debilidad. Resultados de este estudio revelan una inmediata y crítica necesidad por ajustes necesarios al modelo de formación de maestros en Educación Ambiental de la UPEL.

Finalmente, se espera que esta investigación interesada en la calidad de la formación de los maestros en Educación Ambiental, provea los incentivos y la información necesaria para que los individuos que toman decisiones en Venezuela mejoren el modelo de formación de maestros en Educación Ambiental de la UPEL.

PREFACE

This study is a response to many years of concern over the need for evaluating and improving the UPEL environmental education teacher training model. It was a great satisfaction to reach certain important conclusions and recommendations. However, there were also great frustrations in dealing with such little support from some of the Venezuelan institutions and individuals related to the research problem.

Nevertheless, it was a challenge to be presented with the opportunity to collaborate with the researcher's country, and particularly with the university where the researcher developed her professional career as an educator, in the task of overcoming the various obstacles. This thesis does not pretend to present all of the definitive answers for UPEL, but it can provide practical information which will serve to move it in the right direction.

The dissertation is organized according to ten chapters which are interrelated. It begins by laying out general guidelines for the understanding of the reader, including an outline of the objectives and scope of the study (Chapter I). Chapter II offers a summary of some critical research concepts arising in the study. Chapter III presents an exhaustive literature review of the most relevant sources related to environmental education, especially those related to the training of teachers in this field. Chapter IV presents the research methodology, including the research approach, methods and techniques. Chapter V presents the UNESCO

environmental education teacher training competencies model. Chapter VI presents environmental education in the context of the legal and institutional foundations of the teacher training programmes in Venezuela. Chapter VII presents the UPEL environmental education teacher training competencies model. Chapter VIII presents a comparison of the UNESCO and UPEL environmental education teacher training competency models. Chapter IX presents a study of the views of key Venezuelan individuals in relation to both the relevance of the UPEL model to Venezuelan environmental reality and the model's strengths, weaknesses and adjustments. Chapter X includes the major residual messages of this study; implications of these messages for environmental education teacher training programmes, particularly for the UPEL programme; and a set of recommendations. In addition to these ten chapters, a comprehensive bibliography of the most relevant and up-to-date sources associated with environmental education and teacher training is presented in this dissertation. This bibliography is a valuable resource for future researchers in this field, as well as for those who may wish to learn more about specific aspects of environmental education and teacher training which are mentioned in this study. Finally, this thesis includes supplementary appendices which provide significant data and information serving as support for the analysis and discussion of the research questions.

In summary, it can be said that this study is made in the spirit of improving the quality of teacher training in environmental education in Venezuela. Inherent in this statement is the demand for a model which reflects the country's problems and needs. Probably the most important aspect of this research is the desirability of greater concern for environmental values.

ACKNOWLEDGEMENTS

This research has been partially supported by the Universidad Pedagógica Experimental Libertador (UPEL). The author owes a special debt to professor Duilia Govea de Carpio, Dean of UPEL, and Adela de Liendo, director of the Instituto Pedagógico Siso Martínez, one of the UPEL institutes where the author has worked for many years. This research could not have been undertaken without their help.

I am also deeply grateful to Rubén Carpio Castillo, geographer, parliamentarian and always my friend and adviser, who got me started in all this enterprise.

Thanks also to the Ministry of External Affairs of Venezuela for supporting me in various ways during all these study years. I gratefully remember the strong support of his Excellency, Gilberto Carrasquero, Ambassador of Venezuela in Ottawa.

The author wishes to extend a special thanks to UNESCO, and especially its offices in Paris, for generosity in providing several documents required for this research. My special thanks to Orlando Hall, programme specialist in the section of environmental education. Similar gratitude is given to the UNESCO office staff in Ottawa.

The large number of key individuals and institutions who contributed to this research is such that it is simply not possible to name individually all those to whom gratitude is due. But their names appear in personal communications. The author thanks all of

them for their precious time and valuable information in making this research possible.

The author wishes to acknowledge the support of environmental education professors at the Institutos Pedagógicos de Caracas, Siso Martínez, Maturín, and Mejoramiento Profesional del Magisterio who answered the survey.

My special appreciation to Margarita García, major curriculum designer of the UPEL model, for her time and inestimable information.

The author thanks those UPEL students who answered the survey bringing invaluable information to this thesis. My students in the seminar of environmental education discussed with me the problems and needs of their communities for many hours. It was a useful experience for this study.

And of course without the inestimable contributions of my thesis advisors, Dr. Roger Needham and Dr. Peter Johnson, this work would not have been possible. In particular I wish to thank Dr. Needham for the hours of assistance and encouragement which he has given me throughout the course of my work. I have appreciated immensely his superior abilities in research techniques and the insight which he has brought to so many aspects of this thesis.

The author also extends her appreciation to professors Ruth Whitehead and Patrick Babin of the Department of Education at the University of Ottawa for their invaluable assistance.

Thanks also to Jan Haggart for her efficient help in preparation of the tables and to Sylvie Létang for her translation of the French portions of the thesis.

With loving thanks to my children, Ramsés and Lorena, for their support and understanding, which made it possible for me to do this work. Ramsés guided me through the pitfalls of a new computer system, without which this work simply would not have been done, and his work on the figures was critical.

Love and thanks to my mother, Sara, whose strong and loving spirit continues to be an active presence in my life. My sisters, Reina, Raquel, Irma and Luisa deserve special recognition because of their solid support in my stay in Canada as well as in Venezuela every time I needed to be there. Similar recognition to my nieces Carmen María and Sarilena.

Finally, my husband and companion, Ed Honeywell, has been patient and supportive throughout all the research and writing. He deserves credit for all the days and evenings he spent editing each portion of this thesis. He took away countless hours from his own busy and successful career for helping me to achieve this important goal.

My apologies to anyone I may have left out.

LIST OF ACRONYMS

. CBE	Competency Based Education
. CBTE	Competency Based Teacher Education
. CEEC	Competency in Environmental Education Content
. CICA/PNFD	Consejo Interinstitucional de Coordinación Académica del Programa Nacional de Formación Docente
. CNU	Consejo National de Universidades
. DEA	Dirección de Educación Ambiental
. EE	Environmental Education
. EEC(s)	Environmental Education Competency(ies)
. EEP	Environmental Education Programme
. EETT	Environmental Education Teacher Training
. EETTCs	Environmental Education Teacher Training Competencies
. EETTP	Environmental Education Teacher Training Programme
. FCPE	Foundational Competency in Environmental Education
. IEEP	International Environmental Education Programme
. MARNR	Ministerio del Ambiente y de los Recursos Naturales Renovables
. ME	Ministerio de Educación
. NEEP	National Environmental Education Programme
. PEC	Professional Education Competency
. TTI	Teacher Training Institutes
. TTP(s)	Teacher Training Programme(s)
. UNEP	United Nations Environmental Programme
. UNESCO	United Nations Educational, Scientific and Cultural Organization
. UPEL	Universidad Pedagógica Experimental Libertador

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CHAPTER I

INTRODUCTION

The role and importance of evaluation in education has been clearly demonstrated (Chinapah and Miron, 1990; Cronbach, 1977; Eisner, 1985; Franklin and Thrasher, 1979; Gottman and Classen, 1972; Hopkins, 1980; Popham, 1974; Sanders, 1985; Wolf, 1984; Worthen, 1985). In the era of sustainable development, environmental education (EE) is increasingly playing a more prominent role. Social critics of every stripe have recognized that the sustainable development challenge can only be addressed by increased investment in education - a process that ultimately establishes perception, attitudes, values and ethics. At the same time, this enhanced role for environmental education has called for revisions and "upgrades" in environmental science curricula. Wisely, additional attention by education observers, planners and researchers has been afforded a relatively new domain - the assessment of the training programmes producing future generations of environmental education teachers. These observers, planners and researchers in unison have asked: are the schools graduating teachers competent enough to provide the environmental education needed?

1.1 PURPOSE

The purpose of this research is to describe and analyze the environmental education teacher training competencies (EETTCs)¹ of Venezuelan teachers. The ultimate objective is to answer the following question: does the Venezuelan model² contain the elements of the international model for environmental education teacher training (EETT) outlined by the United Nations Educational, Scientific and Cultural Organization (UNESCO)? In other words, the Venezuelan model is to be compared and contrasted with the international model which has been designed as an international standard. In essence, this research is built upon a comparative-evaluative approach.

Complementary to the evaluation of the Venezuelan model is an analysis of its relevance to Venezuelan environmental reality. The opinions of Venezuelan environmental education participants as to the strengths, weaknesses, and adjustments needed to improve the Venezuelan environmental education teacher training programme (EETTP) are the basis of this analysis.

Evaluation of the Venezuelan model is guided and organized in terms of one primary question and two secondary questions. The primary question is: to what extent is the Venezuelan model congruent with the international model? Congruency is to be tested

¹ Because many of the acronyms are quite complex, entire definitions are repeated along with the acronyms.

² The term "Venezuelan model" is now used as a short form for Venezuelan EETTCs and EETTP. The terms "International model" or "UNESCO model" are also used as short forms for UNESCO EETTCs.

by analyzing the structure and content of competency training specified by both models. The secondary questions are: first, to what extent is the Venezuelan model relevant to the country's environmental reality? Relevance is to be determined by identifying the significant environmental problems and determining if the Venezuelan model provides the knowledge and professional training to meet the challenge. Second, what are the Venezuelan model's strengths, weaknesses and points of adjustment or improvement? Strengths, weaknesses and adjustments are to be determined by describing and analyzing information provided by individuals involved in the Venezuelan environmental education teacher training programme. Answers to these questions will provide guidance for a set of recommendations needed to improve the Venezuelan model.

1.2 CENTRAL POSITION

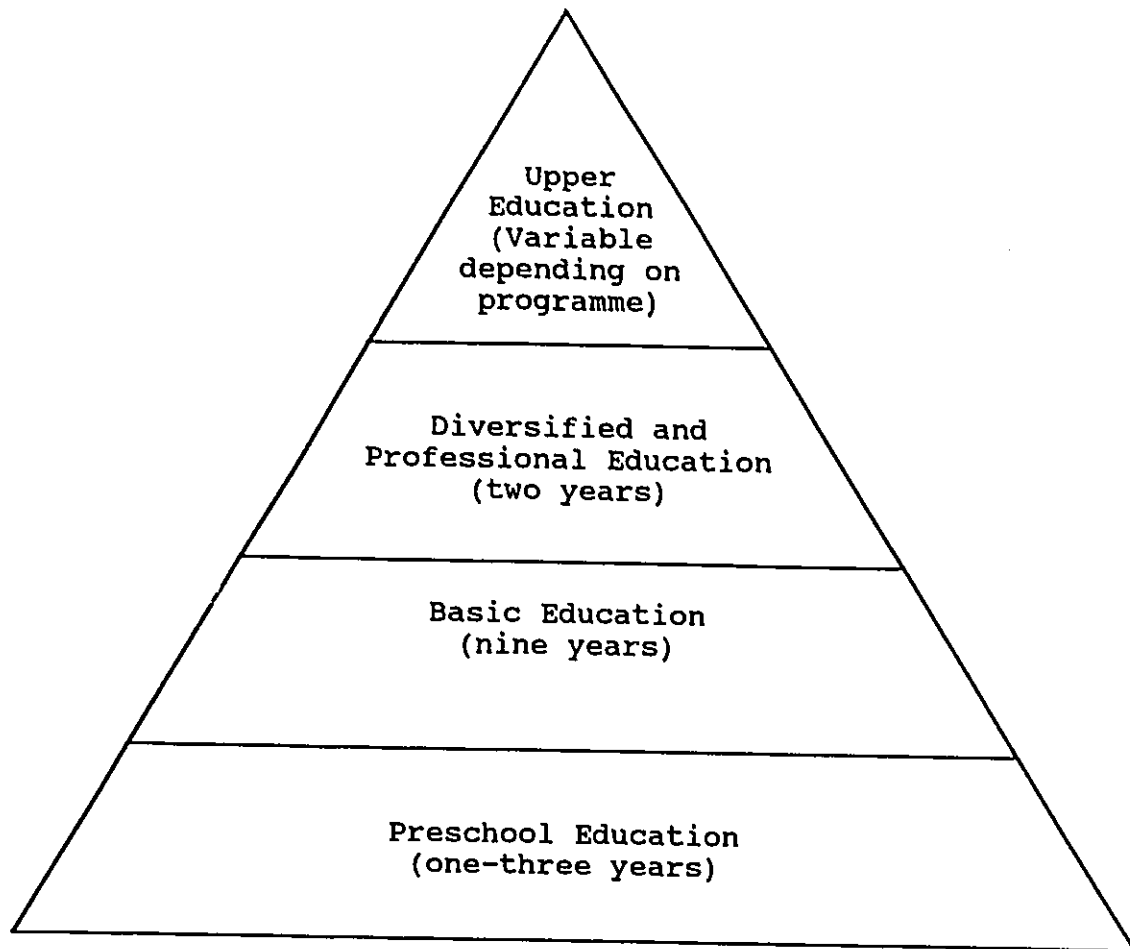
The central position taken is that the Venezuelan model can be significantly improved to a standard above that which can be realized by both the UNESCO and existing Venezuelan models. This heightened or elevated standard is achievable through improvements to the competency training of new teacher candidates. If teachers do not have the necessary knowledge, attitudes and skills to teach environmentally related curricula, then they are not prepared to contribute to the development of environmentally literate students (Blum and Hungerford, 1976; Buethe and Smallwood 1987; Byran, 1990; Lucko et al, 1982; Rakow, 1985; Stapp et al, 1980/81; UNESCO, 1977

(a,b,c), 1980; UNESCO-UNEP-IEEP, 1987). Competent teachers are prerequisites to successful implementation of environmental education. The task is to develop a set of competencies that are needed for environmental educators - ones that will eventually provide a minimum level of expertise. However, the challenge is to decide what competencies should be included in the teacher training programme (TTP). In this context, the UNESCO model can serve as a general guideline in the establishment of environmental education competencies (EECs) in teacher training programmes (Wilke, 1985).

Such an analysis of "competencies" is both timely and urgently needed as Venezuela has been putting into practice since 1985 a national environmental education programme (NEEP). This programme embraces each level of the Venezuelan education system: preschool, basic, diversified and professional, and upper education (Figure 1.1).

The implementation of a national environmental education programme in Venezuela demanded a teacher training programme in environmental education. The Universidad Pedagógica Experimental Libertador (UPEL), which has the responsibility for educating teachers in Venezuela, included a compulsory environmental education course in its curriculum in 1985. Unfortunately, no evaluation of this course has been done, and no one knows whether teachers in Venezuela are acquiring the necessary knowledge, skills and attitudes for teaching environmental education (García, 1992, Personal Communication; Lima, 1991, Personal Communication; Marín, 1991, Personal Communication; Tovar, 1990, Personal Communication).

Figure 1.1 Levels of the Venezuelan Education System



Source: Adapted from Congreso de la Republica de Venezuela, 1980.

Therefore, there now appears to be a window of opportunity available to analyze and evaluate the Venezuelan or Universidad Pedagógica Experimental Libertador model³, and to assess its competencies and its relevance to Venezuelan environmental reality.

1.3 PROBLEM CONTEXT

1.3.1 The International Situation in the Realm of Environmental Education

International interest in environmental education started in the late 1960s and early 1970s when most industrially developed countries became deeply concerned about environmental problems (Sandbach, 1980). A worldwide concern about development and its impact on the environment and quality of life, was the major reason for holding the United Nations Conference on The Human Environment in Stockholm, June, 1972. At this conference the international community emphasized the role of education in preventing and solving world environmental problems. Recommendation Number 96 exhorted United Nations' organizations to adopt the necessary measures to establish an international programme of environmental education (UNESCO, 1980). As a consequence, UNESCO and the United Nations Environmental Programme (UNEP) launched the International Environmental Education Programme in 1975. It was initially aimed towards the promotion and encouragement of environmental education among UNESCO member states.

³ The terms "Venezuelan model" and "UPEL model" refer to the same model or programme.

A preliminary task undertaken by the international environmental education programme was to lay down a general framework of ideas and guidelines related to international environmental education needs and priorities. For this purpose, UNESCO and UNEP carried out an international survey in 1975, as well as a 1976 International Workshop on Environmental Education in Belgrade, and regional and subregional meetings in Africa, the Arab States, Asia, Europe, and Latin America during the 1976-77 period. The result of these activities was the recognition by member states of the need for education and training in environmental education (UNESCO, 1977 (b); 1980; UNESCO-UNEP-IEEP, 1977).

One of the most important activities of the international environmental education programme was the convocation of the **First Intergovernmental Conference on Environmental Education held in Tbilisi, USSR, in October 1977**. Two hundred and sixty-five delegates from 66 UNESCO member states and 65 representatives and observers took part in the conference (UNESCO, 1980).

The declaration and recommendations of the Tbilisi conference made it possible to define the nature, aims, objectives and pedagogical principles of environmental education and to establish broad guidelines for action in this field at the national and international levels (UNESCO, 1980, 1978). More specifically, environmental education was considered an essential component in comprehensive lifelong education and the environment was seen as "an integrated whole", simultaneously comprising natural aspects

and those that result from human action (Brennan M, 1988, 1986, 1974; Schmieder, 1977; UNESCO, 1980). Since Tbilisi, environmental education has become a means to facilitate interdisciplinary approaches to environmental problem solutions and the active and responsible involvement of each individual and community (Hall W, 1977; Hass, 1987; Jakouska, 1987; Wals et al, 1990). In this context, environmental education should be an integral part of the entire educational process aimed at every category of the population (Stapp, 1979; UNESCO, 1980). Emphasis has been placed in the literature on the development of an integrated global environmental ethic, the awareness and understanding of basic ecological concepts, and the development of cognitive, affective and skill-behaviour processes (Hungerford and Volk, 1990; Hungerford et al, 1980; Knapp, 1983; Lucko et al, 1982; Selim, 1977; UNESCO, 1980).

1.3.2 The International Situation in the Realm of Teacher Training

Environmental education programme (EEP) delivery and proper use of teaching materials depend on trained personnel as regards to both the content and the methods specific to this form of education (UNESCO, 1977 (b); UNESCO-UNEP-IEEP, 1987). The possibilities of integrating environmental education into formal and non-formal education programmes, as well as the implementation of such programmes, depend essentially on the training of the personnel responsible for putting the programmes into effect (UNESCO-UNEP-IEEP, 1987, 1977; Wilke, 1985). However, a survey of

international environmental education needs and priorities for UNESCO member states has revealed important deficiencies in teacher training programmes (UNESCO, 1977; UNESCO-UNEP-IEEP, 1990). According to this survey, most training programmes suffer from a bias towards disciplinary approaches. This condition tends to lay emphasis on specialization and to encourage too narrow a perception of reality. The existing teacher training programmes do not take into account modern educational ideas based on participation, research and experimentation in methods of evaluation which are indispensable elements of learning-centred education. As a result, most teachers and activity organizers are unfamiliar with interdisciplinary techniques geared toward actual problem solving, the evaluation of responses to real situations or problems and team-work (UNESCO, 1980).

Therefore, in the context of this reality the need for teacher training in environmental education was expressed by experts at the regional meetings during 1976 and 1977. At these meetings, teacher training was seen as one of the most fundamental aspects of environmental education (UNESCO, 1980, 1977 (b,c); Wilke et al, 1981). At the Arab States Regional Meeting held in Kuwait, November, 1976, the principal need for the further development of environmental education was seen as the training of teachers and leaders, and recommendations were made to urge the strengthening of existing training programmes and the creation of new programmes (UNESCO, 1977 (b,c); Wilke, 1981).

The first Intergovernmental Conference on Environmental Education in Tbilisi, 1977, was the most important event where the need for teacher training in environmental education was recognized. This conference established the training of qualified personnel as a priority for both pre-service (novice training) and in-service (retraining and enrichment) training of teachers (UNESCO, 1978). Training in environmental education should be developed both during the teacher training period and during the teacher's professional career. As a consequence, the UNESCO member states emphasized the establishment of a national action programme which would familiarize teachers, educational administrators and planners with different aspects and problems of the environment (UNESCO, 1978). According to this conference report, action should take the form of both pre-service and in-service training of teachers.

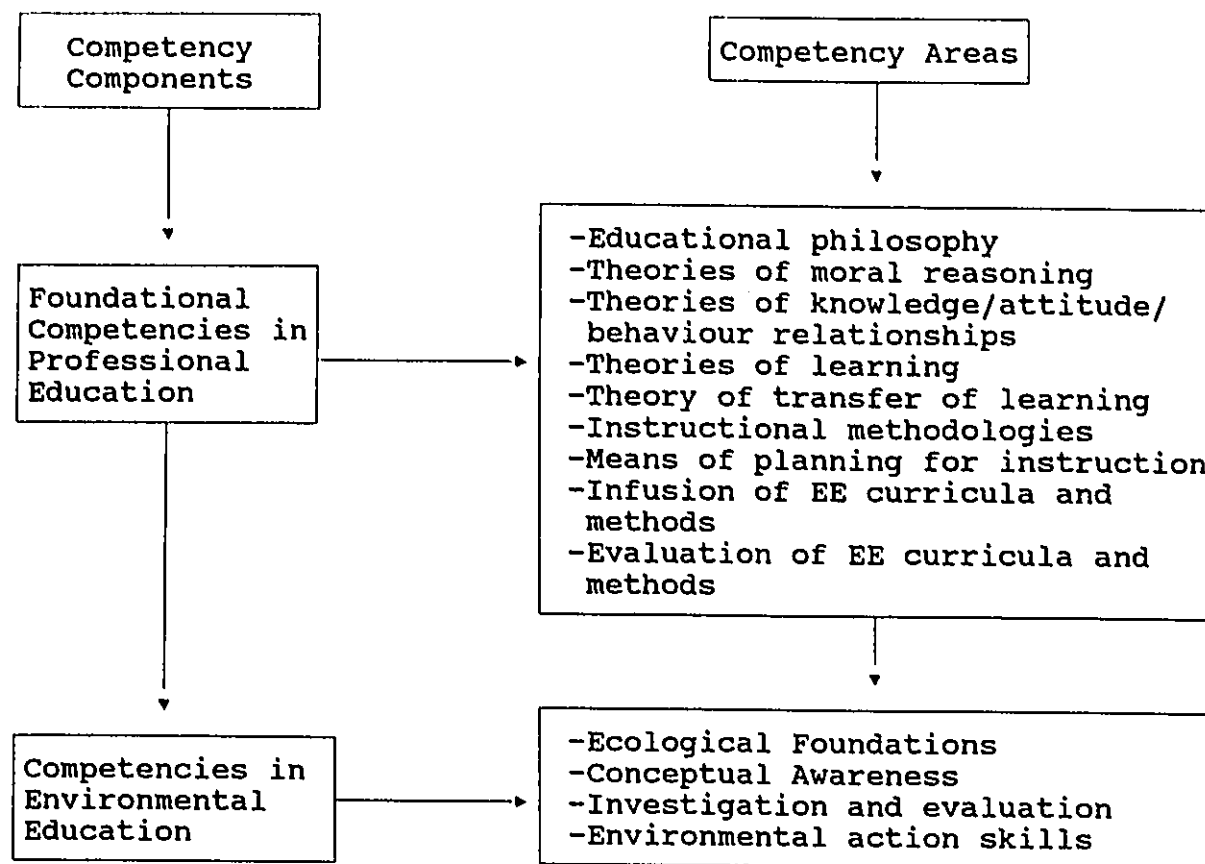
Since the Tbilisi conference, efforts have been made towards the establishment of teacher training policies, as well as towards the development and implementation of teacher training programmes. The International Conference on Training and the Environment (Moscow, 1987) ratified the need for environmental education teacher training programmes. It reviewed progress and trends in this field and produced an international strategy for environmental education and training during the 1990s (UNESCO-UNEP-IEEP, 1987). Teacher training was once again considered a key factor in the development of environmental education. The implementation of environmental education programmes was seen to depend on

appropriately trained personnel - the teachers. The term "appropriately trained" refers to a standard of competencies, both professional and in content, necessary to provide this specific form of education (Combs et al, 1974; Cruickshank, 1984; Houston, 1985; Pearson, 1989; Reushaw, 1971).

Additional progress in this domain has reasoned that the initial steps in the development of a teacher training programme must include a definition of the teacher product. The most functional way to define the product is the approach known as **Competency Based Teacher Education**. This approach is associated with knowledge, attitudes, behaviour and skills that make teachers competent for assuming their professional roles (Andrews, 1973; De Vault, 1974; Gay and Daniel, 1973; Houston, 1974, 1985; La Grone and Wall, 1974; Nash, 1973; Pratt, 1975; Thomas and Kay, 1974). Competent teaching is a component of general, professional and speciality education; as well as practical experience (Burdin, 1975; Cruickshank, 1984; De Landsheere, 1985; Friedman et al, 1980; Haberman and Stinnett, 1973; Pearson, 1989; Peters, 1977; Reushaw, 1971).

In the development of environmental education teacher training programmes, a general competencies model has been proposed by UNESCO/IEEP (1980) (Figure 1.2). It embraces two distinct competency categories: Foundational Competencies in Professional Education (FCPE) and Competencies in Environmental Education Content (CEEC). Each competency category includes elements or

Figure 1.2 Environmental Education Teacher Training Competencies Model of UNESCO



Source: Adapted from Wilke, Point, Peyton and Hungerford 1980.

themes which better prepare teachers for their careers as environmental education practitioners, not just as teachers.

1.3.3 The Venezuelan Situation

As a consequence of the Stockholm and Tbilisi conferences, Venezuela initiated its national environmental education programme with the sanctioning of the Environmental Act in 1976 and the creation of the Ministerio del Ambiente y de los Recursos Naturales Renovables (MARNR) in 1977. The objective of this initiative was to establish an integrated development policy and a set of guiding principles for the conservation, defence, and improvement of the environment and quality of life. This objective involves the development of a public environmental conscience, as well as the orientation of educational and cultural processes (Congreso de la República de Venezuela, 1976 (b), 1977). Therefore, the Education Act (1980) states that national education must promote the development of a citizen conscience in order to conserve, defend and improve the environment, quality of life and rational use of natural resources (Congreso de la República de Venezuela, 1980). In order to achieve these goals, a national environmental education office and municipal boards for conservation, defence and improvement of the environment were created (Congreso de la República de Venezuela, 1977; Brito, 1990). These municipal boards are accountable to the Ministry of the Environment⁴. The

⁴ The terms "MARNR" and "Ministry of Environment" refer to the same ministry.

Environmental Education and Citizen Participation Programme (1977) constituted the first environmental education programme in Venezuela which included both formal and non-formal education (MARNR-DEA, 1977).

The insertion of environmental education into the Venezuelan education system demanded coordinated work between both the national Ministry of the Environment and the Ministry of Education (ME). Therefore, in May, 1978, an inter-ministerial commission for the elaboration of a national inventory relating to environmental education activities was established. This institutional arrangement considered the analysis of school curricula as well as the elaboration of an environmental education technical framework. The complexity of the process and the lack of criteria made the work of this commission difficult and it did not produce any positive results (Brito, 1990). The period between 1977 and 1979 is considered one of innovation and experimentation in environmental education matters. From this period forward, the foundations for future environmental education actions were established.

In 1980 a new inter-ministerial agreement was signed by the Education and Environment ministries. A commitment was made to insert environmental education into the Venezuelan education system. Since then the Ministry of Education and the Ministry of the Environment have coordinated work in order to structure an environmental education programme which adapts the UNESCO international environmental education guidelines to the unique

national and local situations of Venezuela (Brito, 1990; MARNR-DEA, 1987). As a result of these joint efforts, Venezuela now has a national environmental education programme which embraces both the non-formal and formal education sectors.

Environmental education in the non-formal education sector constitutes an integral and permanent process aimed at the general population outside of the education system. Its goal is to improve public awareness of environmental problems and their solutions. It has as a major objective the integration of environmental content and activity into all programmes designed and administered by the Ministry of Education and universities. It also embraces the training of human resources, the elaboration of instructional materials, and the basic organization of the educational community in order to procure its participation in environmental conservation, defence, and improvement activities.

Environmental education in formal education, on the other hand, comprises each education level - preschool, basic, diversified and professional, and upper education (Brito, 1990; ME, 1989; Parilli, 1988) (Figure 1.1). The inclusion of environmental education in this education system was possible because of new educational reforms which occurred in 1980. Preschool education was established as a compulsory education level. The primary school of six years was replaced by a compulsory basic school of nine years. The secondary school of five years was converted to a diversified and professional education level of two years. The major aim of these reforms was the creation of integrated education for students

through the development of skills and scientific, technical, humanistic, and educational capacities (Congreso de la República de Venezuela, 1980). Environmental education was considered part of this integrated education process designed to mould its participants.

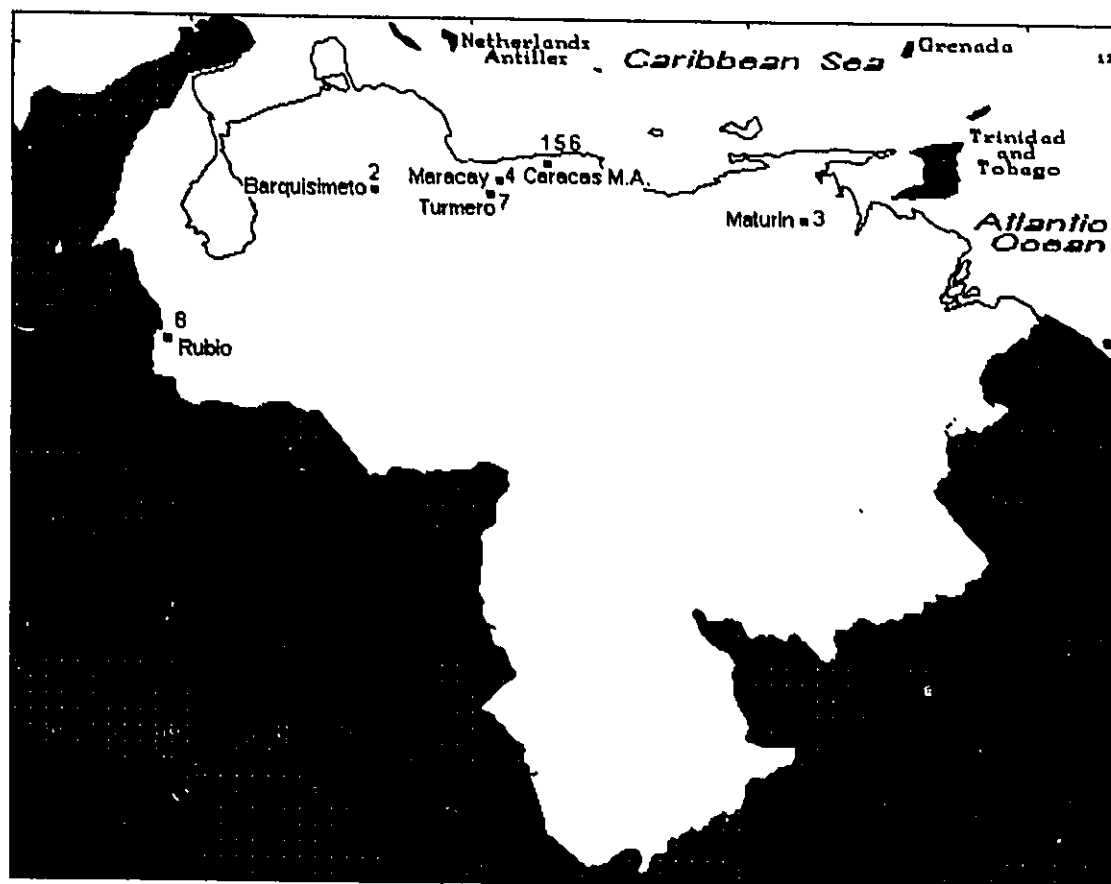
The demand for an integrated education system required the training of teachers who could meet this challenge. Therefore, the Universidad Pedagógica Experimental Libertador (UPEL) - leader in teacher training in Venezuela, adjusted its curricula to these new needs.

UPEL, a national teacher training university, is a collection of eight teacher training institutes (TTI) (Figure 1.3). They are: Caracas; Barquisimeto; Maturín; Rafael Alberto Escolar Lara; José Manuel Siso Martínez; Institute for the Professional Improvement of the Teacher; El Mácaro for Rural Education; and Gervasio Rubio for Rural Education. Further, the Institute for the Professional Improvement of the Teacher has a national network of academic and extension branches (UPEL, 1991).

The strategy adopted by UPEL is a compulsory environmental education course for each training institute in its system. Every teacher candidate must complete this course programme before graduation. The course has three academic credits and is included in the general education teacher training stream. Until this moment, it has been assumed that this investment would produce well-rounded and well-prepared environmental education teachers.

Figure 1.3 Teacher Training Institutes of UPEL

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1. Caracas TTI. Caracas Metropolitan Area (M.A.), Distrito Federal
2. Barquisimeto TTI. Barquisimeto, Estado Lara
3. Maturín TTI. Maturín, Estado Monagas
4. Rafael Alberto Escobar Lara TTI. Maracay, Estado Aragua
5. Jose Manuel Siso Martinez TTI. Caracas M.A., Estado Miranda
6. Institute for the Professional Improvement of Teachers. Caracas M.A.
7. El Macaro TTI for Rural Education. Turmero, Estado Aragua
8. Gervasio Rubio TTI for Rural Education. Rubio, Estado Tachira

Source: Adapted with modifications from UPEL, 1991

1.4 THESIS DEVELOPMENT

This thesis is organized according to ten major chapters. These chapters, though interrelated, reflect different purposes and objectives. Thesis development, therefore, evolves as follows:

- . Chapter 2. Critical Research Concepts;
- . Chapter 3. Literature Review in the Realm of Environmental Education Teacher Training Programmes;
- . Chapter 4. Research Methodology;
- . Chapter 5. The UNESCO Environmental Education Teacher Training Competencies Model;
- . Chapter 6. The Institutional Foundations of the Teacher Training Programme in Venezuela;
- . Chapter 7. The UPEL Environmental Education Teacher Training Competencies Model;
- . Chapter 8. A Comparison of the UNESCO and UPEL Environmental Education Teacher Training Competencies Models;
- . Chapter 9. The UPEL Model as Perceived by Key Venezuelan Individuals;
- . Chapter 10. Concluding Remarks and Messages.

CHAPTER II

CRITICAL RESEARCH CONCEPTS

2.1 PURPOSE

The purpose of this chapter is to define more fully and precisely two basic and two companion concepts related to environmental education teacher training competencies. The basic concepts are Competency Based Education (CBE) and Competency Based Teacher Education (CBTE). The companion concepts are Professional Education Competency (PEC) and Environmental Education Competency (EEC).

2.2 Competency Based Education.

Competency Based or Performance Based Education is education derived from the specification, learning and demonstration of the knowledge, skills, behaviour and attitudes required for a given role, profession or career (Gay, 1987; Hall and Jones, 1976; Houston, 1974, 1985; Joyce, 1974; Klingstedt, 1973; McDonald, 1974). This role is expressed in terms of a set of interrelated competencies (Joyce, 1974). One of the first steps in the elaboration of educational programmes is the identification and comprehensive delineation of those competencies needed to successfully master a profession or trade (Hall and Jones, 1976; Mehne and Davis, 1979/80; Thomas and Kay, 1974). They should describe the desired outcomes as specifically and clearly as

possible (McDonald, 1974). In this context, problems of ambiguity should be avoided. Expected outcomes expressed in the competencies should be communicated in such a manner as to facilitate the observation that the stated purpose of a lesson has in fact been accomplished (Gagne et al, 1988).

Eight information sources are proposed in the literature as offering the guidance from which competency equations can be identified. They include referral to existing lists of tested competencies; course analysis and translations into competency guidelines; course analysis and translations with safeguards related to practitioner feedback; taxonomic analysis of competencies; input from the professions and trades; theoretical constructs; input from clients, including pupils and the community; and task analysis (Table 2.1). In this context, taxonomic analysis is one of the most frequently used sources for the specification of competencies. In the context of this dissertation, taxonomic analysis is employed in evaluating and comparing environmental education competencies of both the UNESCO and Venezuelan models. Bloom's taxonomy offers understandable guidelines for this evaluation. It has been used successfully by curriculum designers and evaluators throughout the world (De Landsheere, 1985). It involves three taxonomic domains: the cognitive, the affective, and the psychomotor (Bloom, 1969; Edwards et al, 1977; Hall and Jones, 1976; Houston, 1974) (Figure 2.1).

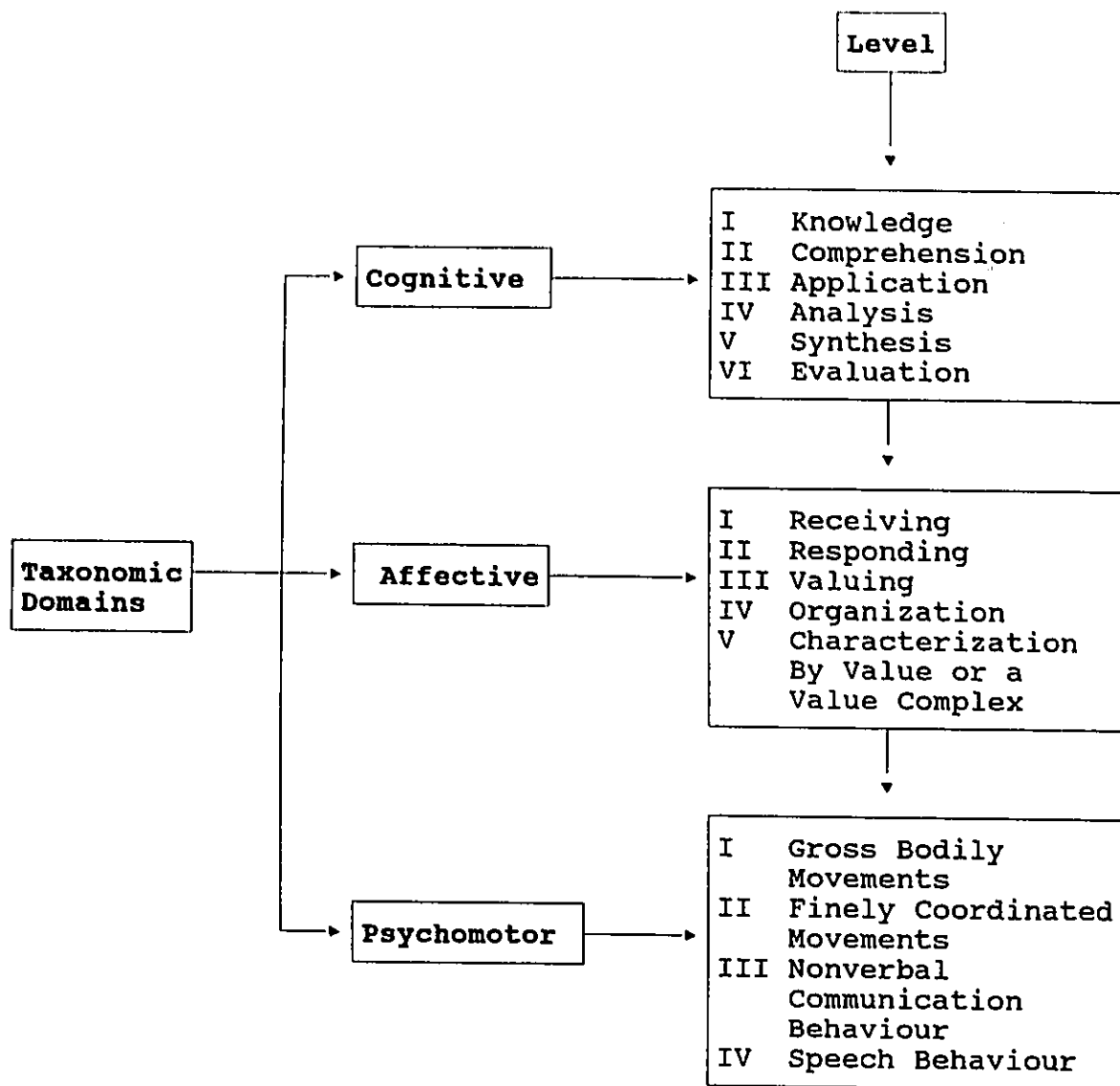
According to Bloom (1969) the **cognitive domain** concerns itself with the recall or recognition of knowledge and the development of

TABLE 2.1 Information Sources Related to the of Identification of Competencies

SOURCES	DESCRIPTIONS
Existing Lists	Lists of spelled-out objectives and competencies are identified in many curriculum textbooks. Before accepting published competencies and objectives they must be compared with the planners' own assumptions. It is also recommended to search for and investigate the assumptions of the programme for which the listed objectives or competencies were originally intended.
Course Translations	The present curriculum is a source of competencies and objectives for a CBE programme. Planning for competency based programmes should include a re-examination of the goals and assumptions of existing programmes. Course content is operationalized into goals, competencies and sub-competencies, and finally, objectives and skills.
Course Translations with Safeguards	The course translation process can increase its value if (1) instructors specify projections of ideal competencies and objectives in addition to their existing course competencies and objectives; and (2) each faculty member rates, through some technique, the objectives and competencies submitted by other faculty members.
Taxonomic Analysis	This source focuses on a taxonomy of competencies. The taxonomy proposed by Bloom (1969) includes cognitive, affective and psychomotor competencies.
Input from the Profession	Membership of the affected profession is a source of input for CBE programmes. Programme planners should ask teachers (1) information on the kinds of objectives and competencies that practitioners wish they had at the beginning of their professional experience, (2) information on the needs of practising professionals as they see them, and (3) information on projections for the future of the profession.
Theoretical Constructs	In this area a theoretical position is assumed by programme builders, and competencies can then be specified from the theory.
Input from Clients, Including Pupils and the Community	Input from clients allows decision makers to obtain another perspective on professional competence. It assumes that a direct relationship can be derived between the needs of pupils, subsequent teacher actions, and teaching competencies.
Task Analysis	Specification of the job and hence the performance required of the functionary by doing a task analysis of what is required to get the job done

SOURCE: Adapted from Hall and Jones, 1978

Figure 2.1 Taxonomic Domains and their Skill Levels



Source: Adapted with modifications from Bloom, 1969.

intellectual abilities and skills. The **affective domain** concerns itself with the changes in interests, attitudes and values, and development of appreciations and adequate adjustments. The **psychomotor domain** concerns itself with manipulative and motor-skills and is, therefore, not particularly relevant to the research problem at hand.

The cognitive and affective domains have a hierarchical taxonomy or classification which is developed on the basis of educational objectives. Competency based teacher education, with its emphasis on clear and concise objectives, is a powerful vehicle for facilitating and assessing the effectiveness of teacher training programmes (Burns, 1973; Houston et al, 1974; Quirk, 1974; Shavelson, 1985). Table 2.2 shows the conceptualization of skill levels by competency domain. The **cognitive domain**, as indicated earlier, is related to the acquisition of knowledge or information. Its taxonomy is composed of six major classes that have been accepted by education planners: knowledge, comprehension, application, analysis, synthesis and evaluation. They are arranged in a hierarchy, with knowledge being the lowest and evaluation skill the highest in rank order.

Knowledge includes situations and conditions in which the student is expected to remember, memorize, and recall information he/she has previously seen, been exposed to, or has learned. **Comprehension** is the ability to know the meaning of material or ideas and make some use of the knowledge. This skill is associated with translation, interpretation and extrapolation. **Application**

TABLE 2.2 Conceptualization of Skill Levels of Cognitive and Affective Domains

Competency Domains	Skill Levels
Cognitive	1. Knowledge includes situations and conditions which the student is expected to remember, and memorization and recall of information which he/she has previously seen, learned or been exposed to. 2. Comprehension is the ability to know the meaning of material or ideas and to make some use of the knowledge. This is involved primarily with three forms of behaviour: translation, interpretation and extrapolation. Translation means changing material from one form to another. Interpretation goes beyond translation in that it takes a much broader view possibly requiring a generalization based on the changes that were discovered. It includes gleaning the more essential data from certain material. Extrapolation not only states what something means but also the possible consequences of what is learned. 3. Application refers to using material (that is learned or comprehended) in new and different situations. 4. Analysis involves breaking down material into its component parts and finding the relationships among them. 5. Synthesis is the ability to put known parts, principles, etc., together to make a new entity or a new whole. 6. Evaluation includes making judgments about the value of material for a given purpose according to specific criteria.
Affective	1. Receiving (Reception) is the level at which the student is provided with certain phenomena or stimuli and he/she shows his/her awareness or consciousness of actively receiving information by making appropriate responses. 2. Responding (Reaction) is that point when the student is not just attending to a situation but instead is acting out a particular value. At this level he/she reacts and actively participates in accordance with that particular value. 3. Valuing (Valuation) level occurs when the student, through a slow internalization process, has attached some particular worth to an object, an interest, or some other phenomenon. Further, the student must display this on a consistent enough basis so that it becomes the student's belief or attitude. He/she must show a commitment to something. 4. Organization. Students are faced with successive values and acceptance or rejection of them; they face situations in which more than one value is encountered. They are then required to organize various values into a value system, find the relationships of values to each other, and finally decide which are the most important. 5. Characterization by a value or value complex. This involves an individual with a value or value system which has controlled his/her behaviour for a long period of time. He/she is recognized and characterized by this value complex. He/she can thus be expected to react in a certain way as a result of it.

SOURCE: Adapted from Bloom, 1969

refers to using material in new and different situations. **Analysis** involves breaking down material into its component parts and finding the relationships amongst them. **Synthesis** involves the breaking down of materials into their component parts and the ability to put known parts, principles, etc., together to make a new entity or new whole. **Evaluation** includes making judgments about the value of material for a given purpose according to specific criteria.

The affective domain, as indicated previously, is made up of attitudes, interests, appreciation, and values. It has a hierarchical structure with five levels: receiving (reception), responding (reaction), valuing (valuation), organization and characterization by a value or a value complex.

Receiving (reception) provides the student with certain phenomena or stimuli and he/she shows awareness or consciousness of actively receiving information by making appropriate responses. **Responding** (reaction) is acting out a particular value. At this level, reacting and active participation are in accordance with that particular value. **Valuing** (valuation) is the attachment of some particular worth to an object, an interest, or some other phenomenon through a slow internalization process. It must be displayed on a consistent enough basis so that it becomes a belief or attitude. It must show a commitment to something. **Organization** is related to the facing of successive values and acceptance or rejection of them. It faces situations in which more than one value is encountered. It then allows the organization of various values

into a value system, finding the relationships of values, and finally deciding which are the more important. **Characterization by a Value or Value Complex** is illustrated by an individual with a value or value system which has controlled his/her behaviour for a long period of time. The individual is recognized and characterized by this value complex so that he/she can thus be expected to react in a certain way as a result of it.

In order to facilitate the formulation of statements of objectives or competencies within the framework of Bloom's taxonomy (1969), several authors provide frameworks around which behavioral statements of objectives or competencies can be formulated (Bernabei and Leles, 1970; Burns, 1972; Kibler et al, 1971). In this context, Tables 2.3 and 2.4 present the taxonomic instrumentation of cognitive and affective domains relevant to this research. Each taxonomic classification is associated with a set of appropriate infinitive articles that more precisely identify the behaviour or activity desired and a set of general terms relative to the subject matter and its properties. This instrumentation is employed in comparing competencies of both UNESCO and Venezuelan models.

2.3 COMPETENCY BASED TEACHER EDUCATION (CBTE)

Competency based education has proven to be an effective approach in programmes of teacher training (Gagne and Winne, 1975; Joyce, 1974; La Grone and Wall, 1974; McDonald, 1974). A teacher training programme is effective if it produces teachers with

TABLE 2.3 Taxonomic Instrumentation of the Cognitive Domain

Taxonomy Classification		Examples of Infinitives
1	Knowledge	
1.1	Knowledge of Specifics	
1.1.1	Knowledge of Terminology	to define, to distinguish, to acquire, to identify, to recall, to identify
1.1.2	Knowledge of Specific Facts	to recall, to recognize, to acquire, to identify
1.2	Knowledge of Ways and Means of Dealing with Specifics	
1.2.1	Knowledge of Conventions	to recall, to identify, to recognize, to acquire
1.2.2	Knowledge of Trends, Sequences	to recall, to recognize, to acquire, to identify
1.2.3	Knowledge of Classifications and Categories	to recall, to recognize, to acquire, to identify
1.2.4	Knowledge of Criteria	to recall, to recognize, to acquire, to identify
1.2.5	Knowledge of Methodology	to recall, to recognize, to acquire, to identify
1.3	Knowledge of the Universals and Abstractions in a Field	
1.3.1	Knowledge of Principles, Generalizations	to recall, to recognize, to acquire, to identify
1.3.2	Knowledge of Theories and Structures	to recall, to recognize, to acquire, to identify
2	Comprehension	
2.1	Translation	to translate, to transform, to give in own words, to illustrate, to prepare, to read, to represent, to change, to rephrase, to restate
2.2	Interpretation	to interpret, to reorder, to rearrange, to differentiate, to distinguish, to make, to draw, to explain, to demonstrate
2.3	Extrapolation	to estimate, to infer, to conclude, to predict, to differentiate, to determine, to extend, to interpolate, to extrapolate, to fill in, to draw
3	Application	
		to apply, to generalize, to relate, to choose, to develop, to organize, to use, to employ, to transfer, to restructure, to classify
4	Analysis	
4.1	Analysis of Elements	to distinguish, to detect, to identify, to discriminate, to recognize, to categorize, to deduce
4.2	Analysis of Relationships	to analyze, to contrast, to compare, to distinguish, to deduce
4.3	Analysis of Organizational Principles	to analyze, to distinguish, to detect, to deduce
5	Synthesis	
5.1	Production of a Unique Communication	to write, to tell, to relate, to produce, to constitute, to transmit, to originate, to modify, to document
5.2	Production of a Plan, or Proposed Set of Operations	to propose, to plan, to produce, to design, to modify, to specify
5.3	Derivation of a Set of Abstract Relations	to produce, to derive, to develop, to combine, to organize, to synthesize, to classify, to deduce, to develop, to formulate, to modify
6	Evaluation	
6.1	Judgments in Terms of Internal Evidence	to judge, to argue, to validate, to assess, to decide
6.2	Judgments in Terms of External Criteria	to judge, to argue, to consider, to compare, to contrast, to standardize, to appraise

SOURCE: Adapted with modification from Kibler, Barker and Miles, 1971

TABLE 2.4 Taxonomic Instrumentation of the Affective Domain

Taxonomy Classification		Examples of Infinitives
1	Receiving (Reception)	
1.1	Awareness	to differentiate, to separate, to set apart, to share
1.2	Willingness to Receive	to accumulate, to select, to combine, to accept
1.3	Controlled or Selected Attention	to select, to respond to, to listen (for), to control
2	Responding (Reaction)	
2.1	Acquiescence in Responding	to comply (with), to follow, to commend, to approve
2.2	Willingness to Respond	to volunteer, to discuss, to practice, to play
2.3	Satisfaction in Response	to applaud, to acclaim, to spend leisure time in, to augment
3	Valuing (Valuation)	
3.1	Acceptance of a Value	to increase measured proficiency in, to increase numbers of, to relinquish, to specify
3.2	Preference for a Value	to assist, to subsidize, to help, to support
3.3	Commitment	to deny, to protest, to debate, to argue
4	Organization	
4.1	Conceptualization of a Value	to discuss, to theorize (on), to abstract, to compare
4.2	Organization of a Value System	to balance, to organize, to define, to formulate
5	Characterization by Value or Value Complex	
5.1	Generalized Set	to revise, to change, to complete, to require
5.2	Characterization	to be rated highly by peers in, to be rated highly by superiors in, to be rated highly by subordinates in, and to avoid, to manage, to resolve, to resist

SOURCE: Adapted with modification from Kibler, Barker and Miles, 1969

certain desired characteristics. In this context, **Competency Based Teacher Education** is defined as a programme designed specifically and explicitly to provide prospective teachers with learning experiences which help prepare them to assume agreed upon teaching roles. (Gage and Winni, 1975; McDonald, 1974; Tarr, 1974; Weber, 1974; Wollin, 1974). A teacher training programme is successfully completed when candidates can demonstrate that they are competent to assume the role for which they have been prepared. This demands the organization of what is to be learned into interdependent components and the precise specification of what is to be learned (McDonald, 1974). In the case of this particular research, two competency components are identified: professional education and environmental education. They are associated with specific subject matter or content.

2.4 PROFESSIONAL EDUCATION COMPETENCY

Professional education competency is related to a set of educational theories, methods, techniques and technologies that teachers require in order to perform the environmental education teaching-learning process (Combs, 1974; Cruickshank, 1984; McDaniel, 1982; Pearson, 1989).

2.5 ENVIRONMENTAL EDUCATION COMPETENCY

Environmental education competency is defined as a systematic process in which teacher candidates gain the environmental knowledge, skills, behaviour, and attitudes, required to educate

responsible and active citizens who are knowledgeable about the biophysical and socio-cultural environment and its associated problems; aware of the means to help these problems; and motivated to work towards their solution (Rubba and Wiesenmayer, 1988; Schaefer et al, 1979; Stapp et al, 1980/81).

This research has reached a critical stage. It is now time to set these concepts into a literature review which reveals their evolution and denotes their importance.

CHAPTER III

LITERATURE REVIEW IN THE REALM OF ENVIRONMENTAL EDUCATION TEACHER TRAINING PROGRAMMES

3.1 PURPOSE

The literature review is purposeful, organized and evolves from a general discussion and definition of key concepts to a more specific evaluation of select academic and scientific opinion (Figure 3.1 and Table 3.1). In this review, six dominant themes are shown to be strongly linked. They are: environmental education, the state of environmental education, teacher training of environmental education, competency based teacher training, the Venezuelan experience, and the UNESCO and Venezuelan teacher training models. Attention is focused on those concerns addressed by academics, environmentalists, educators, politicians and others working in domains associated with the environment, education and environmental education.

3.2 ENVIRONMENTAL EDUCATION

The environmental education concept can best be understood by examining its key elements (Figure 3.2). These key elements, taken together, represent an integrated framework. This framework is dominated by environmental education definitions, goals and objectives, guiding principles, target populations, content, instructional methodologies, instructional resources, and

Figure 3.1 Organizational Structure of the Literature Review

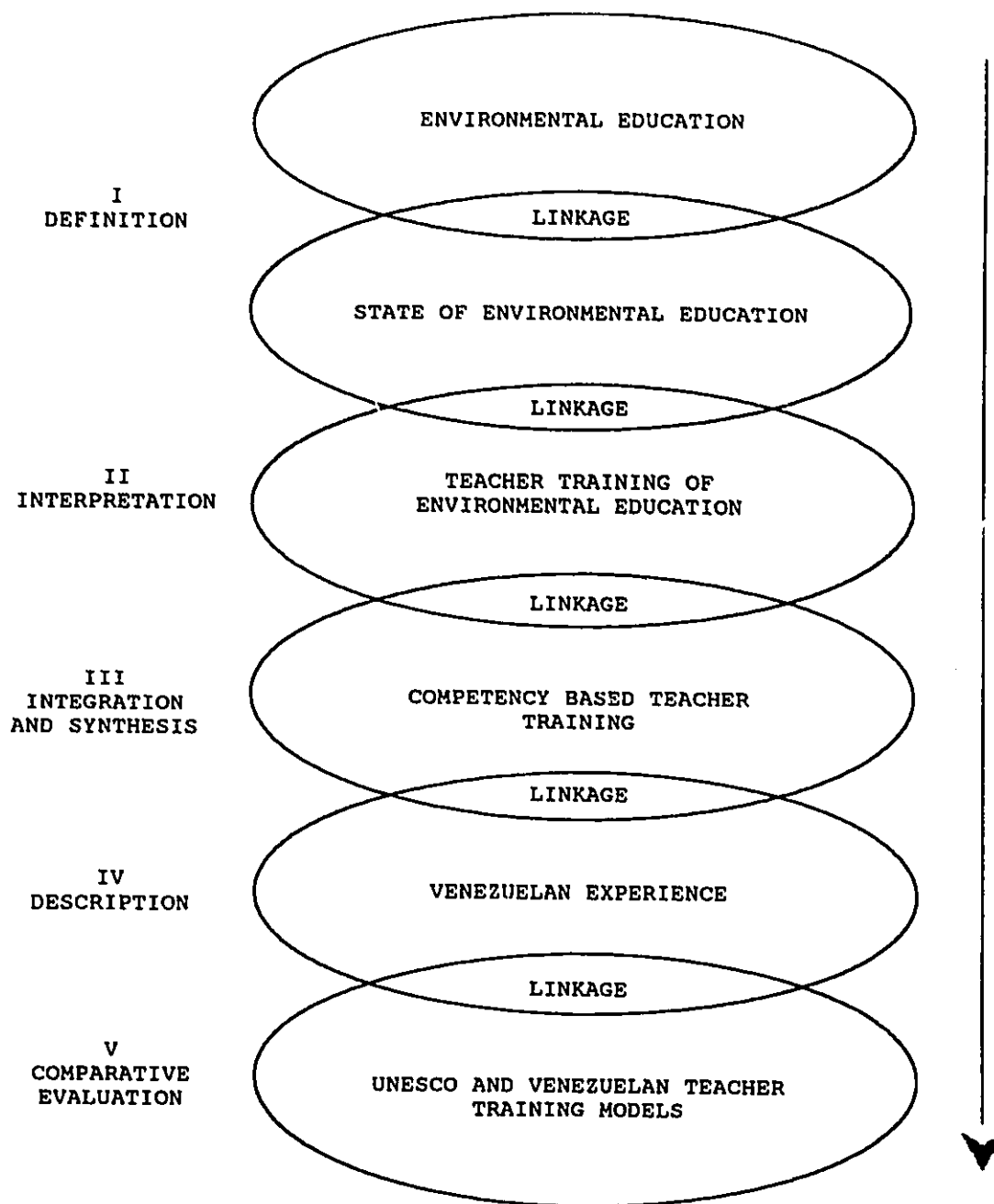
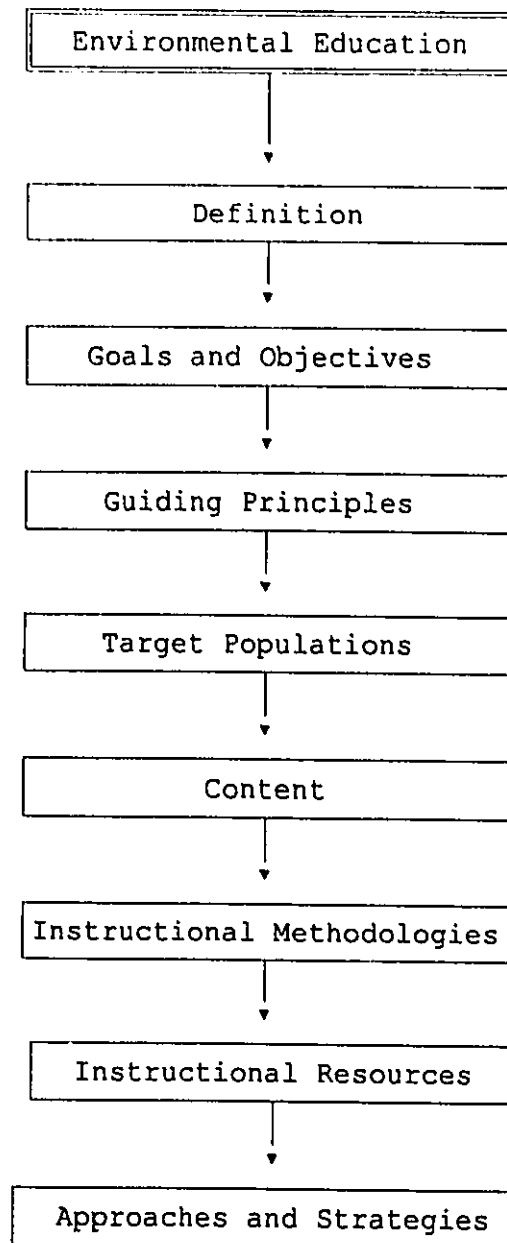


TABLE 3.1 Key References Serving as the Basis for Research Problem Definition

I. Environmental Education Theoretical Framework	II. Environmental Education Teacher Training	III. Education, Research and Evaluation	IV. UNESCO IEEP	V. Venezuela NEEP
1. Agne <i>et al</i> (1975) 2. Baez (1987) 3. Bazan (1976) 4. Blum (1987, 1987/88) 5. Bottinelli (1977) 6. Bowman (1976, 1978) 7. Brannen (1974, 1986) 8. Brown <i>et al</i> (1977) 9. Cenovsky (1977) 10. DeFelice <i>et al</i> (1985) 11. Fensham (1977, 1978, 1983, 1985) 12. Francis (1987) 13. Frischknecht and Brandenburg (1981/1982) 14. Ham <i>et al</i> (1987/88) 15. Harshman (1978/79) 16. Hart (1981) 17. Hepburn (1976, 1978) 18. Hungerford (1978) 19. Hungerford <i>et al</i> (1977, 1980, 1983, 1990) 20. Iozzi (1988/89, 1989) 21. Kauchak <i>et al</i> (1978) 22. Knamiller (1978, 1987) 23. Knapp (1972, 1974, 1981/82, 1983) 24. Kormondy (1984) 25. Krall and Holt (1979) 26. Krasilchik (1987) 27. Kupchella and Hyland (1977) 28. Lewis (1981/82) 29. Lucas (1977, 1985) 30. Lucko <i>et al</i> (1982) 31. Metha (1987) 32. Miles (1976, 1977, 1991) 33. Monroe and Kaplan (1988) 34. Quetel and Souchon (1985) 35. Ramsey <i>et al</i> (1989) 36. Schmieder (1977) 37. Schwaab (1982/83) 38. Schaefer <i>et al</i> (1979) 39. Simmons (1988, 1989, 1990) 40. Stepp (1974, 1978, 1979, 1980/81, 1984) 41. Steel <i>et al</i> (1977) 42. Steenhouse (1977) 43. Swan (1974) 44. Taylor (1985) 45. UNESCO (1977, 1980, 1987, 1990) 46. Volk and Hungerford (1981) 47. Wals <i>et al</i> (1990) 48. Willard (1976) 49. Wolak (1977) 50. Zoller (1986/87)	1. Bluhm and Hungerford (1976) 2. Buethe and Smallwood (1987) 3. Bowman (1978) 4. Caduto (1984/85) 5. Champeau and Wilke (1980) 6. Dushane (1974) 7. Fensham (1983) 8. Gardella (1979) 9. Lahiry <i>et al</i> (1988) 10. Lucko <i>et al</i> (1981/82) 11. Markowitz and Robottom (1987) 12. Mayfield (1977) 13. McKenna (1973) 14. Peyton and Hungerford (1980) 15. Rakow (1985) 16. Ritz (1977) 17. Rubba and Wiesenmayer (1988) 18. Selim (1977) 19. Stepp <i>et al</i> (1980/81) 20. Towler (1980/81) 21. Volk <i>et al</i> (1984) 22. Wilke (1985) 23. Wilke <i>et al</i> (1980, 1987)	1. Andrews (1973) 2. Bloom (1979) 3. Budd <i>et al</i> (1971) 4. Burns (1972, 1973) 5. Burrus-Bammel <i>et al</i> (1988) 6. Cerney (1972) 7. Chinapah (1990) 8. Cronbach (1977) 9. Cruickshank (1984) 10. DeLandsheere (1985) 11. Eisner (1985) 12. Feldman (1974) 13. Flitter (1978) 14. Friedman <i>et al</i> (1980) 15. Fuchs (1980) 16. Gagne (1974, 1988) 17. Galfo (1975, 1983) 18. Gay (1987) 19. Gottman <i>et al</i> (1972) 20. Heck and Williams (1984) 21. Holmes (1981) 22. Holsti (1969) 23. Houston (1974, 1985) 24. Kohlberg (1973, 1976, 1981) 25. Krippendorf (1980) 26. LaGrone (1974) 27. McDaniel (1982) 28. McDonald (1974) 29. Noah (1985) 30. North (1963) 31. Pearson (1989) 32. Popham (1974) 33. Provus (1971) 34. Quin (1980, 1987) 35. Rath (1988) 36. Reushaw (1971) 37. Richey (1986) 38. Rossier (1985) 39. Sanders (1985) 40. Scriven (1977) 41. Shavelson (1985) 42. Slavin (1984) 43. Sodhi (1983) 44. Thomas (1989/90) 45. Walker and Schaffarzick (1977) 46. Wiersma (1991) 47. Worthem (1973, 1985)	1. Baez (1987) 2. Brown (1978) 3. Dalhberg (1985) 4. Redclif (1984) 5. Stepp (1975, 1976, 1979, 1980/81) 6. UNESCO (1977, 1980, 1983, 1985, 1986, 1987, 1990, 1992) 7. UNESCO - UNEP Environmental Education Newsletters	1. Brito (1990) 2. CICA/PNFD (1989) 3. CNU (1985) 4. Congreso de la Republica de Venezuela (1961, 1970, 1976, 1977, 1978, 1980, 1983, 1988) 5. Flores (1980, 1981) 6. Gabaldon (1984) 7. Garcia, Anez and Figueroa (1990) 8. Leon (1981) 9. MARNR (1983, 1992) 10. MARNR - DEA (1977, 1980, 1981, 1982, 1987, 1988, 1992) 11. MARNR - DI (1989) 12. MARNR - ME (1986) 13. MARNR - ME - SVCN (1981) 14. MARNR - ORCO (1982) 15. ME (1983, 1989) 16. Mendoza, Castellano and Aguielena (1984) 17. Parilli (1988) 18. Romero (1991) 19. Sylva (1981) 20. UPEL (1985, 1987, 1991) 21. Wheeler (1977) 22. Ypez (1991) 23. UNESCO (1983)

Figure 3.2 - Environmental Education's Framework of Elements



approaches. Key authors have repeatedly stated that the definition of these aspects in education programmes is a critical task because they guide the design and implementation process of such programmes (Downey and Kelly, 1979; Eash, 1985; Gagne, 1974; Gagne et al, 1988; Klein M, 1985; Richey, 1986; Romiszowski, 1990; Skilbeck, 1985). Such statements are relevant to environmental education because this discipline is a new dimension in the school curriculum. Therefore, a comprehensive definition of the relevant theoretical elements seems to be a requirement of the appropriate design and implementation of these programmes.

3.2.1 Definition of Environmental Education

A major issue is the problem of environmental education definition. Relevant literature reveals environmental education as an integral part of the education process aimed at developing environmental knowledge, awareness, values, attitudes, behaviour, and action (Blum and Hungerford, 1976; Bogan, 1973; Harblin and Maynard, 1976; Hungerford et al, 1983; Kupchella and Hyland 1977; Lucas, 1980/81; Mayfield, 1977; UNESCO, 1980; UNESCO-UNEP-IEEP, 1987, 1977). A noteworthy point in this context is the general belief that environmental education is an integral part of the societal education process since the aims of both are compatible (Dushane, 1979/80; Frischknecht and Brandenburg, 1981/82; Swan, 1974; UNESCO, 1980). This formal bond between the general education of society and environmental education was first made by Whitehead in 1929. He emphasized the role of education in guiding individuals

towards an appreciation and comprehension of their environment. Further, good education is thought to contain strong tutelage in environmental science as such science takes a holistic and comprehensive view of the world (Clark, 1975). However, an important question begs proposition: is the environmental education discipline mature enough to offer an education product that can be considered an integral component of any general education programme?

In addition to this question, the Tbilisi Conference explored four tenets considered to be directly related to environmental education. They are: practical problems, interdisciplinarity, values study, and active participation. The value of these tenets is shared by a large number of environmental education practitioners and critics (Andrews, 1980; Caduto, 1985, 1983 (a, b); Disinger, 1990; Hass, 1987; Heath and Weible, 1979/80; Hepburn, 1976; Jakouska, 1987; Miles, 1976; Monroe and Kaplan, 1988; Pais, 1977; Schmieder, 1977; Smyth J., 1987; The World Commission on Environment and Development, 1987; Wals et al, 1990; Yambert, 1986; Zoller, 1986/87). In essence, the cogent message is that environmental education is an integral part of the education process aimed at educating citizens knowledgeable and aware of environmental problems, and active in contributing to their solution. Interestingly, environmental education literature is most often focused on environmental problem resolution. Unfortunately, little of this literature investigates the preventive role that environmental education can play in environmental problem

avoidance. Could it be that professional educators are predisposed to the same function as many other professionals, including lawyers and doctors, that is, focusing on problem solving rather than problem prevention?

3.2.2 Goals and Objectives of Environmental Education

The Tbilisi Conference identified a specific set of goals and objectives for environmental education (Table 3.2). Environmental education is aimed at developing environmental awareness for the protection, preservation, and improvement of the environment. In order to meet this goal, five (5) objective categories related to awareness, knowledge, attitudes, skills and participation are established (UNESCO, 1980). These categories of environmental education goals and objectives are supported by several influential authors (Aldrich and Blackburn, 1977; Fensham, 1977; Fensham and Hunwick, 1983; Hungerford et al, 1980; Knamiller, 1987 (a); Lucko et al, 1982; Schmieder, 1977; Schultz, 1978; Stapp, 1978, 1979; Steel et al, 1977; Swan, 1974; Volk et al, 1984; Zoller, 1986/87). These authors go on to stress that a citizenry that is knowledgeable about biophysical and sociocultural environments; is aware of environmental problems; and is motivated to act responsibly in solving environmental problems, is a realistic production of a well designed environmental education programme. These environmental education goals and objectives are relevant to present environmental needs. Increasing deterioration in quality of life and environmental contamination demands the education of

TABLE 3.2 Goals and Objectives of Environmental Education Established by the Tbilisi Conference (1977)

Goals of Environmental Education:	
1.	to foster clear awareness of, and concern about, economic, social, political and ecological interdependence in urban and rural areas
2.	to provide every person with opportunities to acquire the knowledge, values, attitudes, commitment and skills needed to protect and improve the environment
3.	to create new patterns of behaviour of individuals, groups and society as a whole towards the environment
Objectives of Environmental Education:	
1.	to help social groups and individuals acquire an awareness of and sensitivity to the total environment and its allied problems
2.	to help social groups and individuals gain a variety of experience in, and acquire a basic understanding of the environment and its associated problems
3.	to help social groups and individuals acquire a set of values and feeling of concern for the environment, and the motivation for actively participating in environmental improvement and protection
4.	to help social groups and individuals acquire the skills for identifying and solving environmental problems
5.	to provide social groups and individuals with an opportunity to be actively involved at all levels in working toward resolution of environmental problems

SOURCE: Adapted from UNESCO, 1977, 1980

citizens to interact with different environments with understanding, awareness and responsibility.

3.2.3 Guiding Principles of Environmental Education

Guiding principles are important when outlining and implementing environmental education programmes because they characterize environmental education theory and practice (Schmieder, 1977). However, it is a mandatory task to define these principles very clearly and in accordance with environmental education goals and objectives since they relate to the structure and organization of the teaching-learning process. In this context, the UNESCO Member States established 12 guiding principles of environmental education (Table 3.3). These principles are entirely consistent with the environmental education definition and objectives endorsed by the same organization (UNESCO, 1980). This literature reveals clearly that environmental education must be considered a lifelong process, directed to the solution of practical problems with an interdisciplinary approach and the involvement of the community. These principles are critical to environmental education. They define it as a continuing process concerned with solutions to environmental problems. Unfortunately, the preventive character of this process is not emphasized in these principle statements in spite of the fact that problem prevention is one of the most important roles of education.

Several authors also refer to similar principles identified by UNESCO (Baez, 1987 (a); Blum and Hungerford, 1976; Bogan, 1973;

TABLE 3.3 Environmental Education Guiding Principles Established by the Tbilisi Conference (1977)**Environmental Education should:**

1. Consider the environment in its totality - natural and built, technological and social (economic, political, technological, cultural-historical, moral, aesthetic);
2. Be a continuous lifelong process, beginning at the preschool level and continuing through all formal and non-formal stages;
3. Be interdisciplinary in its approach, drawing on the specific content of each discipline in making possible a holistic and balanced perspective;
4. Examine major environmental issues from local, national, regional and international points of view so that students receive insights into environmental conditions in other geographical areas;
5. Focus on current and potential environmental situations, while taking into account the historical perspective;
6. Promote the value and necessity of local, national and international cooperation in the prevention and solution of environmental problems;
7. Explicitly consider environmental aspects in plans for development and growth;
8. Enable learners to have a role in planning their learning experiences and provide an opportunity for making decisions and accepting their consequences;
9. Relate sensitivity, knowledge, problem-solving skills and values clarification to every age, but with special emphasis on environmental sensitivity to the learner's own community in the early years;
10. Help learners discover the symptoms and real causes of environmental problems;
11. Emphasize the complexity of environmental problems and thus the need to develop critical thinking and problem-solving skills;
12. Utilize diverse learning environments and a broad array of educational approaches to teaching/learning about and from the environment with due stress on practical activities and first-hand experience.

SOURCE: Adapted from UNESCO, 1977, 1980

Dushane, 1974; Harper and Stein, 1978; Kupchella and Hyland, 1977; Kupchella and Levy 1975; Lahiry et al, 1988; Rillo, 1974; Schmieder, 1977; Stapp, 1978; Willard, 1976). It is very surprising that so much literature is a bland response to UNESCO initiatives. In other words, the literature appears to be "too accepting" of UNESCO. Does this condition reflect a discipline lean in evaluation and criticism? It may seem a harsh comment, but the science of environmental education is not likely to advance without more critical assessment from both inside and outside of the discipline.

One of the most thorough works is offered by Hart (1981). This author, after a systematic examination of the literature in environmental education, including UNESCO references, identifies 25 environmental education characteristics which are needed to improve environmental education conceptualization (Table 3.4). Hart (1981) identifies an important set of environmental education characteristics relating to the need for institutional flexibility, modification of existing educational structures and development of new curricula, curriculum evaluation and research base, and teacher training. These characteristics are considered fundamental when delineating and developing environmental education programmes. However, this literature also indicates that institutional, administrative and academic restrictions represent important barriers to the creation of sound environmental education programmes. It will be interesting to see if this is indeed the case in the Venezuelan experiment, an experiment that is the central case study in this thesis. In addition, select literature

TABLE 3.4 Key Characteristics of Environmental Education, by Hart (1981)¹

1	Interdisciplinarity: Environmental Education should be part of every subject taught
2	Multilevel: EE should be taught at all grade levels from kindergarten through grade twelve and beyond
3	Global views: EE involves the development of an integrated global environmental ethic
4	Concepts: EE entails awareness and understanding of basic ecological environmental concepts (e.g. limiting factors, carrying capacity)
5	Process development: EE involves development of cognitive, affective, and skill-behaviour processes, especially for development of attitudes and values which motivate people to become involved in environmental problem solving
6	Problem solving: EE involves helping students develop processes of thinking which could be more effective in resolving complex environmental problems
7	Values clarifying: EE involves exploring personal assumptions, values, and feelings toward self and society as well as the relationship of these to the natural world
8	Systems thinking: EE implies that one must learn to think in terms of systems of interacting factors; that is, to think not only rationally about the parts of a complex system but to develop an intuitive feel for the dynamic behaviour of such a system as a whole
9	First-hand experiences and activities: EE teaching requires a commitment to the development and utilization of all situations where learning can best be nurtured through first-hand experiences and activities which foster a deep respect and love for the natural world
10	Environmental issue oriented: EE entails use of local environmental issues, as well case studies, role playing, simulations and games which provide opportunities to examine and participate in the complexities of decision making, understanding of personal and alternative values and the actual operation of systems - natural and man-made
11	Present and future orientation: EE does not exist in the reactive sense only but continually assesses the present and promotes an ideology which examines desirable images of the future
12	Active participation: EE emphasizes active participation in preventing and solving environmental problems
13	Individual learning: The breadth of EE and variety among students implies that individual learning programmes involving certain degrees of independent study of a diverse number of interdisciplinary environmental problems will be appropriate
14	Team approach to teaching/learning: EE involves teacher participation in environmental problem-solving learning situations as team members
15	New productive student-teacher relationships: Personal responsibility and group interaction: EE places an emphasis on problem solving which implies many things including recognition of the values and biases of oneself and others and responsibility for working individually and collectively in a process of informed environmental decision making
16	Community oriented: EE involves the entire community as a learning environment in the achievement of environmental education objectives
17	Field studies (urban and natural environments): EE includes provision of field experiences - that group of first-hand experiences which are best suited to areas outside the classroom and school
18	Communications networking: EE entails communication skills as a process which can provide more complete and accurate images about environmental problems. It is important to understand how environmental information flows through networks linking the members of a system together
19	Coordination and cooperation: International, national, regional, and local: EE promotes the value of and necessity for local to international cooperation in the solution of environmental problems
20	Flexible administrative organizational patterns: Institutional flexibility is required to cope with evaluation and provide adequate instruction, given the interdisciplinary problem-solving nature of EE
21	Reform of educational processes and systems: EE implies modification of existing educational structures
22	Curriculum development base: EE, because of its program component and support elements and strategies, implies active involvement in the development of new curricula
23	Curriculum evaluation base: Evaluation is required for effective programme development in EE so as to guide selection of adequate EE programs, examine all processes that lead toward achievement of intended outcomes, and judge its appropriateness for support or adoption
24	Research base: EE requires more objective evidence of its benefits and effects in order to buttress rhetoric with instances of success and failure
25	Teacher education: EE involves continued improvement in professional development through inservice and preservice channels to assist in the development of an environmental ethic

¹ In this Table "EE" means Environmental Education

SOURCE: Hart, 1981

rigorously stresses the lifelong character of environmental education (Schmieder, 1977; UNESCO, 1980; UNESCO-UNEP-IEEP, 1977). Environmental education should be a continuous process, embracing each level of the formal and non-formal education system. The residual message is that environmental education is for everybody without exception of age and sex. This principle orientates the definition of the target population for environmental education.

3.2.4 Target Populations for Environmental Education

Discussion related to the environmental education target population theme is quite lean. In addition, only a few authors spend time identifying and describing the alternative target populations of environmental education. Interestingly, the authors provide the same perspective (Stapp, 1979; UNESCO, 1977 (a), 1980; UNESCO-UNEP-IEEP, 1987). More specifically, they identify three target groups and the function environmental education must perform (Table 3.5). **A primary and basic function is the education of the general public.** The literature strongly indicates that environmental education should be provided at every age and at all levels of formal and non-formal education. Further, the suggestion is made that environmental education should not be limited to children or adults who have the financial resources or who are physically and mentally capable of fitting into the traditional school or nature centre programme (Bialeschki, 1981). This suggestion complements the previous idea of environmental education for the general public.

TABLE 3.5 Environmental Education Target Populations

Environmental Education Functions	Education Forms	Education Levels	Target Groups
Education of the general public	Formal Education	Pre-primary, Primary, Secondary and Higher Education	Pupils and the Teachers
	Non-formal Education		Young People and Adults
Training of specific occupational or social groups	Formal and non-formal education (preservice and inservice training)		Engineers, Architects, Town planners, Economists, Lawyers, Property developers, Industrialists, Trade Unionists, Doctors, etc.
Training of professionals and scientists working on specific environmental problems	Formal and non-formal education (preservice and inservice training)	Higher Education or Graduate Education	Professionals and scientists working in the planning of the use of resources, techniques for the monitoring of air and water pollution, town planning, landscape architecture, etc. This category includes specialists in the natural and social sciences.

SOURCE: Adapted from UNESCO, 1977, 1980, 1990; Stapp, 1979; Brennan, 1986

A second environmental education function is related to the education of specific occupational or social groups whose activities or influence have an important bearing on the environment. In this category are: engineers, architects, town planners, economists, lawyers, property developers, industrialists, trade unionists and doctors. Environmental education for these groups is extremely important because their professional decisions impact the environment.

A third environmental education function has to do with the training of certain professionals and scientists working on specific environmental problems, for example, planning the use of resources, techniques for the monitoring of air and water pollution, landscape architecture, etc. The cogent message in this literature is that environmental education must involve the total environment of people and activities. "Total Education for the Total Environment" as Brennan (1986) suggests, is a recognition of interdependence between people and their environment, and the responsibility of people to maintain an environment fit for life and living. In this context, both natural and social science specialists have an important role to play in laying a foundation of knowledge upon which environmental education can be based. Further, the need for training effective environmental problem solvers is, perhaps, the most extensive idea of specialists, professionals and scientist target groups indicated in the literature (Baldwin et al, 1975; Maldaque, 1977; Mehne, 1978). Certainly, present environmental problems demand not only the broad

view of the generalist in dealing with large-scale problems, but also highly specialized professionals in particular areas of expertise. Professionals in areas such as solid waste, air, water, radiation ecology, pest control, impact evaluation, land use management, etc. should be able to apply their specific technical skills to undertake solutions to specific environmental problems.

In addition, this literature also reveals a large number of articles associated with formal and non-formal environmental education, as well as environmental education at different education levels (Agne et al, 1975 (a); Alles and Chiva, 1977; Ambry et al, 1975; Cook and Weidner, 1977; Eichler, 1977; Emmelin, 1977; Francis, 1987; Francis and Mijares, 1987; Kanhasuwan and Webb, 1987; Keown, 1991; Knamiller, 1987 (a); Partha, 1987; Schoenfeld and Disinger, 1978; Selim, 1977; Teich, 1979; Wayburn, 1987; Withrington, 1977; Youngs and Maggs, 1987). Examination of these articles reveals little attention paid to the formal education of pre-primary or pre-school children and much attention paid to university students. One wonders whether this situation relates to a lack of environmental education programmes and activities at the pre-primary level or to a lack of research motivation and skills on the part of people involved at this level of education. The need for higher environmental education training, as well as the commitment of the university to environmental education, is fully analyzed by the relevant literature (De Bell, 1977 (a); Edmisten, 1985/86; Fisher, 1977; Francis, 1987; Nash, 1976; Reidel, 1973; UNESCO-UNEP-EE Newsletter, 1984). This need is

understandable since universities are expected to provide the human resources which a society demands for its own welfare.

3.2.5 Content of Environmental Education

Specification of content is an important task when designing educational programmes. It provides the necessary information for achieving goals and objectives established in such programmes. Therefore, content must be congruent with programme goals and objectives (Connelly and Clandinin, 1985 (a); Cummings, 1974; Eash, 1985; Klein, 1985; McKenna, 1973). More specifically, the content of environmental education programmes should be associated with the cognitive and affective knowledge and skills involved in environmental education goals and objectives. Further, **awareness of major environmental problems** is a primary focus of environmental education since it guides the development of knowledge, values, attitudes and commitment needed to protect, defend and improve the environment. Several authors stress the need for discussing global and local environmental problems as they provide a frame of reference in which problems peculiar to a country, region or locality may be identified and analyzed (Allen, 1972; Baez, 1987 (a); Benjamin, 1971; Blackburn, 1986; Caldwell, 1970; Gardella, 1979; Glasser, 1974; Howell, 1974; Kupchella and Hyland, 1977; Metzger and Whittaker, 1991 (a); Ross, 1979; Smyth, 1987). These authors agree that in discussing environmental problems, a consideration of their causes and effects is essential. Presumably, when selected problems are relevant to student communities, the

level of students' understanding and involvement in these problems is greater.

Further, this literature also indicates that "building" awareness of major environmental problems is important in underdeveloped countries. The lack of public understanding of these problems is a critical part of the problem itself (Knamiller, 1979, 1987 (b); Roth, 1979; Rugumayo, 1987). Certainly, failure to develop awareness of local environmental problems is a barrier to community participation.

Interestingly, the literature exudes a special interest for energy affairs (Cohen M., 1981; Detwyler, 1979; Gottlieb, 1977; Jackson, 1985; Kochan and Allen, 1981; McLeod et al, 1987; Trent, 1978; Wert, 1976). This is especially important to those countries whose economies depend on oil. Such is the case of Venezuela.

Further, the relevant literature also reveals a need for the understanding and use of **basic ecological concepts** (Arcury et al, 1986; Botkin, 1987; Buchsbaum and Buchsbaum, 1979; Kormondy, 1984; Monroe, 1971; Odum, 1975; Riddel, 1981; Sponsel, 1987; Tanner, 1974; Tomera, 1979; Turk, 1975; Yambert and Donow, 1986). This literature indicates that a multitude of biotic and abiotic structures, processes and interrelationships are involved in moving energy and nutrients and in regulating population and community structures and dynamics. Consideration of these aspects in an environmental education programme is a necessity. Their study assists people in understanding ecosystem processes and their value, and in harmonizing their activities with the earth's

ecosystems. Such an investment is especially needed in underdeveloped countries where a lack of ecological concern in the general and elite populations is easily recognized (Chiappo, 1978).

Investigation and evaluation of environmental issues is stressed as a basic aspect of environmental education programmes by many authors (Cooley, 1972; Hungerford, 1978; Ramsey and Hungerford, 1989; Ramsey et al, 1989). They indicate that participation in these processes allows students to identify, analyze and evaluate environmental problems in their communities. In essence, such participation becomes a basic requirement for community environmental problem solving (Hall, 1977; Monroe and Kaplan, 1988; Quetel and Souchon, 1985; Swan, 1974 (a); Volk and Hungerford, 1981; UNESCO, 1980). Certainly, development of investigation and evaluation skills is needed when students are expected to identify, describe and analyze environmental problems in terms of their causes, effects and solutions.

An issue occupying the attention of several authors is community participation and citizen action (Caldwell et al, 1976; Cortese, 1991; Everitt and Dyckman, 1978; Fanning, 1975; Harblin and Maynard, 1976; Heath and Weible, 1979/80; Hepburn, 1976; Jakouska, 1987; King, 1977; Mathews, 1974; Metha, 1987). It is indicated in this corpus that environmental education programmes must include discussion of the need for active community involvement. These programmes seek the solution of concrete environmental problems in terms of practical actions by the community. Student awareness of the value of community

participation is needed in most developing countries where a lack of community awareness and genuine power exists (Howard, 1982/83). Community environmental awareness and participation is needed to build a society which is knowledgeable about its own problems and prepared to make intelligent decisions about the problems affecting community life.

The conviction that environmental education must focus on the development of values is probably the most extensively discussed position in the literature. More specifically, key authors stress the development of environmental values as a means for the development of a societal environmental ethic (Baker et al, 1978; Bleicker, 1976; Caduto, 1983 (a,b); Dahlberg et al, 1985; Goodpaster and Sayre, 1979; Harper and Stein, 1978; Harshman, 1978/79; Iozzi, 1988/89, 1989; Kauchak et al, 1978; Knapp, 1972, 1983; Milbrath, 1984; Miles, 1976 (a,b), 1977 (a,b); Pais, 1977; Rolston, 1988; Scherer, 1978; Science, Action Coalition, 1980; Simmons, 1990; Wideman and Davis, 1982; Willard, 1976). There appears to be consensus among these authors that an environmental ethic is needed in each society for avoidance of environmental crises. This position is fully shared by key Venezuelans (Buroz, Personal Communication, 1992; Burk, 1981; Flores, 1980 (b,c); Gabaldon, 1984; Léon, 1981; Luzardo, Personal Communication, 1992; Moya, Personal Communication, 1992; Quero, Personal Communication, 1992; Romero, 1991; Salazar, Personal Communication, 1992; Silva, 1981). They strongly indicate that the lack of positive environmental values is a major concern in existing problems in

Venezuela. As a Venezuelan educator, the author shares this feeling and has kept this fundamental issue in mind when evaluating the Venezuelan environmental education model. Perhaps the greatest challenge today lies in the reassessment of our moral values.

3.2.6 Instructional Methodologies of Environmental Education

The "appropriateness of teaching methods" is a major issue encountered in the literature of environmental education. Key authors emphasize the importance of selecting and applying appropriate methodologies to achieve environmental education goals and objectives (Lewis, 1981/82; Schwaab, 1982/83; Steel et al, 1977; UNESCO, 1977 (b), 1980; Wolsk, 1977). However, this literature is scarce in reporting application of instructional methodologies for environmental education. Teaching methods are a primary concern for environmental education teachers. They are the means to transfer the environmental message from theory into practice. Therefore, training in the appropriate use of methodologies should be a major task in teacher training programmes.

Further, the literature also provides a comprehensive review of major instructional methodologies for environmental education (Table 3.6). In this context, **outdoor education** is one of the most frequently mentioned teaching methods. Several authors indicate that outdoor activity is an effective tool since it motivates learning through direct contact between learners and natural and cultural environments (Corcoran, 1976; Crompton and Sellar, 1981;

TABLE 3.6 Major Environmental Education Instructional Methodologies and Associated Supporting Authors

Methodologies	Author
Outdoor Experience	Askham (1974); Chenery and Hammerman (1984/85); Corcoran (1976); Crompton and Sellar (1981); Ewart (1986); Ewart and Hollenhorst (1990); Ford (1981); Hammerman and Hammerman (1964); Hawkings (1987); Hazelwort and Wilson (1990); Howie (1974); Keown (1986); Lewis (1981/82); McCaw (1979/80); Miles (1986/87, 1991); Nash (1980); Nichols (1982); Piesse (1977); Priest (1986); Riggins (1986); Shepard and Speelman (1985/86); Wal (1976)
Excursions, Field Study	Hungerford <i>et al</i> (1988); Hepburn (1976); Keown (1986); Wal (1976); Wolsk (1977)
Simulation and Games	Agne (1975); Alden and Schaefer (1976); Bazan (1976); Bierma and Walbert (1987); Blum (1987); Bottinelli (1977); Crawford and McKee (1975); Dunlop (1979); Hardacie (1979); Kirts and Tumeo (1991); Lewis (1981/82, 1991); Manning and Potter (1984); Nafzigen (1974); Powers (1985/86); Rago (1984); Shelton (1977); Steel (1977); Swinerton (1972); Taylor (1983); Verral (1992/93)
Computer Simulation	Howard and Magid (1977); Huber and Falkenmayer (1987); Manning and Potter (1984); Taylor (1983); Wallick (1982/83)
Problem Solving	Agne (1975); Baldwin <i>et al</i> (1975); Cohen (1981); Davis (1978); Glasser (1974); Hall (1977); Hungerford (1978); Hungerford <i>et al</i> (1988); Lucko, Disinger and Roth (1982); Monroe and Kaplan (1988); Quetel and Souchon (1985); Stapp <i>et al</i> (1980/81); Swan (1974); UNESCO (1977, 1980); Volk and Hungerford (1981); Wals, Beringer and Stapp (1990); Weibel (1983)
Interpretative Education	Colpitts (1979); Hammitt (1981, 1984); Hanna and Mullins (1977); Hartman and Hanna (1987); Moscarado (1988)
Transactional Analysis	Cohen and Austin (1979/80)
Public Information Conference	Fortner (1985/86)
Project Strategy	Hass (1987); Mittels and Frank (1974)
Issue Analysis, Investigation and Evaluation	Hungerford (1978); Hungerford <i>et al</i> (1988); Ramsey and Hungerford (1989); Wilke (1985)
Global, Regional and Local Environments	Agne (1975); Buzzati-Traverso (1977); Harblin and Maynard (1976); Howard (1983/84); Redclif (1984)
Remote Sensing	Huber (1983)
Audio Tutorial Instruction	Askham (1973)
Group Interaction	Steel (1977)
Case Study	Taylor (1983); UNESCO (1980); Wilke (1985)
Community and Citizenship Action	Caldwell (1970); Fanning (1975); Heath and Waible (1979/80); Hepburn (1976); IUCN (1980); Keach (1973); King (1977); Knemiller (1987); Mathews (1974); Metha (1987); Orteleb <i>et al</i> (1977); Ramsey and Hungerford (1989); Stapp <i>et al</i> (1980/81); Steel (1977); Volk <i>et al</i> (1984); Wals <i>et al</i> (1990); UNESCO (1980)
Moral Development and Values	Buzzati-Traverso (1977); Caduto (1983); Fisher <i>et al</i> (1983); Harper and Stein (1977); Iozzi (1978, 1988/89, 1989); Kauchak <i>et al</i> (1978); Knapp (1983); Kupchella and Hyland (1976); Miles (1976, 1977); Piaget (1932); Redclife (1984); Timmermand (1986); Troost (1974); UNESCO-UNEP (1986); Wideman and Davis (1982); Zoller (1986/87)

SOURCE: Adapted from several authors

Ewert, 1986; Ewert and Hollenhorst, 1990; Ford, 1981; Hawkins, 1987; Hazelworth and Wilson, 1990; Howie, 1974; Keown, 1986; Nichols, 1982; Priest, 1986, 1989). In addition to outdoor methods, the literature also reveals that **simulation games and role playing** are equally effective in environmental education. Most articles report the benefits of these methodologies (Alden and Schaefer, 1976; Bazan, 1976; Blum, 1987; Bottinelle, 1977; Lewis J, 1991; Lewis P, 1991; Nafzigen, 1974; Rago, 1984; Swinerton, 1972; Taylor, 1983). The important point is that these methods help in linking learning with the decision-making processes and with the application of knowledge already learned. This is critical to environmental education since one of its roles is to give people the opportunity of taking part in the social decisions which affect their surroundings.

One teaching method that has evoked many critical comments is **problem-solving** (Hungerford, 1978; Monroe and Kaplan, 1988; Quetel and Souchon, 1985; Volk and Hungerford, 1981; Wals et al, 1990). These authors agree that this method is of primary concern for environmental education. The noteworthy point is that problem-solving methodology helps learners to understand the environmental problems of their community and to participate in their solution. In this context, the literature stresses community and citizenship action skills. These skills are needed for community members in order to take action on critical local environmental problems (Fanning, 1975; Ramsey and Hungerford, 1989; Stapp et al, 1980/81; Volk et al, 1984; Wals et al, 1990). This is relevant to developing

countries where community involvement in environmental problems is very weak. It is weak because members of these communities lack proper action skills in dealing with issues related to solving problems.

Few sources present strategies or procedures involved in an environmental education problem-solving approach. Therefore, no variety of alternatives for implementing and using this approach is presented. This represents a limitation in the process of understanding, selecting and adapting methods to specific local interests and needs. Some of these alternatives are suggested in a work prepared by Quetel and Souchon (1985). According to these authors, the problem-solving approach implies: discussion groups, guided environmental interpretation, clarification of values, games and simulation, experimental demonstration workshops, practical action projects, and action-oriented research. Unfortunately, the literature fails in providing a clear example of the application of this process to a specific environmental problem.

In support of earlier concerns expressed for moral education, the importance of **instructional methodologies related to values education** is an often discussed issue in the literature (Caduto, 1985, 1983 (b); Harshman, 1978/79; Iozzi, 1989; Knapp, 1983; Knapp and Dushane, 1974; Miles, 1977 (b); Paehlke, 1986; Simmons, 1988; Timmerman, 1986). It is generally believed that it is impossible to guarantee the internalization of environmental values and the changing of individual attitudes and behaviour without application of appropriate methodologies when studying values or moral

education. Teachers need to learn how and when to use environmental values education methodologies in order to become effective agents of attitude and behaviour change. Teachers also need to know the strengths and weaknesses of each values education methodology in order to apply it to their students' backgrounds and local reality. Unfortunately the literature is quite lean in providing responses to these specific needs.

A study conducted by Caduto (1985) reveals eight major valuing strategies. They are: *laissez faire*, moral development, inculcation, values analysis, values clarification, action learning, confluent education and behaviour modification. Moral development, values analysis and values clarification are the most frequently recommended strategies in the literature. Several authors agree that **moral development** is a relevant strategy in environmental values education (Ayim, 1985; Caduto, 1985; Galbraith and Jones, 1976; Isaksson, 1979; Kauchak et al, 1978). This strategy, based on Piaget's and Kohlberg's theories, helps teachers to understand their students' moral reasoning when dealing with attitudes and values issues by knowing the typologies established in these theories. In this context, Kohlberg's model is widely discussed in the literature (Berglin, 1985; Kauchak et al, 1978; Miles, 1977; Philips, 1985). Its typology of levels and stages of moral development may be utilized by environmental education teachers when dealing with values issues. Authors also attribute important worth to **values analysis** (Caduto, 1985; Harshman, 1978/79; Iozzi, 1989; Miles, 1977). They indicate that this

strategy helps students in the process of values exploration and decision making related to environmental issues by analyzing and considering the consequences of policy decisions. The use of this methodology in environmental education is relevant, especially if it is used in developing countries, because it helps people to develop abilities for making or judging policy decisions through application of processes of reasoning or rational judgement.

According to the environmental education literature, **values clarification** is the most used and recommended strategy for value study in environmental education. This approach allows people to examine alternative value positions available to them and gives them the chance to choose among them (Bowman, 1976; Byrant and Hungerford, 1977; Caduto, 1985; Harshman, 1978/79; Iozzi, 1989; Knapp, 1983, 1972, 1981/82; Knapp and Dushane, 1974; Lamb, 1975; Miles, 1977; Simon et al, 1972). Several procedures are mentioned in developing this approach. However "choosing", "prizing" and "acting" processes are the most often alluded to in the literature. These procedures encourage students to make choices, examine alternatives when facing their choices and consider what it is that they prize and cherish. A model developed by Banks (1973) seems to be a significant contribution as it describes the steps involved in the process of valuation. The model gives students the opportunity to explore and analyze problems in a systematic manner, demanding not only values clarification of a student's value position but also examination of decisions concerning the value question. This exercise is consistent with goals and objectives

dealing with environmental values.

The recommendation for using moral dilemmas in values education is revealed in the literature (Hungerford and Peyton, 1977; McInnis, 1975; Milbrath, 1984; Miles, 1977; Powers, 1985/86; Ray and Upson, 1977). Examples offered illustrate the great potential of this approach to environmental values study. It enhances the level of students' moral reasoning and allows the establishment of the relationship between fact and value judgement which is critical in analyzing environmental issues involving morality and ethics. A cogent message is that if values or moral education is an important component of environmental education then teachers must be trained in implementing and applying appropriate methodologies that deal with this type of issue.

Project methodology provokes little comment in the environmental education literature. This paucity of comment exists even though the methodology is critical to environmental education since it is associated with problem solving and community participation.

3.2.7 Instructional Resources of Environmental Education

An effective process of environmental education must consider instructional resources. These resources are intended to explain facts, problems, approaches and solutions, as well as to indicate directions for learning activities (Cerovsky, 1977; Lucko, 1979; Stapp, 1980/81; UNESCO, 1977 (b), 1980; UNESCO-UNEP-IEEP, 1992). Discussion of this theme indicates the existence of a large variety

of teaching materials and learning environments which can be used in achieving specific environmental education goals and objectives.

More specifically, teaching materials refer to a set of conventional and non-conventional materials. For example, **conventional instructional materials** are associated with printed materials, such as handbooks, magazines, periodicals and teaching guides; audiovisual materials, such as films, tapes, slides, movies, videos; and equipment for laboratory and field work (Boulton, 1987; Cerovsky, 1977; Iozzi, 1989; Janke, 1982; Lewis J, 1991; Nafzigen, 1974; Pormerantz, 1986; Serrel, 1981; Steel et al, 1977; UNESCO, 1980).

Non-conventional instructional materials are associated with kits, games and simulations (Blum, 1987; Cerovsky, 1977; Januszkiewicz, 1985; Lewis, 1981/82; Steel et al, 1977; Taylor, 1983). An important point is that the effectiveness of teaching materials depends not only on their production quality but also on the degree of preparation and competence that educators exhibit in using these materials.

Further, the literature also explores **indoor and outdoor learning environments** (Cerovsky, 1977; Goudswaard, 1977; Lewis, 1981/82; Lively, 1979; Riggins, 1986; Serrel, 1981; Snitgen, 1976; Stapp et al, 1980/81). This literature indicates that environmental education should not be limited to the traditional learning environment such as classrooms and laboratories, but should be extended to non-traditional environments, such as nature and environmental education centres, physical sites, campus residences,

sanctuaries, zoos etc. The environment itself, therefore, has a natural role to play as an instructional resource. It offers the array of biophysical and geophysical processes that are affected by human activities.

An important issue reported in the literature is the importance of using **community resources**. Key authors indicate that the community represents a useful resource for environmental education, since it can provide direct and relevant experiences for students (Gardella, 1979; Hungerford et al, 1988; Marshdoyle et al, 1982; Orteleb et al, 1977; Steel et al, 1977; Wilke, 1985). It is especially significant when these resources are related to the learners' own community. They enrich learning experiences through the process of self-identification. Certainly, a great variety of human and material resources, familiar to students, can be located in the community and used in the process of understanding community problems.

In addition to teaching materials and learning environments, the literature also stresses the fundamental role that the **mass media** play in environmental education (Cerovsky, 1977; Iozzi, 1989; Mander, 1977; Ostman and Parker, 1986/87; Sandman, 1974; Schoenfeld, 1976; UNESCO, 1980). This literature strongly indicates that the use of radio, television and the press is an effective means of enhancing environmental literacy. The mass media are a powerful influence in promoting and stimulating attitudes and behaviour. Positive results can be achieved through environmental education broadcasts and telecasts. This is important for

developing countries, particularly in rural areas where radio is the most popular means of communication.

3.2.8 Approaches and Strategies of Environmental Education

Environmental education approaches and strategies literature is very rich and varied (Table 3.7). However, it appears to be weak in two areas. First, there is no distinction made between the terms approach and strategy. These words are used interchangeably to refer to the same concept. The major implication of this weakness is that there is no clear specification of different strategies or ways to implement a specific approach. Second, there is no system of classifying approaches and strategies. Approaches and/or strategies are described in a general way, without referring to their level of application. That is to say, most descriptions fail to indicate whether the approach or strategy is for incorporating, integrating or teaching environmental education. This particular omission makes it difficult for curriculum planners and educators to understand, select and implement appropriate environmental education approaches and strategies in different stages of the educational process.

However, the literature reveals that the most relevant approaches to this thesis are: interdisciplinarity, problem-solving and moral development.

More specifically, the most cogent messages coming out of the environmental education approaches and strategies literature is that **an interdisciplinary approach should be the focus of**

TABLE 3.7 Environmental Education Approaches and Strategies Included in the Literature

Approaches/Strategies	Authors
Disciplinarity	Evans and Brown (1977); Lucas (1977); UNESCO (1977, 1980)
Interdisciplinarity	Agne (1975); Brogdon and Rowsey (1977); Davis (1978); De Felice <i>et al</i> (1985); Evans <i>et al</i> (1977); Glatthorn and Foshay (1985); Harrison (1979); Hass (1987); Hepburn (1978); Jondrow and Clapp (1978); Krall and Holt (1979); Lucko <i>et al</i> (1982); Mayer and McKenzie (1974); Moroni (1978); Peterson (1977); Sacks (1978); Stapp <i>et al</i> (1980/81); UNESCO (1977, 1980); Zoller (1986/87)
Multidisciplinarity	Allen <i>et al</i> (1977); Baldwin <i>et al</i> (1975); Bridgewater and McDonald (1983/84); Dushane (1974); Francis (1987); Goudswaard (1977); Lucas (1977); Nash (1976); Rakow (1985); Reed and Cloud (1973); Ritz (1977); Taylor (1988); UNESCO (1977, 1980)
Pluridisciplinarity	Lucas (1977)
Transdisciplinarity	Glatthorn and Foshay (1985); Lucas (1977); Ritz (1977)
Crossdisciplinarity	Lucas (1977)
Holistic View	Berberet (1978); Blum (1987/88); Bogan (1973); Brennan (1986); Brown and Evans (1977); Clark (1975); Evans and Brown (1977); Francis (1987); Frischknecht and Brandenburg (1981/82); Iozzi and Chew (1978); Lahart and Bernes (1978/79); Miller A. (1981); Miller J. (1988); Talbot (1984); Wali (1987)
System Approach	Berberet (1978); Frischknecht and Brandenburg (1981/82); Miller (1981); Wang (1970)
Lifelong, Forward Looking Education	UNESCO (1977, 1980)
Moral Development	(See Table 3.6)
Solving Problems	(See Table 3.6)
Community Oriented	Davis and Surtis (1975); Everitt and Dyckman (1978); Force <i>et al</i> (1977); Heath and Wible (1979/80); Lucko <i>et al</i> (1982); Tanner (1980); Teich <i>et al</i> (1978); UNESCO (1980)
Action Based School	Hass (1987); Jakouska (1987); UNESCO (1977)
Issue Based Learning	Young and Maggs (1987)
Cultural Ecology	Sponsel (1987)
Human Ecology	Horwley (1986)

SOURCE: Adapted from several authors

environmental education. Such an orientation provides a more comprehensive picture of environmental problems (Brogdon and Rowsey, 1977; Davis, 1978; De Felice et al, 1985; Evans and Brown, 1977; Evans et al, 1977; Harrison, 1979; Hass, 1987; Krall and Holt, 1979; Moroni, 1978; Petterson, 1977; UNESCO, 1980, UNESCO-UNEP-EE Newsletter, 1981; UNESCO-UNEP IEEP, 1987). In this context, an interdisciplinary approach demands the specific contribution of various disciplines. They assist in identifying and analyzing phenomena causing the problems and establishing interdependences among them. This process is not easy and demands well trained personnel. However the literature is weak in providing clear examples of the integration of interdisciplinary approaches.

The need for a holistic approach to environmental education is strongly emphasized by leaders in this field (Berberet, 1978; Blum, 1987/88; Brown and Evans, 1977; Evans and Brown, 1977; Frischknecht and Brandenburg, 1981/82; Miller, 1981). The belief that environmental education should not be a single discipline or subject of study but rather that it should run throughout the other disciplines of the formal education curriculum is probably the most pervasive position in the literature. But again, the literature review does not reveal examples of environmental education programmes based on holistic models. Such exposure would better explain this type of approach in practice.

Unfortunately, little of the literature is related to strategies for incorporating an interdisciplinary environmental approach into educational curricula. However, a study prepared by

Felice, Giordan and Souchon for UNESCO (1985) is noteworthy in this regard. It presents three specific strategies: restructuring disciplinary content, disciplinary convergence, and teaching through interdisciplinary projects. The important point is that these strategies can be combined and adapted to each country's potential.

In discussing environmental education approaches, examples of relationships between environmental education and other disciplines are also found in the literature (Disinger, 1979; Hong Choi, 1983; Horvath, 1987; Jakouska, 1987; Perkins, 1977; Schrepfer and Steen, 1976; Schwart, 1985; Simpson, 1989 (b)). However, it is surprising to find few articles linking environmental education and geography. Geography has been traditionally concerned with the interrelationships between humankind and the environment, and conservation of natural resources has been a primary concern of this discipline (Berry, 1980; Emery and Milne, 1974; Hebden and Whomsley, 1983; Mitchell, 1974; Pemberton, 1989; Rorabacher, 1973; Saveland, 1970). In fact, both physical and cultural geographies deal with natural and human environmental systems which are relevant to environmental problems. In essence, many environmental education objectives, content and methodologies are related to the teaching of geography (Bailey, 1986; Keith, 1985; Rawling, 1992). It perhaps explains the fact that most teachers of environmental education have a geography background.

In addition, the literature also emphasizes the need for a **moral development approach** in environmental education (Caduto,

1985; Fisher et al, 1983; Harper and Stein, 1978; Harshman, 1978/79; Kauchak et al, 1978; Miles, 1977; Science, Action Coalition, 1980). The cogent message is that environmental education is concerned with environmental ethics, therefore, its approach should be consistent with this orientation.

The environmental education approaches and strategies literature also reveals that there are three major strategies in incorporating environmental education into the educational curriculum. They relate to: infusion of environmental topics into existing courses or disciplines; creation of an environmental education course; and integration of existing subjects around environmental education (Disinger, 1985/86; Galushin and Doraiswami, 1973; Howard, 1982/83; Hungerford et al, 1988; Knamiller, 1987 (a); Miller, 1981; Schaefer et al, 1979; Simmons, 1989; Steel et al, 1977; UNESCO, 1980). However, this literature indicates that the most satisfactory method involves doing away with traditional compartmentalization. The relevant message is that environmental education should integrate the content of the various curricular subjects within a framework related to the main environmental problems. In this context, two question can be posed: 1. Are educational structures flexible enough to adopt this integrative approach? 2. Are teachers qualified to deal with this integrative approach? The researcher has no doubt that this type of approach is the most suitable for environmental education. However, her experience in curriculum planning indicates that such an approach is very difficult to adopt since most educational

curricula are inflexible and have a strong disciplinary orientation. This situation is fully consistent with the disciplinary training of educational planners and teachers.

In summary, the literature indicates that there is no universal model. Any approach must take into account the specific educational and environmental conditions of each country (Dushane, 1974; Fenshman, 1977; Rillo, 1974; Ritz, 1977; Schmieder, 1977; Stapp et al, 1980/81; UNESCO, 1980; UNESCO-UNEP-IEEP, 1990). This view is especially important for developing countries where a tendency to copy and adopt models and approaches from developed countries has existed. Here, adoption rather than adaptation is made without considering the country's needs and reality. A key condition is the training of curriculum planners and educators in understanding and applying environmental education approaches.

As an educator involved in environmental education, the author was impressed to see the plethora of articles that attempt to provide environmental education conceptual frameworks. However, one is left wondering whether or not environmental education programmes are putting into practice these environmental education models.

3.3 THE STATE OF ENVIRONMENTAL EDUCATION

The literature associated with the state of environmental education reports progress and obstacles at the international, regional and national levels. This literature is most often UNESCO publications, especially UNESCO-UNEP EE Newsletters and reports. Most of the background information contained in these UNESCO

reports is provided by various national governments (Hall, 1992, Personal Communication). The researcher is wondering whether, in view of the suspected propaganda focus of many government pronouncements, this information is objective. In addition, most UNESCO reports have a certain "biased orientation" towards environmental education progress. Articles reporting obstacles and deficiencies are quite lean. This lack of information makes it difficult for researchers to identify problems that impede the development of environmental education programmes.

3.3.1 The International State of Environmental Education

The literature easily reveals the important role of UNESCO-UNEP as an international leader in environmental education affairs. Certainly, UNESCO's leadership is observed in numerous international and regional events sponsored by this organization. For example, the Stockholm Conference (1972); the Belgrade Workshop (1975); the Nairobi Conference (1976); the Tbilisi Conference (1977); and the Moscow Conference (1987) were benchmark congresses in the 1970's and 1980's (Baez, 1987 (a); Brown N, 1978; Dahlberg et al, 1985; Redclift, 1984; Stapp, 1980/81; Stapp et al, 1979 (a); UNESCO-UNEP-EE Newsletter, 1983 (a), 1978 (b), 1977, 1987 (c)). The Intergovernmental Conference on Environmental Education in Tbilisi, specifically, is noteworthy in this context. It is, perhaps, the international catalytic event which has become the starting-point for the international environmental education movement.

Teacher training is, perhaps, the international issue of major

concern encountered in the literature. Certainly, this theme is the focus of discussion of several UNESCO-UNEP documents. For example, the Environmental Education series in Training Seminars on Teacher Training in Environmental Education (Fensham and Hunwick, 1986; Hungerford et al, 1988; Lahiry et al, 1988; Muthoka and Rego, 1985; UNESCO-UNEP-IEEP, 1987; Wilke et al, 1987). A noteworthy point in these documents is that they contribute much information and insight as to strategies for the training of teachers in environmental education (Fensham and Hunwick, 1986; Hungerford et al, 1988; Lahiry et al, 1988; Muthoka and Rego, 1985; UNESCO-UNEP-IEEP, 1987; Wilke et al, 1987).

In addition to international environmental education progress, the literature also identifies some obstacles to efficient development of environmental education programmes in individual nations. The most severe obstacles include the lack of: national policies and mechanisms for the coordination of environmental education programmes, on-going research and assessment, allocation of human, financial and material resources (Agne et al, 1975 (a); Ambry, 1975; Childress, and Wert, 1976; Clark, 1975; Disinger, 1985/86; Ham and Sewing, 1987/88; Ham et al, 1987/88; Keack, 1976, 1973, 1978/79; Krasilchik, 1987; Miller K, 1984; Pomerantz, 1990/91; Railton, 1975; Schmieder, 1977; Stapp, 1974, 1984; Stapp et al, 1980/81; UNESCO, 1977 (b); UNESCO-UNEP, 1990).

The human resources theme is largely a discussion of the dimension of teacher training. This dimension has produced the largest body of comment. Several articles indicate that inadequacy

of teacher training is the major obstacle in developing national environmental education programmes and one of the most important national needs and priorities of environmental education (Adams et al, 1988; Baez, 1987 (a); Hepburn and Keach, 1974; Horn, 1978; IUCN, 1980; Lucko et al, 1982; Railton, 1975; Ritz, 1977; Stapp et al, 1980/81; Volk et al, 1984; Wilke, 1985). However, the literature fails to analyze inappropriate versus appropriate teacher training models in any detail.

3.3.2 The Regional State of Environmental Education

Beneath the international level of activity, the regional state of environmental education is best discussed in terms used by UNESCO-UNEP. Not surprisingly UNESCO is practically the only information source on regional initiatives. This source describes specific situations existing in Africa, the Arab States, Asia and the Pacific, Latin America and the Caribbean, Europe and North America (UNESCO-UNEP, 1990; UNESCO-UNEP EE Newsletter, 1979 (a,b), 1980 (a,c), 1981 (c)). This is because most regional environmental education events are supported by UNESCO-UNEP.

More specifically, UNESCO-UNEP dominated literature reveals that in the last two decades several regional environmental education workshops, seminars and conferences have been organized as an effort to improve the quality of environmental education programmes (UNESCO-UNEP-EE Newsletter, 1983 (a,b,d), 1978 (a,c), 1980 (b), 1986 (b), 1987 (b)). In these events, the training of environmental education teachers has been the major concern.

However, in spite of these regional efforts, key literature indicates that regions still present serious deficiencies in their environmental education programmes (UNESCO-UNEP, 1990). These deficiencies are associated with a regional bias for traditional environmental education approaches, strategies, and teaching materials. For example, the infusion of specific topics relating to conservation of natural resources, health and nutrition, and contamination into natural sciences curricula seems to be the strategy most used at the regional level. An underlying point in this literature is that these deficiencies are due to inadequate teacher training as well as to lack of investigation, experimentation and evaluation activities. In this context, it is also indicated that Africa and Latin America are the regions with greater deficiencies and needs. One wonders if this is true in the case of Venezuela, a Latin American country where a national environmental education programme has been put into practice.

3.3.3 The National State of Environmental Education

The UNESCO-UNEP Environmental Education Newsletter represents a major source in the periodic reporting of information relating to national environmental education initiatives. Most countries have had their programmes documented in this source. For example, Sri Lanka, Canada, The United States, Australia, Costa Rica, Tunisia, China, Rumania, India, Egypt, Sudan, Korea, Bulgaria, Indonesia, Thailand, Poland, the former Czechoslovakia, Cuba, the United Kingdom, Zaire, Japan, Colombia, Argentina, (UNESCO-UNEP-

EE Newsletter, 1983 (a,b,d), 1978 (a,c), 1980 (b), 1986 (b), 1987 (b)). This source is very rich in describing national environmental education efforts and progress. However, it is weak in reporting national environmental education obstacles. This bias is due to the inclination of most national governments to report only success and to hide failures, particularly when the audience is to be the international community. It appears obvious that in order to assess objectively the national environmental education state, external evaluations are needed, and this must pass judgement on the accuracy of state information and programme assessment.

Literature arising from research and evaluation activities carried out by academics provides more objective information on the national status of environmental education. It examines environmental education experiences from a more scientific and impartial perspective. This information reports progress and obstacles of environmental education activities in countries such as the United States, Canada, England, India, Australia and Israel. However, most of these reports refer to the United States experience (Adams et al, 1988; Atreya, 1987; Attfield, 1987; Bottinelli, 1976; Cherif, 1992; Childress, 1976, 1978; Hartman, and Hanna, 1987; Khoshoo, 1987; Kirk, 1980/81; Klee, 1982/83; Linke, 1977, 1980/81; Petterson, 1977; Pettus and Schwaab, 1978/79; Pettus and Teates, 1983; Tewksburry and Harris, 1982; Towler, 1980/81; Towler and Francis, 1980/81; Trent, 1983; Trojcak and Harvey, 1976). Interestingly, most national environmental education reports also reveal a great concern for the training of teachers,

indicating that lack and inadequacy of teacher training is the major national obstacle in developing environmental education programmes (Dushane, 1974; Lucko et al, 1982; Ritz, 1977; Rubba and Weisenmayer, 1988; Stapp et al, 1980/81; Taylor, 1988; Towler, 1980/81; Trent, 1983; Volk et al, 1984). It can be stated with confidence that teacher training programmes represent the first national need and priority in matters of environmental education.

In summary, examination of the literature related to the state of environmental education reveals that most environmental education programmes are not putting into practice the essential environmental education guidelines designed to achieve environmental education goals and objectives. One is left wondering if this situation is similar in the realm of environmental education teacher training programmes.

3.4 TEACHER TRAINING IN ENVIRONMENTAL EDUCATION

The literature related to teacher training is quite rich and varied. More specifically, a major issue frequently encountered is that training teachers is the key to the integration and implementation of environmental education into formal and non-formal education programmes (Baez, 1987 (a), 1986; Brown, 1975; Burdin, 1975; Eichler, 1977; Krasilchik, 1987; Michael, 1974; Rakow, 1985; Selim, 1977; Stapp et al, 1980/81; Steel et al, 1977; UNESCO, 1980; UNESCO-UNEP, 1987, 1990). The underlying point is that if teachers do not have the knowledge, skills and attitudes to "environmentalize" their curricula, it is unlikely that

environmentally literate students will be produced. Thus, the great challenge of teacher training colleges and universities is to help prospective teachers obtain the necessary knowledge, attitudes and skills for helping their students become more aware of their environment at all levels and in all subjects (Edmisten, 1985/86; Fensham, 1977; Selim, 1977; UNESCO, 1980). This suggests the need to incorporate environmental education into the teacher training curriculum. However, the literature reveals much hesitancy to have environmental education training as a mandatory task in these institutions. There is a dearth of articles associated with the compulsory character of environmental education teacher training, and the literature addressing this issue is quite weak in terms of argument (Bowman, 1978; Ritz, 1977; Rubba and Wiesenmayer, 1988; Wilke, 1985). However, a question can be posed: How may teacher training institutions face the challenge of educating environmental educators?

Further exploration of this theme covers major deficiencies in environmental education teacher training programmes. Articles describe shortcomings affecting the quality of teacher training and consequently environmental education in general. For example, an international survey conducted by UNESCO (1980) reveals that the number and quality of teacher training programmes in the world is far below an acceptable level. Although these findings are accepted cautiously, they are corroborated by national studies conducted by key researchers. For example, a survey of Canadian pre-service training in environmental education carried out by Towler

(1980/81), reported that a very small number of teachers is involved in environmental education and their academic background is not as strong as one might have hoped. Unfortunately, any recent assessments, if they have been undertaken at all, are not reported in the literature. This makes it difficult for researchers to know the real situation in Canada. Unquestionably, these findings should be of concern to Canadian education system administrators. In comparison is the Venezuelan case where international and national literature does not report evaluations of the environmental education teacher training programme.

Other studies reveal that teachers are not being adequately prepared to help environmentally literate students (Bluhm and Hungerford, 1976; Buethe and Smallwood, 1987; Byran, 1990; Ham and Sewing, 1987/88; Krasilchick, 1987; Lucko et al, 1982; Rakow, 1985). This is a critical concern to formal environmental education programmes as they can not be successful without competent training of teachers in this field. Associated studies indicate that teachers lack the environmental education knowledge, skills and attitudes necessary to deal with environmental problems (Bluhm and Hungerford, 1976; Champeau et al, 1980; Lucko et al, 1982; Peyton and Hungerford, 1980; Stapp et al, 1980/81; Steel et al, 1977; Taylor, 1988; Towler, 1980/81; Trent, 1983; Volk et al, 1984). It will be engaging to see if this is in fact the case of Venezuela.

More specifically, the literature reveals that one of the most serious deficiencies is the use of inappropriate strategies and methodologies in delivering environmental education programmes

(Caduto, 1984/85; Dushane, 1974; Hungerford and Peyton, 1976; Hungerford et al, 1988; Lahiry et al, 1988; Lewis, 1981/82; McCaw, 1979/80; Miller et al, 1990; Nichols, 1982; Raths, 1978; Ritz, 1977; Selim, 1977; Stapp et al, 1980/81; Timmerman, 1986; Towler, 1980/81; UNESCO, 1980; UNESCO-UNEP, 1990). This particular deficiency represents a critical point in the environmental education teaching-learning process. Selection and application of proper instructional methodologies determines the quality and effectiveness of the environmental message. For example, how can specific environmental education goals and objectives be achieved without the application of sound instructional methodologies? Undoubtedly, this theme is of crucial relevance to this thesis.

The process of integrating environmental education into teacher training programmes is also reported in this literature. Various authors present and describe experiences and training models for environmental education teachers (Caduto, 1984/85; Cortes et al, 1986; DuShane, 1974; Fensham, 1983; Gardella, 1979; Henning, 1980; Hungerford et al, 1988; Lahiry et al, 1988; Markowitz and Robottom, 1987; McKenna 1973; Muthoka, 1985; Ritz, 1977; Rubba and Wiesenmayer, 1988; Selim, 1977; Stapp et al, 1980/81; Wilke, 1985, 1987, 1980). They collectively suggest that environmental education teacher training programmes be developed through three approaches or strategies: the creation of a specific course in environmental education, the infusion of environmental education and methods components into existing programme courses, and the addition of courses of foundational components into the

curriculum. The reviewer is left wondering why a more holistic approach, having environmental education as a curricular axis of the total curriculum, is not discussed in this literature.

Several key authors indicate that any inadequacy associated with teacher training can be related to a lack of specification and determination of goals (Champeau et al, 1980; Hungerford et al, 1980; Rubba and Wiesenmayer, 1988; Simmons et al, 1989; Volk et al, 1984). Goals guide curriculum development. However, an important point is that clear statements of goals also serve to define the desired teacher product. This product is defined in the form of expected competencies.

Several authors spend time identifying the basic competencies required by an environmental educator (McKenna, 1973; Rubba and Wiesenmayer, 1988; Selim, 1977; Stapp, 1975 (a); Stapp et al, 1980/81; Wilke, 1985; Wilke et al, 1987, 1980). However, the most cogent message is that teacher training in environmental education must include both competencies in professional education and competencies in environmental education.

On reflection, the residual message coming from environmental education teacher training literature is that teacher training programmes in environmental education lack the proper competencies needed for training effective environmental education teachers.

3.5 COMPETENCY BASED TEACHER TRAINING

The literature associated with competency based teacher training has largely originated in faculties and schools of

education. Key authors indicate that clear statements of the knowledge, skills, behaviour and attitudes expected from a desired teacher provide guidance for developing teacher training programmes (Edwards et al, 1977; Hall and Jones, 1976; Houston, 1974; Joyce, 1974; Nash, 1973; Rosner, 1972). The underlying point is that a competency based teacher training approach helps to create models of teachers in terms of sets of competencies and these models enable teacher candidates to acquire the competencies necessary to play defined roles.

In the context of teacher training in environmental education, the need for specification of competencies has also been expressed by several authors involved in environmental education (Bowman, 1978; Champeau et al, 1980; McKenna, 1973; Rubba and Wiesenmayer, 1988; Selim, 1977; Stapp, 1975; Stapp et al, 1980/81; Wilke, 1985; Wilke et al, 1987, 1980; Volk et al, 1984). In other words, the literature suggests that the description of environmental education teacher training competencies must be a fundamental task in designing training programmes. It helps to identify the specific tasks that a competent environmental educator should be able to perform. However, in spite of the expressed need for a definition of environmental education competencies, the literature is weak in identifying competencies and presenting models.

In addition, research focusing on competency models appear to be quite sparse. However, studies referring to this issue emphasize the importance of determining competencies pertinent to environmental education teacher training (Caduto, 1985; Rubba and

Wiensemayer, 1988; Stapp et al, 1980/81; Wilke, 1985; Wilke et al, 1980). One relevant message coming from these works is that the training of teachers in environmental education must include professional and environmental education competencies. In this context, the UNESCO environmental education teacher training competencies model (Wilke et al, 1980) is reported to be the best structured and most comprehensive model. Unfortunately, the literature does not present an evaluation of this model. The suggestion is that the UNESCO model can serve as an international template for training teachers in environmental education (Wilke, 1985). This thesis will address this evaluation assessment void.

3.6 THE VENEZUELAN EXPERIENCE

The literature describing Venezuelan experience in environmental education appears fundamentally in government documents, and mainly in those generated by the ministries of the Environment and Education. It is evident that this literature is a simple response to government initiatives in matters of environmental education. It is restricted to the description of environmental education efforts in terms of programme design. Information recording the results of programme implementation and development is quite lean, and there are no articles associated with Venezuelan environmental education programme evaluation. Further, the literature arising from research and evaluation activities conducted by academics is quite scarce. Can this situation help the progress of environmental education programmes

in Venezuela? There is considerable doubt here.

More specifically, the Venezuelan literature is dominated by a description of the legal and conceptual bases of environmental education. The various laws, decrees, agreements, and action plans created by the state for governing national environmental education are discussed in depth (Congreso de la República de Venezuela, 1976 (a), 1976 (b), 1977, 1978, 1979 (b), 1980). For example, the promulgation of the Environmental Act (1976), the creation of the Ministry of the Environment (1977), and the reform of the Education Act (1980) represent key actions in the formalization and materialization of environmental education in Venezuela. This change empowers both Environment and Education ministries to share leadership in matters of environmental education. However, according to a key Venezuelan individual, this situation has generated serious environmental education coordination problems (Parilli, 1992, Personal Communication). This affects the efficient development of environmental education activities, especially in a country such as Venezuela where human, financial and material resources are extremely limited.

A theme that has occupied much attention in the literature is the description of the conceptual orientation of Venezuelan environmental education (Brito, 1990; MARNR, 1992 (b); MARNR, ME and SVCN, 1981). Most articles focus on environmental education definition, goals and objectives, approach and strategies. It is evident that the content of these elements is strongly influenced by UNESCO environmental education literature. One is wondering if

the theory reflected in these elements has been put into practice; and if so, what adjustments have been introduced in order to make it relevant to Venezuelan reality.

National strategy for integrating environmental education into the Venezuelan education system is also quite prominently discussed in the literature. Articles focus on the definition and progress of programmes of investigation and planning, formal education, non-formal education, technical assistance, environmental education dissemination, citizen participation, professional development and international relationships (Brito, 1990; MARNR-DEA, 1987). However, a significant message is the need for a national environmental education strategy that is in harmony with Venezuelan reality. In other words, a Venezuelan environmental education model must reflect national, natural and cultural characteristics (Brito, 1990; MARNR-DEA, 1987). One is left wondering whether this need is reflected in the Venezuelan environmental education teacher training programme.

In the context of environmental education programmes the literature also reveals a strong preoccupation with the formal education of young people. Most articles are dominated by descriptions of major characteristics of environmental education programmes at the levels of preschool, basic, and upper education (MARNR-DEA, 1980, 1987, 1989; Ministerio de Educación, 1989 (a,b)). However, little is written on the level of diversified and professional education. One is left with the impression that very little environmental education effort has been expended in this

education domain.

Another cogent message coming out of the literature related to environmental education strategy and programmes is that environmental education must be considered as a curriculum development problem. As a consequence, in Venezuela environmental education is a component of the preschool and basic school curriculum. However, a similar approach at the level of upper education is not discussed. Articles reveal that the addition of environmental education courses to the curriculum is the preferred strategy adopted by upper education institutes (Brito, 1990; MARNR-DEA, 1989). These courses focus on the solution of community environmental problems and the study of developmental issues from an environmental perspective. An interdisciplinary approach is neglected in the literature at this educational level.

An additional noteworthy point is the compulsory character of environmental education at the level of each upper education institute (Brito, 1990; ME 1989 (a,b); MARNR-DEA 1980). This policy represents substantial environmental education progress in Venezuela. It gives university students from every discipline - scientific, social and technical - the opportunity to absorb the environmental awareness necessary to appreciate how the decisions they take in their future professional lives will affect the environment and the quality of life. Consequently, this obligatory nature of environmental education is extended to teacher training programmes. More specifically, a mandatory environmental education course for every teacher candidate is included in the general

component of the teacher training curriculum (CICA/PNFD, 1989; CNU, 1985; UPEL, 1987 (a,b)). This initiative distinguishes Venezuela as one of the few developing countries with this experience.

In the realm of teacher training programmes of environmental education, the literature describes the UPEL model. The literature review of this model indicates that several modifications have been made to the model. However, there is no literature relating to evaluation reports. Unfortunately, successes and failures of this model are not known. This deficiency make it difficult for curriculum planners and evaluators to identify major weaknesses and strengths, a task which is fundamental for making the appropriate adjustments. The reviewer is wondering what criteria are being used by curriculum planners at UPEL to modify the existing environmental education teacher training model?

3.7 THE UNESCO AND VENEZUELAN TEACHER TRAINING MODELS

The literature review has revealed a critical deficiency in the training of teachers. This deficiency is related to the lack of proper professional and environmental competencies required of an effective environmental education teacher. One of the primary purposes of this research, therefore, is to assess the adequacy of the Venezuelan environmental education teacher training competency model. Relevant literature indicates that the quality of a competency based teacher education programme can be evaluated in terms of a comparison with other programmes (Gage and Winne, 1975; Joyce, 1974). In this research, the UNESCO model is used as an

international standard and the Venezuelan model is tested against this standard. Thus, this research will make an important contribution to comparative studies in environmental education teacher training programmes, especially in the realm of competency models.

CHAPTER IV

RESEARCH METHODOLOGY

4.1 PURPOSE

This chapter presents a description of the research methodology used to analyze and evaluate the Venezuelan environmental education teacher training competencies model. Much of this evaluation is related to a comparison of the Venezuelan model with the international standard proposed by UNESCO. The description is organized in terms of research questions, variables, approach, method, and techniques.

4.2 RESEARCH QUESTIONS

Analysis and evaluation of the Venezuelan model is guided by three research questions - one primary question and two secondary questions - and sets of companion questions that provide additional detail (Section 1.1 and Table 4.1). The questions are repeated here for the sake of convenience. A primary question seeks to evaluate the Venezuelan model by establishing a comparison with the UNESCO model. The question is: to what extent is the Venezuelan model congruent with the International model? Two secondary questions are necessary in order to test personal opinions and remove personal bias in view of the fact that the researcher is a university professor who may be too close to the issue. Secondary question number one is: to what extent is the Venezuelan model

TABLE 4.1 Research Questions in Analyzing and Evaluating the Venezuelan Model

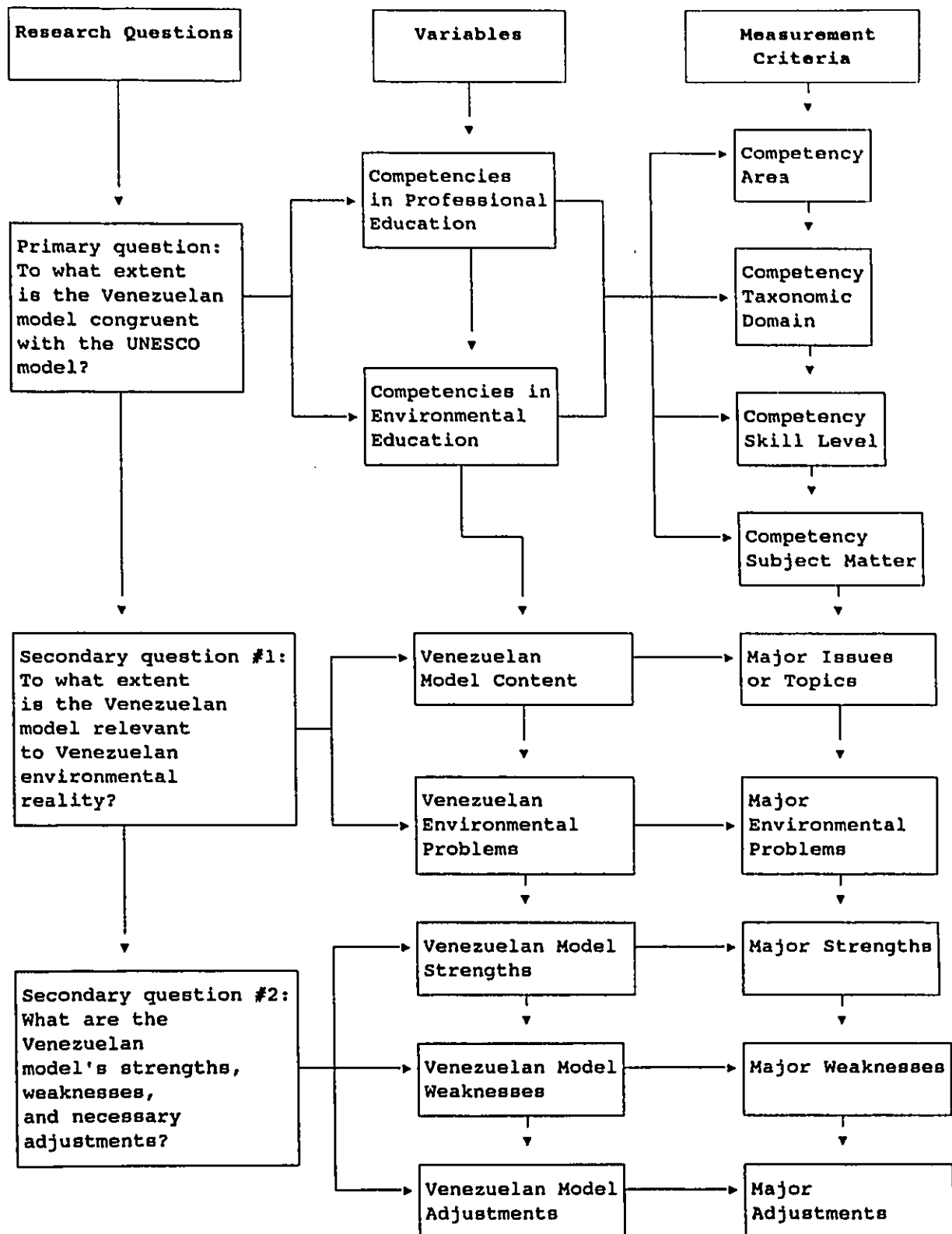
Research Questions	Companion Questions
PRIMARY QUESTION: 1. To what extent is the Venezuelan Model congruent with the International Model?	(a) What similarities exist between the International and Venezuelan Models in relation to Competencies in Professional Education? (b) What differences exist between the International and Venezuelan Models in relation to Competencies in Professional Education? (c) What similarities exist between the International and Venezuelan Models in relation to Competencies in Environmental Education? (d) What differences exist between the International and Venezuelan Models in relation to Competencies in Environmental Education?
SECONDARY QUESTION #1: 2. To what extent is the Venezuelan Model relevant to the country's environmental reality?	(a) What are the major environmental problems in Venezuela? (b) Does the UPEL Model contain the substance needed to enrich the training of Environmental Education teachers and, therefore, enhance society's objectives to address these problems?
SECONDARY QUESTION #2: 3. What are the Venezuelan Model's strengths, weaknesses and necessary adjustments?	(a) What are the major strengths of the Venezuelan Model? (b) What are the major weaknesses of the Venezuelan Model? (c) What adjustments are required for improving the Venezuelan Model and making it more sensitive to Venezuelan environmental reality?

relevant to the country's environmental reality? Secondary question number two is: what are the Venezuelan model's strengths, weaknesses and necessary adjustments?

4.3 RESEARCH VARIABLES AND ASSOCIATED MEASUREMENT CRITERIA

The research questions lead to the establishment of evaluation variables and associated measurement criteria (Figure 4.1). A comparison of the UNESCO and Venezuelan models is facilitated by two variables - competencies in professional education and competencies in environmental education. The former refers to general education knowledge, attitudes and skills sets related to the teaching - learning process. The latter refers to specific knowledge, attitudes and skills sets particular to environmental education. Each of these variables, therefore, will serve as a comparison marker in terms of competency area, subject-matter, taxonomic domain, and skill level. The competency area will permit recognition of the similarities and differences in terms of knowledge domains or fields used in the environmental education teacher training programme, for example, educational philosophy, instructional methodology and ecological foundations. The subject-matter analysis will allow identification of the similarities and differences in terms of specific themes or content involved in the competency areas associated with the environmental education teacher training programme including, by way of illustration, philosophical theories, outdoor education methods and human ecological concepts. The taxonomic domain will allow identification

Figure 4.1 Research Questions, Variables and their Associated Measurement Criteria 86



of similarities and differences between the models in cognitive and affective competencies. Finally, skill level will permit determination of similarities and differences between the models in terms of competency skills such as application, analysis and organization.

An analysis of the relevance of the Venezuelan model to the country's environmental reality is facilitated by two variables - the Venezuelan model's content and Venezuelan environmental problems. The former refers to the major issues or topics involved in the Venezuelan model. The latter refers to major Venezuelan environmental problems identified by strategically placed decision makers and managers. Each variable, therefore, will serve as a comparison marker and will be placed in terms of a list of major environmental education issues and environmental problems. This list will permit determination of similarities and differences between types of issues contained in the model and types of problems existing in the country. The characteristics of these problems are known to experts who are in a position to judge the value of environmental education in Venezuela.

An identification of the Venezuelan model's strengths, weaknesses and adjustments is facilitated by three variables - the Venezuelan model's strengths, weaknesses and adjustments. They refer to academic and administrative curriculum aspects involved in the Venezuelan model, such as structure, content and logistical support. Each variable, therefore, will serve as an assessment marker in terms of major strengths, weaknesses and adjustments.

4.4 RESEARCH APPROACH AND METHOD

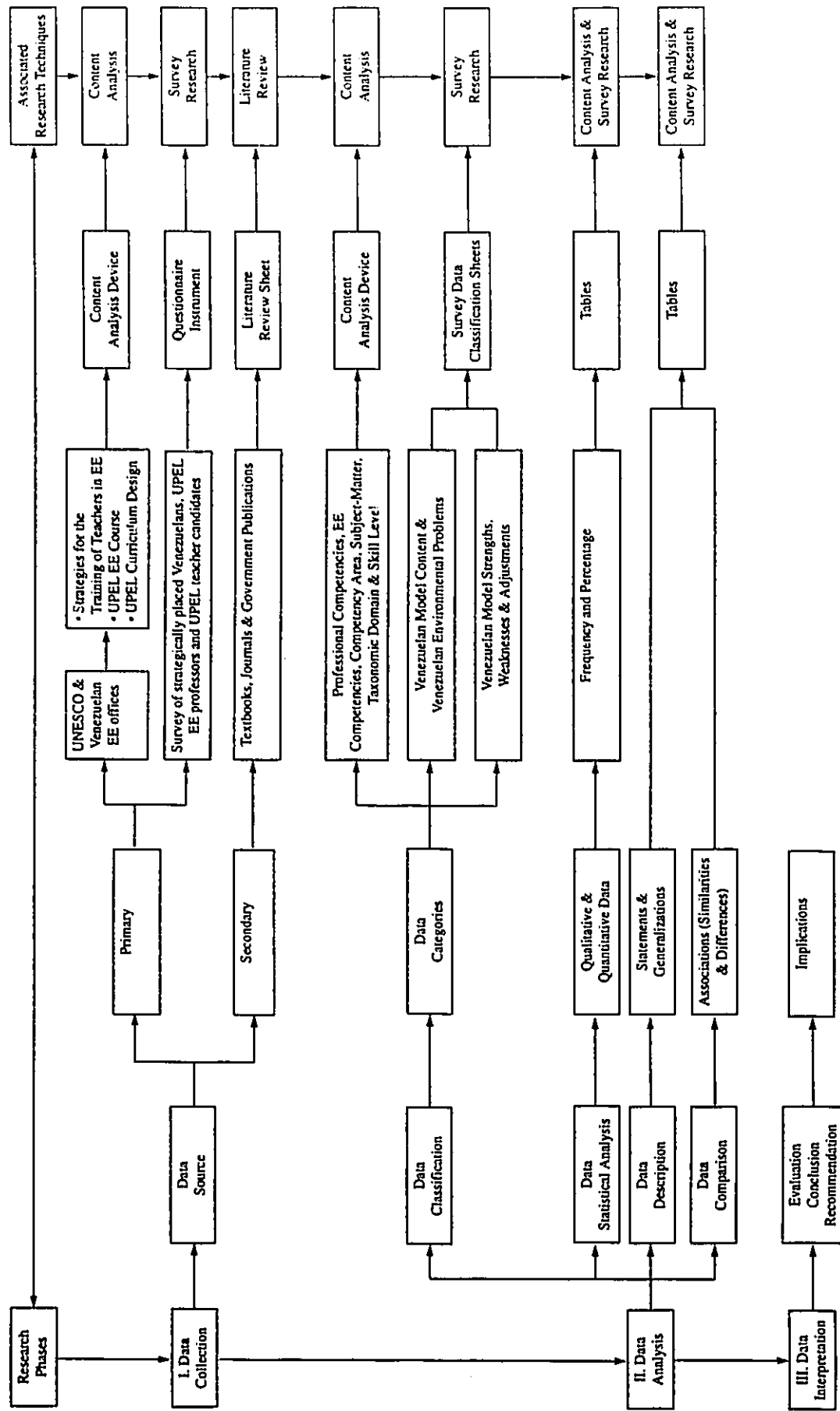
Study of the Venezuelan model uses a strategy of descriptive-comparative analysis. More specifically, the existing environmental education teacher training competencies established in the Venezuelan model are described and later compared with the competencies proposed by the UNESCO model. Complementary to this activity, evaluation also includes description and analysis of opinions of strategically placed Venezuelan individuals with active knowledge of the model and its relevance to the country's environmental reality. In addition, because of their positions in government, business, the NGO community, academia and the university community, they possess considerable insight into the model's strengths, weaknesses, and necessary adjustments.

Evaluation of the Venezuelan model is organized in terms of three major research phases established to meet the needs of the research questions and variables and their associated measurement criteria (Table 4.1 and Figure 4.1). The phases are data collection, data analysis and data interpretation (Figure 4.2). These phases are associated with a primary research technique - content analysis, and two secondary research techniques - survey research and literature review. Brief highlights of each phase and associated techniques are presented below. However, a description of each research technique is presented in Section 4.5.

4.4.1 Data Collection.

The relevant literature originated with primary and secondary

Figure 4.2 Research Methodology for Description and Analysis of the Venezuelan Model



sources. In comparing the UNESCO and Venezuelan models, primary data sources were UNESCO and UPEL environmental education offices. These offices provided the relevant documents needed for this study - strategies for the training of teachers in environmental education, the UPEL environmental education course, and UPEL curriculum design. Here, a content analysis device was used in the process of data collection (Table 4.2). The device included the variables and measurement criteria addressed in the present study. In analyzing and comparing the content of the Venezuelan model with environmental problems, as well as in identifying the Venezuelan model's strengths, weaknesses and adjustments, the primary data sources were a survey instrument applied to key Venezuelan individuals, UPEL environmental education professors and UPEL teacher candidates. The data were collected by a set of questionnaires (Appendices A,B,C, and D).

Secondary data sources were textbooks, journals, and government publications. A rigorous and detailed literature review of environmental education was utilized to develop a comprehensive understanding of the domain, to assess the relative importance of the various forms of publication, to trace the influence of authors in that discipline, and to clarify, to question or to suggest relationships in the descriptive - comparative study (Chapter III) (Chinapah and Miron, 1990; Force, 1978; Metress and Metress, 1976; Pomerantz, 1990/91). Literature review catalogue sheets were used in this exercise (Table 4.3). These sheets, including categories of major environmental education issues, were used to identify the

TABLE 4.2 Content Analysis Device

MODEL:

Categories of Analysis						Units of Analysis
Components	Areas	Competencies (Statements)	Taxonomic Domain	Skill Level	Subject Matter	Documents

TABLE 4.3 Literature Review Catalogue Sheet

Summary of Information Relative to Major Environmental Education Issues	Associated Authors
I. Environmental Education 1. Definition: 2. Goals and Objectives: 3. Guiding Principles: 4. Target Populations: 5. Content: 6. Instructional Methodology: 7. Instructional Resources: 8. Approaches II. State of Environmental Education: III. Teacher Training of Environmental Education: IV. Competency-based Teacher Training: V. The Venezuelan Experience: VI. The UNESCO and Venezuelan Models:	

most important works and their contributions.

4.4.2 Data analysis

All analysis involves data classification, statistical analysis, description and comparison (Best, 1978; Combs, 1974; Coombs, 1985; Eckhardt and Erman, 1977; Galfo, 1983; Johnson, 1977; Keeves, 1988; Slavin, 1984; Sowell and Casey, 1982; Wiersma, 1991). In this research, data and information collected in the content analysis device and questionnaire instrument were classified so that they could be grouped by categories according to the stated research questions, variables and measurement criteria (Figures 4.1 and 4.2). The content analysis device (Table 4.2) and survey data classification sheets (Tables 4.4 and 4.5) were used in this stage. These data and information were transformed into qualitative and quantitative tables expressed in terms of frequency and percentage in order to facilitate description and comparison (Quinn, 1987, 1980; Smith G., 1975; Smith P., 1980; Willis, 1985). Description was made by presenting a set of statements and generalizations related to the UNESCO and Venezuelan models and survey results according to research variables and measurement criteria. Comparison was made by establishing relationships between those descriptive statements and generalizations (Bereday, 1969; Holmes, 1981; Sodhi, 1983; Walker and Schaffarzick, 1977). In this study, comparison is only intended to demonstrate association without establishing cause - effect links (Galfo, 1983, 1975). Cause - effect relationships are beyond the realm of this thesis.

TABLE 4.4 Survey Data Classification Sheet Related to Key Venezuelan Individuals

Major Environmental Problems	Major Causes of Environmental Problems	Major Alternative Solutions to Environmental Problems	Summary of Statements of the Relevance of the UPEL Model to Venezuelan Environmental Reality and Needs

TABLE 4.5 Survey Data Classification Sheet Related to the UPEL Environmental Education Professors and Teacher Candidates

Summary of Statements of Strengths of the UPEL Model	Summary of Statements of Weaknesses of the UPEL Model	Summary of Statements of Adjustments to the UPEL Model

4.4.3 Data Interpretation

This phase consisted of the interpretation and evaluation of a set of findings in pedagogical terms. Here, the researcher's perception, knowledge, and intuition permitted the drawing of significant and useful study implications. It forms the basis for the generation of a set of conclusions and recommendations which may help Venezuelan decision makers improve the Venezuelan model.

4.5 RESEARCH TECHNIQUES

As stated in Section 4.4, a primary research technique - content analysis, and two secondary techniques - survey research and literature review, were involved in this research. A brief description of each is presented below.

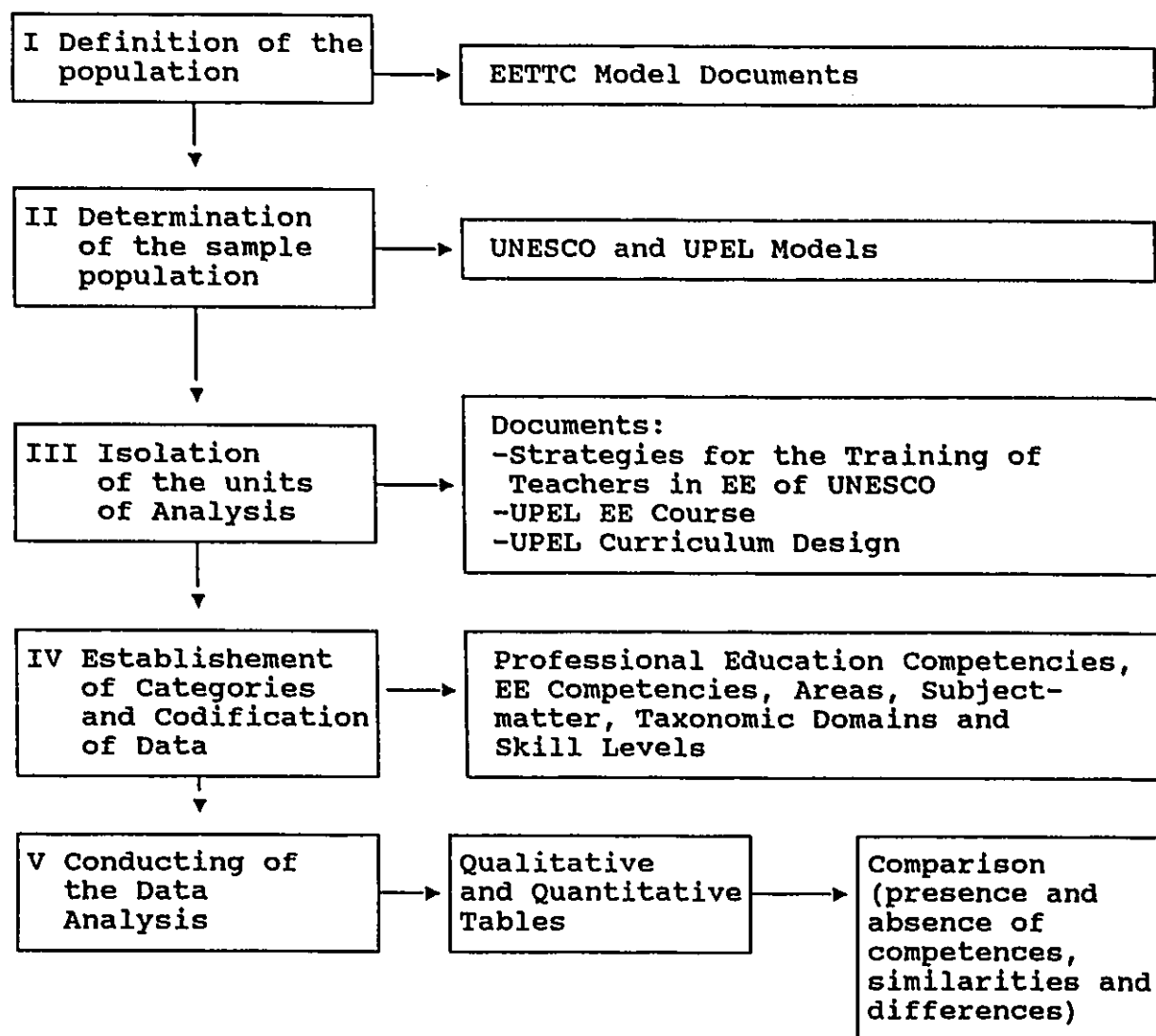
4.5.1 Content Analysis

This technique is used to extract data from documents and other written material in a systematic way (Budd et al, 1971; Carney, 1972; Galfo, 1975; Holsti, 1969; Krippendorff, 1980; North et al, 1963). As a research technique, it permits the objective and systematic description of specified characteristics of the content of information for making inferences which are summarized and compared (Carney, 1972; De Groot, 1969; Holsti, 1969; Kaplan, 1964). Content analysis has demonstrable use in analyzing situations needing decision making, on planning alternatives for instance, a situation with inherent potential for environmental education programmes development (Burrus-Bammel et al, 1988;

Flitter, 1978; Kirk and Karbon, 1986). In the context of this research, the content analysis approach of Burrus-Bammel (1988) was followed and applied (Figure 4.3).

In defining the population, the environmental education teacher training competency model documents comprised the population which formed the subject matter of this study. In determining the sample, the UNESCO and UPEL models were the samples of the study population. In isolating the units of analysis, three units were selected for the study of the UNESCO and UPEL models. They were documents related to UNESCO strategies for the training of teachers in environmental education, the UPEL environmental education course, and the UPEL curriculum design. In establishing categories and encoding the data, the study involved six major groups: competency components, competency areas, competency statements, competency taxonomic domain, competency skill level, and subject-matter. In encoding the data, a content analysis device containing the categories of study was employed to encode the data and information (Table 4.2). In conducting the data analysis, data and information were transformed into qualitative and quantitative tables used in the elaboration of a systematic comparison focused on similarities and differences which may exist between the UNESCO and Venezuelan models. The standards for this comparison were: the presence and absence of competencies, and similarities and differences in terms of categories established in the content analysis. This comparison permitted the identification of congruency between both models. From this account of congruency,

Figure 4.3 Basic Steps of the Content Analysis of the Unesco and Venezuelan Models



(Adapted with modifications from Burrus-Bammel et al, 1988)

or lack of congruency, relevant implications were discerned or inferences drawn, from which were elaborated a set of recommendations for improving the Venezuelan model.

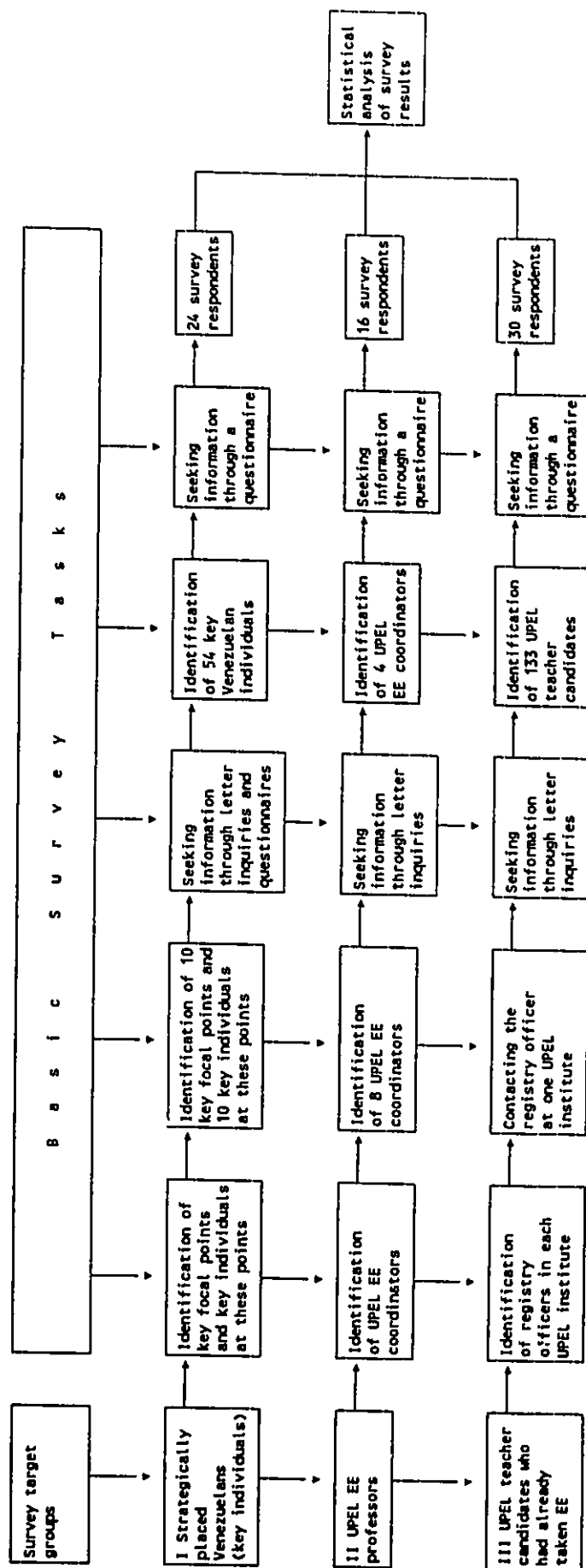
4.5.2 Survey Research

Evaluation methods may involve a survey as a technique in collecting and describing quantitative and qualitative aspects of educational projects and programmes (Babbie, 1973; Chinapah and Miron, 1990; Wiersma, 1991). The survey technique is considered an effective tool for evaluation of educational programmes since it provides a large amount of data and information from various groups of informants through the application of questionnaires (Chinapah and Miron, 1990; Galfo, 1983; Good, 1972; Wolf, 1985).

As stated previously, survey research is used as a secondary technique to remove bias of the researcher by gathering independent evidence and testimony from individuals involved in the Venezuelan model. More specifically, the survey probes strategically placed Venezuelans, UPEL environmental education professors and UPEL teacher candidates for criticism and comment on the relevance of the Venezuelan model to Venezuelan reality, and on the Venezuelan model's strengths, weaknesses and necessary adjustments. Figure 4.4 shows the tasks involved in each survey group.

Survey of Strategically Placed Venezuelans. The inquiry attempts to provide information related to major environmental problems and their connection with the environmental education teacher training programme in Venezuela. This survey demanded the

Figure 4.4 Basic Tasks Involved in the Survey of Strategically Placed Venezuelans, UPEL EE Professors and UPEL Teacher Candidates.



identification of key focal points and key individuals at these points. In other words, those key organizations and individuals actively involved in environmental education. In this context, two ministries dealing with the research problem were important resources. First, the Ministry of Environment, through its environmental education office and community organizations liaison office, was of vital importance. Second, the Ministry of Education and its planning office was also noteworthy.

A list of 10 key focal points and key individuals at these points was finally elaborated (Table 4.6), and questionnaires were mailed to each individual (Appendix A). They were asked to identify key Venezuelan individuals who might provide information in relation to environment and education in Venezuela. Information provided by these individuals served as a basis for the final selection of 54 key Venezuelans to whom a strategic questionnaire was mailed (Appendix B). As previously indicated, this survey instrument provided for comments on the relevance of the Venezuelan model to Venezuelan reality. The questionnaire contained items concerning the state of the environment in Venezuela and the content of the UPEL environmental education teacher training model. Of the list of 54 persons, 24 (44.4%) returned questionnaires (Table 4.7). This response, although somewhat disappointing, is considered more than acceptable in Venezuela (and in much of Latin America) where institutional lethargy and communication delays have a negative effect on expected returns (Marta Sosa, 1979; Morles, 1981). Fortunately, those who responded were well qualified

TABLE 4.6 Key Focal Points and Individuals at these Points

Key Focal Points		Key Individuals
1.	Environment	Hercilio Castellanos
2.	Education	German Flores
3.	Environmental Education	Fanny Parilli
4.	Ecology	Manuel Correa
5.	Environmental Groups	Guillermo Quintana
6.	N. G. Organizations	Sergio Antillano
7.	Academic	Omar Ovalles
8.	Parliamentary/Political	Rafael E. Martinez
9.	Industrial	Anibal Alarcon
10.	Media	Asdrubal Barrios

TABLE 4.7 List of Key Venezuelans Receiving and Responding to the Questionnaire

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Key Focal Points and Individuals at these Points		Approached	Responded
Environment	Hercilio Castellanos	✓	✓
	Aristides Romero	✓	
	Omar Carrero	✓	✓
	Marlene Arias	✓	✓
	Freddy Hermoso	✓	
	Norka Rojas	✓	
Education	Milagros Villasmil	✓	
	German Flores	✓	0
Environmental Education	Fanny Parilli	✓	
	Maria H. Hernandez	✓	✓
	Noris Salazar	✓	✓
	Gloria Luque	✓	
Non-Governmental Organizations	Jose Moya	✓	✓
	Celestino Flores	✓	✓
	Rafael Nunez Escalona	✓	
	Eduardo Buroz	✓	✓
	Susanna Ponds	✓	
	Angel E. Zambrano	✓	✓
	P. Perrone	✓	✓
	Omaira Delgado	✓	
	Cecilia Blohn	✓	✓
	Sergio Antillano	✓	✓
	Antonio de Licio	✓	
	Alexander Luzardo	✓	✓
	Etik Quiroja	✓	✓
	Aldemaro Romero	✓	✓
	Francisco Quero	✓	✓
	Giovanna Merola	✓	✓
Research	Manuel Correa Cruz	✓	✓
	Ricardo Hernandez	✓	✓
	Ketty Navarro	✓	
	L. Tobito	✓	✓
	Dolores Gonzalez	✓	✓
Parliamentary /Political	Arnoldo Gabaldon	✓	✓
Academic	Omar Ovalles	✓	
	Sonia Barrios	✓	
	Maria Pilar Garcia	✓	
	Pedro Duran	✓	
	David Bone	✓	
	Freddy Lozada	✓	
	Andres Banzart	✓	
	Tomas Bandes	✓	0
	Lenin Herrera	✓	
	Sara Aniyar	✓	
	Lucia Antillano	✓	
	Dinna Guitian	✓	
	Isbelia Sequera Tamayo	✓	
Industrial	Carlos Corrie	✓	✓
	Juan Carlos Sanchez	✓	
	Anibal Alarcon	✓	✓
	Haydee Franklin	✓	
Media	Maria del C. Polanco		
	Asdrubal Barrios	✓	
	Marta Aguirre	✓	0
TOTAL		54	24

individuals whose stature, experience and concern for the environment and environmental education in Venezuela is well recognized (Table 4.8).

Surprisingly, no response was obtained from key individuals associated with three important sectors - education, academic and the media (Table 4.5). In spite of the researcher's insistence on receiving the questionnaires back from these individuals, the usual chronic apathy was manifested. This may suggest that there are quite a number of individuals within the environmental education domain who are not fully convinced of the importance of research and evaluation activities as a means for improving environmental education programmes.

Survey of UPEL Environmental Education Professors. The additional survey of UPEL environmental education professors and teacher candidates attempts to provide relevant information relating to the UPEL model. This group, as users of the environmental education course, constitutes a fundamental target group in the process of UPEL model evaluation. The survey demanded the identification of environmental education coordinators in charge at the eight UPEL institutes (Figure 1.3). However, problems of lack of administrative and academic coordination of environmental education activities, coupled with a fear of critical evaluation in the UPEL institutes, resulted in an inability to estimate the total number of professors involved in environmental education in UPEL and a consequent low participation of professors (García, 1992, Personal Communication; Parilli, 1992, Personal

TABLE 4.8 Key Venezuelans Surveyed and their Connection to Venezuelan Environmental Organizations

Individuals by Sector	Organization
Environment	
1. Hercilio Castellanos	Ministry of the Environment (Planning and Policies Office)
2. Omar Carrero	Ministry of the Environment (Forest Planning Office)
3. Marlene Arias	Ministry of the Environment (Water, Soil and Vegetation Planning Office)
Environmental Education	
4. Maria H. Hernandez	CORPOVEN (Venezuelan Petroleum Corporation) (Environmental Education Office)
5. Noris Salazar	Ministry of the Environment (Environmental Education Office)
N. G. Organizations	
6. Jose Moya	FORJA (Association of Environmental Organizations and Boards)
7. Celestino Flores	Conservationist Society of Sucre State. University of Oriente (Oceanographic Institute). Latin American Association of Researchers in Sea Sciences. Venezuelan Association of Sciences
8. Eduardo Buroz	AUDUBON, Conservationist Society. Interamerican Centre for the Integral Development of Land and Water. Venezuelan Chamber of Petroleum
9. Angel E. Zambrano	Citizen Decision. Mayor of Baruta
10. P. Perrone	Neighbourhood School
11. Cecilia Blohn	FUDENA (Foundation for the Defense of Nature)
12. Sergio Antillano	FUDENA
13. Alexander Luzardo	Ecodevelopment Foundation. Universidad Central de Venezuela
14. Erik Quiroja	Club "Friends of UNESCO"
15. Aldemaro Romero	BIOMA Foundation, Venezuelan Foundation for Conservation of Biological Diversity
16. Francisco Quero	Scientific Journalism Club; (Venezuelan Society of Natural Science)
17. L. Tobito	CENAMB (Centre for Integral Environmental Studies)
18. Dolores Gonzalez	CENAMB
19. Giovanna Merola	Venezuelan Association of Women and the Environment
Research	
20. Manuel Correa Cruz	INTEVEP (Center for Petroleum Research and Technology) (Ecology Impact Office)
21. Ricardo Hernandez	INTEVEP (Environmental Regulations Office) (Environmental Protection Office)
Parliamentary/Political	
22. Arnoldo Gabaldon	Member of Parliament. Ex-Minister of the Environment. Adviser to the Ministry of the Environment. Professor, Universidad Simon Bolivar
Industrial	
23. Carlos Corrie	CORPOVEN - Venezuelan Petroleum Corporation (Environmental Impact Assessment Office)
24. Anibal Alarcon	AMBIOCONSULT C.A. (Environmental Consulting Office)

Communication).

As a consequence of these barriers, four of eight UPEL teacher training institutes participated in the survey - Caracas, Siso Martínez, Maturín, and the Institute for the Professional Improvement of Teachers; and 16 professors responded to the questionnaire (Table 4.9). The results were less than ideal but nevertheless informative. The professors were asked to address questions regarding their perceptions of the strengths, weaknesses and necessary adjustments of the UPEL model (Appendix C). The questionnaire was administered by the environmental education coordinators of each UPEL institute.

UPEL Teacher Candidates. The final survey employed was directed towards teacher candidates who had already been exposed to the environmental education course. It attempts to provide valuable insight into the UPEL model from a population exposed to its programme. This survey involved the identification of, and approaches to, registry officers at each UPEL institute with a view to identifying members of the student population. The ideal would have been to survey students from each UPEL institute. However, recurring administrative problems limited the survey to one of the UPEL institutes: the Siso Martínez Teacher Training Institute. The extremely unstable political situation in Venezuela during 1990-92 impeded the conduct of this survey in the other UPEL Institutes. For example, repeated interruption of educational activities by civil strife and resulting suspension of civil rights obstructed survey implementation. Some 133 students were identified as

TABLE 4.9 Survey of UPEL Environmental Education Professors

UPEL Institute	Environmental Education Professors		
	Total Number	Those Surveyed	Those Responding
Caracas	10	10	6
Barquisimeto		No Response	
Maturin	8	8	6
Maracay		No Response	
Siso Martinez	3	3	2
Mejoramiento Profesional	unknown	3	2
Rural "El Macaro"		No Response	
Rural "Gervasio Rubio"		No Response	
TOTAL	21	24	16

graduates of environmental education (Infante, 1993, Personal Communication). Thirty (22.55%) of those students answered the questionnaire (Appendix D). The selection of this survey group was made at random by the researcher at the facilities of the Siso Martínez Teacher Institute. Students were asked to respond to seven questions regarding their perception of the strengths, weaknesses and necessary adjustments needed of the UPEL model.

Now the research can move on to description and analysis of the UNESCO environmental education teacher training competencies model. The UNESCO model serves as an international standard to evaluate the Venezuelan model.

Chapter V

THE UNESCO ENVIRONMENTAL EDUCATION TEACHER TRAINING COMPETENCIES MODEL

5.1 PURPOSE

The purpose of this chapter is to describe and critically analyze the UNESCO environmental education teacher training model. The model was prepared under contract with UNESCO by Wilkie, Point, Peyton and Hungerford in 1980. A later version of the model appeared in 1988. The model, as part of a package entitled "Strategies for the Training of Teachers in Environmental Education", serves as a guide for UNESCO training workshops on environmental education. Its specific focus is the ledger of teacher training competencies considered mandatory for all environmental education professionals or teachers (Wilke et al, 1980). The UNESCO model is primarily composed of two (2) major competency components: professional education and environmental education competencies. Competencies associated with these components define the desired teacher product in the model.

Description and analysis are organized in terms of research variables and their associated measurement criteria (Figure 4.1). The data and information used were derived from a systematic content analysis of critical documents describing these competencies. The content analysis procedure used is presented in detail in Appendix E.

5.2 COMPETENCIES IN PROFESSIONAL EDUCATION

Competencies in professional education are associated with a set of basic pedagogical knowledge, attitudes and skills required by environmental educators in order to guide the teaching-learning process associated with environmental education. The UNESCO model includes ten (10) such foundational competency statements that represent the philosophical reference for the development of competency foci (Table 5.1). These statements are associated with specific competency areas, subject-matter, taxonomic domains, and skill levels. A detailed description of these elements is presented in Appendix F.

5.2.1 Competency Areas

The UNESCO model also embraces nine (9) competency areas of professional education (Table 5.2). As previously indicated, they have been identified within the "Foundational Competency Statements" just presented (Table 5.1). These areas range from educational philosophy to evaluation of environmental education curricula and methods. Their major focus is the discussion of a set of principles, theories and methods associated with the selection, implementation, development and evaluation of environmental education programmes. The competency statements associated with these areas are very general. This situation is in contradiction to the principle that demands a precise specification of what is to be learned (Houston, 1985; McDonald, 1974; Mehne and Davis, 1979/80). The intention of the UNESCO model is to give teacher

TABLE 5.1 Foundational Competency Statements in Professional Education of the UNESCO Model¹

The effective Environmental Education teacher should be able to:	
1.	apply a knowledge of educational philosophy to the selection and/or development of curricular programmes and strategies to achieve both general and Environmental Education goals;
2.	utilize current theories of moral reasoning in selecting, developing and/or implementing Environmental Education curricula which will effectively achieve the accepted goals of Environmental Education with selected receiver groups;
3.	utilize current theories of knowledge/attitude/behaviour relationships in selecting, developing and/or implementing a balanced curriculum which maximizes the probability of desired behaviour changes in receivers;
4.	utilize current theories of learning in selecting, developing and implementing curricular materials and teaching strategies to effectively achieve Environmental Education goals with selected receiver groups.
5.	apply the theory of transfer of learning in selecting, developing and implementing curricular materials and strategies to ensure that learned knowledge, attitudes, and cognitive skills will be transferred to lifestyle decision-making by receivers;
6.	select effective instructional methodologies which are appropriate for desired cognitive and affective outcomes, receiver characteristics and available facilities;
7.	effectively implement the following methodologies to achieve Environmental Education goals:
	(a) outdoor education methods
	(b) affective education methods (e.g. values clarification, Bank's inquiry model, moral dilemma model)
	(c) simulation games (including role playing)
	(d) case study methods
	(e) community resource use (ecological, issue related, human resources)
	(f) methods of autonomous student and/or group investigation, evaluation and action planning for resolving environmental issues
	(g) appropriate teacher behaviour while handling controversial environmental issues;
8.	develop and use effective means of planning for instruction;
9.	effectively infuse appropriate Environmental Education curricula and methods into all disciplines to which the teacher is assigned;
10.	effectively evaluate Environmental Education curricula and methods achievement with receivers in both cognitive and affective domains.

¹ These statements include, in bold lettering, specific competency areas which are identified in Table 5.2 by number (1 - 10).

TABLE 5.2 Professional Education Competency Areas, Taxonomic Domains and Skill Levels of the UNESCO Model

Areas and Associated Competency by Number ¹	Taxonomic Domains										
	Cognitive Skill Levels						Affective Skill Levels				
	1	2	3	4	5	6	1	2	3	4	5
I. Educational Philosophy 1			√								
II. Theories of Moral Reasoning 2			√								
III. Theories of Knowledge, Attitude and Behaviour Relationships 3			√								
IV. Theories of Learning 4			√								
V. Theory of Transfer of Learning 5			√								
VI. Instructional Methodologies 6	√										
7			√								
VII. Means of Planning for Instruction 8			√								
VIII. Infusion of Environmental Education Curricula and Methods 9			√								
IX. Evaluation of Environmental Education Curricula and Methods 10						√					
TOTAL No. 10	1	-	8	-	-	1	-	-	-	-	-

¹ Number after each specified "area" refers to the competency identified in Table 5.1

Recognized Cognitive Domain dealing with skills in:

1 knowledge 2 comprehension 3 application 4 analysis 5 synthesis 6 evaluation

Recognized Affective Domain dealing with skills in:

1 receiving 2 responding 3 valuing 4 organization 5 characterization

SOURCE: Adapted from Wilke, Point, Peyton and Hungerford, 1980; Wilke, Peyton and Hungerford, 1987

training institutions a flexibility template that allows them to refine these statements into more specific ones to meet their own needs. However, one wonders if some less mature countries, especially those lacking education planning expertise, are in a position to take advantage of this opportunity.

5.2.2 Competency Subject Matter

The subject matter of professional education competencies is associated with a set of specific pedagogic topics or themes. Analysis of this subject matter reveals much variety and detail. This richness is to be commended. But, many topics proposed by the UNESCO model do not always match the competency statements. More specifically, some topics enlarge the scope of the original competency statements. However, it is desirable that the subject matter or topics be directly related to the competency statements or, as education history reveals, performance standards and teacher interpretation errors can result. In other words, there is little linkage. This is often the consequence of lack of training in the curriculum design area. As stated in Chapter III, in delineating educational competencies, there should be a close relationship between the knowledge, attitude or skill expected in each competency and the specific content or subject matter serving as a means for achieving such competency. For example, if the knowledge and/or skill of problem solving methodology is expected to be achieved in the programme, then only topics associated with problem solving must be indicated.

In addition to the lack of congruency between topics and competency statements, the researcher also finds a certain lack of organization and coordination in the presentation of subject matter or topics. More specifically, topics proposed for a specific competency are often presented without prioritization or ordering. For example, the model suggest a global list of topics which supposedly are associated with more than two different competencies.

Educational Philosophy. This competency area is associated with the application of knowledge of educational philosophy to the selection and development of environmental education programmes. According to the UNESCO model, all educators should be aware of the philosophical basis for education in their own society. This philosophical reference needs to be emphasized in environmental education teacher training programmes. Specifically, the model suggests the study of philosophies such as Experimentalism or Reconstructionism. These theories maintain that education curricula should be based on individuals' experiences. Experience here means an active process of interaction between the human organism and its natural and social environment. This experience process is indispensable for an appreciation of and a basic approach to problems. In this context, these theories sustain the idea that individual interests and needs are used as the basis to solve problems (Brameld, 1971; Childs, 1931; Dewey, 1971; Emerson, 1981, 1970, 1960, 1962; Henderson, 1947; Ozmon, 1973; Withall, 1985; Wynne, 1963). Certainly, many general education goals, methods and

materials supported by these philosophies, are entirely consistent with environmental education. This form of education considers students' experiences, interests and needs in the teaching-learning process. In addition, problem solving is a primary approach to environmental education.

In addition to this subject matter, the UNESCO model recommends inclusion of other topics such as: differentiation among environmental education, conservation education, outdoor education and outdoor recreation concepts; the goals of environmental education as endorsed by the Tbilisi conference; the need for local, regional, national and global environmental education; and the logic behind a holistic view of the environment (Appendix E). These topics do not fit into these particular competency statements. In other words, little congruency exists between these topics and the subject matter involved in the competency statements presented. The researcher recognizes the importance of these topics in environmental education. Therefore, a better organization of them in terms of competency statements seems to be a necessary task. It may demand the delineation of new competency statements embracing these topics.

Theories of Moral Reasoning. This competency area deals mainly with theories of moral development. Specifically, Kohlberg's and theories of valuation processes are strongly recommended by the UNESCO model. Certainly the cognitive - developmental approach for exploring moral development is fully consistent with environmental education. This theory focuses primarily on the interaction of the

individual with his environment (Ayim, 1985; Beardsmore, 1969; Berglin, 1985; Boyce and Jensen, 1978; Galbraith and Jones, 1976; Isaksson, 1979; Kauchak et al, 1978; Kohlberg, 1976 (a); Phillips, 1985). Therefore, an understanding of this subject matter is important when teachers deal with attitudes and processes in the affective domain. Moral responsibility at individual and community levels is extremely important to environmental education.

In spite of the competency statement referring exclusively to moral reasoning theories, the model suggests the consideration of other topics associated with values education strategies and research. Again, these topics are primary concerns of environmental education. However, they do not fit into this specific competency statement. Therefore, it is necessary to determine whether to place them in competencies related to instructional methodology and research or to re-define the original competency statement. In any case a serious review of competency statements and their subject-matter is required.

Theories of Knowledge/Attitude/Behaviour Relationships. This competency area focuses on the utilization of theories associated with relationships among knowledge, attitudes and behaviour. According to the model, these theories are important when selecting, developing and implementing a balanced curriculum. Environmental educators often assume linear relationships among ecological knowledge, positive environmental attitudes and environmentally ethical behaviour, however current research demonstrates the need for a balanced curriculum in terms of these

relationship categories. The model does not refer to any particular theory. It assumes that teachers may easily identify such theories. What if they do not?

Theories of Learning. The nature of many environmental education goals and objectives is problem solving. Learning theories help in developing problem solving abilities. They also guide the selection of materials and strategies for specific receiver age levels. In this context, the UNESCO model suggests the inclusion of the theories of Piaget, Bruner, and Gagne. A relationship between these theories and the selection, development and implementation of environmental education curricular materials and teaching strategies is necessary.

Social learning theory should also be associated with environmental education. This theory is based on the assumption that the pattern of behaviour people acquire is primarily the result of interaction with other people (Bandura, 1977; Klein and Bower, 1975; Thomas, 1985 (b)). This assumption is useful in the process of environmental awareness development.

Consideration of physical and intellectual development in the planning of environmental education experiences is also considered in this model. Interestingly, in this competency category the model proposes the consideration of special student populations for environmental education, such as the disadvantaged, gifted and disabled. Consideration of these student populations is fundamental since environmental education embraces the education of the total population. In addition, teachers should know how to deal with

these specific target groups.

Theory of Transfer of Learning. This competency area is considered particularly important by the authors of the UNESCO model. It indicates that the ultimate goal of environmental education is to produce environmentally literate citizens who are willing to take and are capable of taking positive environmental action in their lives. Therefore, teachers need to teach students how to transfer knowledge, attitudes and cognitive processes. In this context, principles of transference associated with the learning of environmental education is a basic topic in this area.

Instructional Methodologies. The critical importance of instructional methodologies in teacher training programmes has been demonstrated not only by educational leaders (Banks, 1973; Friedman et al, 1980; Pearson, 1989; Slavin, 1984; Walberg, 1985), but also by key authors of environmental education (DuShane, 1974; Ritz, 1977; Stapp et al, 1980/81; Towler, 1980/81). The UNESCO model includes two competencies in this area (6,7). The first competency relates to the selection of effective instructional methodologies. Criteria for this selection should include the type of desired cognitive and affective outcomes, receiver characteristics and available facilities. The second competency refers to the implementation of specific methodologies. A set of seven (7) methodologies to achieve environmental education goals is proposed by the UNESCO model (Table 5.1). Teacher training in these competencies must be a major task of environmental education programmes.

In addition, the model considers the theme of utilization of resources. More specifically, the model suggest the inclusion of themes related to community resource use at the local and regional levels, resource inventory procedures, and teacher guidelines in methods of resource utilization. But again, the competency statement does not refer to the selection and implementation of instructional resources for environmental education. Topics dealing with instructional resources should be embraced in specific competencies relating to this subject matter.

Means of Planning for Instruction. The subject matter involved in this competency area is not very clear. The competency statement focuses on the development and use of effective means of planning for instruction. However, this statement is too general to permit understanding of exactly what teacher candidates are expected to do. The result of this problem is just confusion in determining the subject matter needed for achieving this competency. It is the researcher's opinion that this competency statement should be redefined in terms of more clear and precise information relating to types and means of planning and their relationship to environmental education. Themes suggested by the model are not consistent with the competency statement. For example, the subject matter is primarily focused on curriculum components and goals. Therefore, it should be the major concern of the competency statement. Means of planning for instruction involve conceptual models, process theories of curriculum, structural curriculum theories and theories of curriculum implementation

(Beone, 1986; Cruickshank, 1984; Foa, 1989; Paz, 1976; Richey, 1986; Taba, 1962). Linkage of these elements is especially important in planning environmental education instruction. Unfortunately, the subject matter of the UNESCO model is not presented in a systematic or structured way, and because the consideration of material sequence is lacking, the model's instructional value is limited. The effort in associating environmental education with curriculum theory is deficient in its conceptual and technical nature. For example, curriculum development is only focused on goals. However, "goals" is only one of the various elements to be considered in curriculum development and by itself does not accomplish the achievement of the competency statement. Preparing for instruction is associated with a set of basic curriculum concepts where instructional methodologies and resources are not considered. Curriculum models are only associated with monodisciplinary, infused and interdisciplinary curricula. Conceptual models of curricula based on interactions, problem solving and social action are consistent with environmental education.

In summary, analysis of this competency area suggests the need for a better organization of these topics in terms of the competency statements and the contribution of curriculum theory to the planning of environmental education.

Infusion of Environmental Education Curricula and Methods. This title refers to the infusion of appropriate environmental education curricula and methods into all disciplines to which the

teacher is assigned. That is to say, environmental education content should be infused into every area of study in which educators teach. The strong preference of the model for the infusion strategy is obvious. The subject matter suggested for this competency is inconsistent and with the competency statement. In addition to topics related to problems, strategies, advantages and disadvantages associated with the implementation and evaluation of an infused environmental education curriculum, the model also includes topics related to monodisciplinary and interdisciplinary curricula. This subject matter is not reflected in the competency statement. Lack of consistency is also observed in the recommendation for case studies illustrating successful interdisciplinary environmental education programmes. This is not the central theme of the competency statement.

This competency area is critical for environmental education teachers. It is the researcher's opinion that analysis of every possible environmental education strategy should be included along with demonstration of different experiences of programmes, even when they have not been successful. Teachers need to know many different ways of dealing with environmental education and its relationship with the total education curriculum. To know strategies, limitations and advantages, as well as failures and successes of specific cases, may be an enriching learning experience.

Evaluation of Environmental Education Curricula and Methods.

This competency refers to the evaluation of environmental education

curricula and methods achievement in both the cognitive and affective domains. The major emphasis is on environmental education evaluation programmes. However evaluation of learning experiences in terms of students' achievements in both domains, cognitive and affective, is not clear in the competency statement.

Problems and strategies associated with the evaluation of an infused environmental curriculum is the only subject matter established in the UNESCO model. Again, preference for infusion is revealed in the model.

In conclusion, the subject matter associated with professional education competencies of the UNESCO model is relevant to environmental education. However, the way in which the model expresses these competencies can be confusing to environmental education teachers, especially for those who are not well trained in the field of environmental education.

5.2.3 Competency Taxonomic Domains

As expressed in Chapter II, educational competencies are associated with cognitive and affective knowledge, attitudes and skills. In the context of the UNESCO model, all ten professional education competencies are cognitive (Table 5.2). These cognitive competencies attempt to help teacher candidates acquire the basic knowledge of professional education for use in environmental education.

5.2.4 Competency Skill Levels.

Skill levels of professional education competencies refer to aptitudes or abilities involved in each cognitive and affective competency (Chapter II). Cognitive competencies of professional education are associated with three skill levels: knowledge (1), application (3) and evaluation (6) (Table 5.2). However, most competencies attempt to develop application skills (8). It is evident that the professional education competencies of the UNESCO model are practical by nature and have been established with the intention of being applied to environmental education.

5.3 COMPETENCIES OF ENVIRONMENTAL EDUCATION

Competencies related to environmental education content are the second set of competencies required to achieve environmental education teacher training goals. The UNESCO model includes nineteen (19) basic content competencies which represent unique applications of knowledge, attitudes, behaviour and skills (Table 5.3). These competencies, like the foundational competencies, are associated with specific competency areas, subject matter, taxonomic domains, and skill levels. A detailed description of these elements is presented in Appendix E.

5.3.1 Competency Areas

The UNESCO model embraces four (4) competency areas of environmental education (Table 5.4). They have been identified within the "Environmental Education Content Statements" (Table

TABLE 5.3 Competency Statements of Environmental Education Content of the UNESCO Model¹

I Ecological Foundations	III Investigation and Evaluation
The effective Environmental Education teacher should be able to: 1. apply a knowledge of ecological foundations to the analysis of environmental issues and identify key ecological principles involved; 2. apply a knowledge of ecological foundations to predict the ecological consequences of alternative solutions to environmental problems; 3. be sufficiently literate in ecology to identify, select and interpret appropriate sources of scientific information in a continuing effort to investigate, evaluate and find solutions for environmental problems; 4. communicate and apply in an educational context, the major concepts in ecology.	The effective Environmental Education teacher should be competent to investigate environmental issues and evaluate alternative solutions and to develop, select and/or implement curricular materials and strategies which will develop similar competencies in receivers, including: 12. the knowledge and skills needed to identify and investigate issues; 13. the ability to analyze environmental issues and the associated value perspectives with respect to their ecological and cultural implications; 14. the ability to identify alternative solutions for discrete issues and the value perspectives associated with these solutions; 15. the ability to autonomously evaluate alternative solutions and associated value perspectives for discrete environmental issues with respect to their cultural and ecological implications; 16. the ability to identify and clarify their own value positions related to discrete environmental issues and their associated solutions; 17. the ability to evaluate, clarify and change their own value positions in light of new information.
II Conceptual Awareness	IV Environmental Action Skills
The effective Environmental Education teacher should be able to select, develop and/or implement materials which will effectively make receivers aware of: 5. how man's cultural activities influence the environment from an ecological perspective; 6. how individual behaviour impacts on the environment from an ecological perspective; 7. a wide variety of local, regional, national and international environmental issues and the ecological and cultural implications of these issues; 8. the viable alternative solutions available for remedying discrete environmental issues and the ecological and cultural implications of these alternative solutions; 9. the need for environmental issue investigation and evaluation as a prerequisite to sound decision making; 10. the roles played by differing human values in environmental issues and the need for personal values clarification as an integral part of environmental decision making; 11. the need for responsible citizenship action in the remediation of environmental issues.	The effective Environmental Education teacher should be competent to: 18. take positive environmental action for the purpose of achieving and/or maintaining a dynamic equilibrium between quality of life and quality of the environment; 19. develop, select and/or implement curricular materials and competencies in receivers to take individual or group action when appropriate (e.g. persuasion, consumerism, political action, legal action, ecomanagement, or combinations of these action categories).

¹ These statements include, in bold lettering, specific competency areas which are identified in Table 5.4 by number (1 - 19).
SOURCE: Adapted from Wilke, Point, Peyton and Hungerford, 1980; Wilke, Peyton and Hungerford, 1987

TABLE 5.4 Environmental Education Competency Areas, Taxonomic Domains and Skill Levels of the UNESCO Model

Areas and Associated Competency by Number ¹		Taxonomic Domains											
		Cognitive Skill Levels						Affective Skill Levels					
		1	2	3	4	5	6	1	2	3	4	5	
I. Ecological Foundations	1	✓		✓									
	2			✓									
	3	✓	✓										
	4			✓		✓							
II. Conceptual Awareness	5	✓		✓		✓		✓					
	6	✓		✓		✓		✓					
	7	✓		✓		✓		✓					
	8	✓		✓		✓		✓					
	9	✓		✓		✓		✓					
	10	✓		✓		✓		✓					
	11	✓		✓		✓		✓					
III. Investigation and Evaluation	12	✓		✓	✓	✓	✓						
	13	✓		✓	✓	✓	✓						
	14	✓		✓	✓	✓	✓						
	15	✓		✓	✓	✓	✓						
	16	✓		✓	✓	✓	✓				✓		
	17	✓		✓	✓	✓	✓				✓	✓	
	IV. Environmental Action Skills	18								✓			
19		✓		✓		✓							
TOTAL No.		19	16	1	17	6	15	6	7	1	-	2	1

¹ Number after each specified "area" refers to the competency identified in Table 5.3

Recognized Cognitive Domain dealing with skills in:

1 knowledge 2 comprehension 3 application 4 analysis 5 synthesis 6 evaluation

Recognized Affective Domain dealing with skills in:

1 receiving 2 responding 3 valuing 4 organization 5 characterization

SOURCE: Adapted from Wilke, Point, Peyton and Hungerford, 1980; Wilke, Peyton and Hungerford, 1987

5.3). These areas range from Ecological Foundations to Environmental Action Skills. Their major focus is the discussion of a set of issues related to ecological concepts and principles, environmental awareness, investigation and evaluation skills and citizenship action. The relationship between these areas and environmental education goals and objectives established in the Tbilisi Conference is evident.

5.3.2 Competency Subject Matter

The subject matter of environmental education competencies is associated with a set of specific topics or themes related to competency statements in each competency area (Table 5.5).

Ecological Foundations. This area embraces four (4) competencies and is associated with a set of basic ecological concepts and principles (1-4). These concepts and principles range from individuals, populations, communities and ecosystems, as legitimate organizational levels in nature, to the population as an organizational level of the basic unit of the ecosystem. It is desirable that the selection and development of these concepts have a practical usefulness when analyzing environmental issues, identifying key ecological principles involved and predicting ecological consequences of solutions to environmental problems.

Conceptual Awareness. This competency area is perhaps the major concern of environmental education leaders (Chapter III). It includes the largest number of environmental education competencies in the UNESCO model (5-11). All of them are aimed at making

TABLE 5.5 Major Ecological Concepts and Principles According to the UNESCO Model

1.	Individuals, populations, communities and ecosystems represent legitimate organizational levels in nature which must use homeostatic mechanisms to cope with the laws of the universe (e.g. laws of thermodynamics) and the forces of change in the environment, in order to survive.
2.	Changes in the environment or the internal structure of these organizations will predictably cause responses within, as the organization attempts to maintain a homeostatic existence.
3.	Populations are organizations of interacting individuals of the same species inhabiting the same geographical area at the same time.
4.	Ecological communities are organizations of populations interacting (e.g. competition, symbiotic relations, predation/parasitism) within a specified geographical region and time.
5.	Communities interact with non-living (abiotic) factors at a more complex organizational level (ecosystems).
6.	Energy flows through and matter must recycle in ecosystems.
7.	Succession is the process of ecosystems changing with time, generally from a less complex stage to a more complex and mature stage.
8.	There is a general decrease in excess potential energy and in energy flow per unit of biomass as ecosystems change to more mature stages.
9.	When the organization of an ecosystem is disrupted as through exploitation, the maturity of the ecosystem declines.
10.	The population as an organizational level is the basic unit of the ecosystem. Each population occupies a specific functional niche which "fits" into the organization of the ecosystem (e.g. as part of the energy flow and biogeochemical cycles).

SOURCE: Adapted from Wilke, Point, Payton and Hungerford, 1980; Wilke, Payton and Hungerford, 1987

students aware of environmental problems. In this context, the environmental impact of humankind's cultural activities and the individual's behaviour represents an important topic. Awareness of environmental problems demands the analysis of local, regional, national and international environmental issues. The ecological and cultural implications of these issues contribute much to the development of environmental awareness. In addition to the subject matter of environmental problems, the model also involves themes of alternative solutions to such environmental problems. The ecological and cultural implications of these solutions are also emphasized.

Awareness of the need for environmental issue investigation and evaluation, personal values clarification and responsible citizenship action are considered primary concerns of sound environmental decision making. Certainly, in solving environmental problems these three aspects are essential. However, responsible citizenship action is particularly important in teacher training programmes since educators are environmental leaders. As examples of environmental actions, the UNESCO model mentions: persuasion, consumerism, legal action, political action and ecomanagement. However, action more directly related to education should be, but is not, mentioned.

In addition, the UNESCO model includes subject matter related to research and teaching methods of awareness education. This subject matter is very important in environmental education, however, it is out of the competency statements' reach. The topics

of research and teaching methods of awareness education should either be replaced in their proper competencies, or be added to the statement of this competency area.

Investigation and Evaluation. This area is also reported as a key environmental education area in the literature review (Chapter III). The UNESCO model includes six (6) competencies (12-17). Their major focus is the investigation and evaluation of environmental issues. More specifically, this area involves the investigation and evaluation of environmental problems and their alternative solutions, and value perspectives associated with the ecological and cultural implications of such problems and solutions. Teaching methods appropriate for use in investigation and evaluation skills is also an important topic suggested by the UNESCO model in this competency area. However, no statement of competencies refers to this topic. As was recommended in the previous competency area, this topic should either be replaced in

the instructional methodology competency area, or be added to the statement of investigation and evaluation area.

Environmental Action Skills. This area is critical in environmental education teacher training. In the challenging role as environmental and educational leaders, teachers are considered "builders of communities" (Heck and Williams, 1984; McKenna, 1973; Pullias and Young, 1977). They are expected to perform positive environmental action. In this area, the UNESCO model embraces two (2) competencies (18-19). They are associated with citizenship

action training. The major subject matter refers to the model of environmental action and its modes of action, levels of action, and criteria for selecting specific actions. Special emphasis is put on teaching strategies appropriate for dealing with such specific actions as persuasion, consumerism, political action, legal action, and ecomanagement skills. The model also includes the theme of research of environmental action skills in the training of teachers and its implications for environmental education. As stated in previous areas, this subject matter is important, but it should be reflected in the competency statements of this area.

5.3.3 Competency Taxonomic Domains

Taxonomic domains of environmental education competencies are associated with cognitive and affective knowledge, attitudes and skills (Table 5.4). With the exception of Ecological Foundations - which is restricted to the cognitive domain - the remaining competency areas include both taxonomic domains. They keep a certain balance between cognitive and affective competencies. Specifically, the area of conceptual awareness attempts to develop cognitive and affective knowledge, attitudes and skills in all their competencies. The development of environmental awareness demands the inclusion of both affective and cognitive competencies.

5.3.4 Competency Skill Levels

Skill levels of environmental education competencies refer to the type of aptitudes or abilities involved in each cognitive and

affective competency. **Cognitive competencies** of the UNESCO model are associated with knowledge, comprehension, application, analysis, synthesis and evaluation skills (Table 5.4).

More specifically, the area of **ecological foundations** is concerned with knowledge, application and synthesis skills. These skills qualify learners to know, use and produce information for selecting, developing, implementing and communicating curricular materials and strategies of environmental education. In this context, the UNESCO model presents a strong bias towards practical applications. This area is also associated with comprehension skills. Here, students are expected to interpret sources of scientific information relating to environmental problems.

The area of **conceptual awareness** is associated with knowledge, application and synthesis skills. Here, students are expected to select, develop and implement curricular materials related to environmental awareness.

The area of **investigation and evaluation** is associated with analysis and evaluation skills. These skills train students in investigation and evaluation of environmental problems, alternative solutions to these problems and their cultural and ecological implications. These skills are also associated with value perspectives and positions with respect to environmental issues.

The area of **environmental action skills** is concerned with knowledge, application and synthesis skills since learners are expected to select, develop and implement curricular materials and strategies related to environmental action skills.

Affective competencies of the UNESCO model are associated with receiving, responding, organization and characterization skill levels (Table 5.4). No competency of the model attempts to develop valuing skills. This type of skill is very important in environmental education since it requires students to show an environmental commitment. However, the researcher is wondering whether this omission is perhaps due to the slow internalization process that this type of skill needs in order to be achieved. In any case, valuing skills should not be ignored in an environmental education teacher training programme. The valuing process must be initiated and/or reinforced in environmental education programmes even though it is not going to be achieved in a short time.

The area of **conceptual awareness** is associated with receiving skills. Here, students are expected to show environmental awareness or consciousness by becoming alert or informed on specific environmental problems.

The area of **investigation and evaluation** is associated with value organization and characterization skills. These skills prepare students to face values, clarify value positions and change the student's own value positions in light of new information. The researcher finds that these two skill categories should also be included in the area of conceptual awareness. The competency statement of this area is fully consistent with this type of skill.

The area of **environmental action skills** is associated with the responding skill, since students are expected to have active participation in taking individual or group environmental action.

This type of skill is fundamental in environmental education teacher training programmes. Action skill is needed in preventing and solving environmental problems. Therefore, educators should be trained in developing this type of skill in order to guide proper citizenship action not only in their pupils, but also in the community where teachers act.

5.4 SUMMARY

This chapter has focused on the description and analysis of the UNESCO environmental education teacher training competencies model. The residual message is that in order to effectively teach environmental education, teacher training programmes must include a set of general professional education and environmental education content competencies. These competencies must embrace both cognitive and affective domains which allow the development of the specific skills needed to deal with environmental issues.

In summary, the UNESCO model appears to be balanced in terms of its cognitive and affective competencies and practical in terms of its application skills. However, technical deficiencies in delineating education 1 competencies are present in the model.

The implications of the findings concerning the UNESCO model are explored in the concluding section of this thesis. The next two chapters focus attention on description and analysis of the Venezuelan model.

Chapter VI

THE INSTITUTIONAL FOUNDATIONS OF THE TEACHER TRAINING PROGRAMME IN VENEZUELA

6.1 PURPOSE

The purpose of this chapter is to describe and analyze the institutional foundations of the teacher training programme in Venezuela. It also presents a description of the theoretical framework used to conceptualize the national environmental education initiative. The description and analysis are guided by the following interrelated questions: what are the basic legal foundations of the environmental education teacher training programme in Venezuela? What types of actors, agencies and institutional arrangements form the operational core of the environmental education teacher training programme, and how are they arranged? What are the programme's basic curriculum elements?

6.2 LEGAL AND POLICY FOUNDATIONS OF THE ENVIRONMENTAL EDUCATION TEACHER TRAINING PROGRAMME

The environmental education teacher training programme has its legal foundations in a set of national regulations and policies relating to the education system and to the environment. In addition, international environmental education guidelines developed by UNESCO have also been influential (Table 6.1). This foundation provides a sound philosophical and conceptual reference

TABLE 6.1 Legal and Policy Foundations of the Environmental Education Teacher Training Programme in Venezuela

1	Constitucion Nacional (1961)
2	Ley Organica del Ambiente (1976)
3	Ley Organica de Administracion Central (1976)
4	Ley Organica de Educacion (1980)
5	Environmental Education Agreement Between Environment and Education Ministries (1980)
6	Resolution Number 12 (1983)
7	National Teacher Training Programme (1985)
8	Teacher Training Study Plan (1985)
9	Environmental Education Course
10	United Nations Conference on the Human Environment in Stockholm (1972)
11	International Environmental Education Seminar in Belgrade (1975)
12	Intergovernmental Conference on Environmental Education in Tbilisi (1977)

SOURCE: Adapted from Congreso de la Republica de Venezuela, 1961, 1976, 1980; Brito, 1990; ME, 1983; CICA/PNFD, 1989; UNESCO-UNEP, 1980

for Venezuela's initiative. The teaching components of the foundation are described in the following discourse.

Venezuela has solid legal support for a national environmental education initiative. More specifically, the **Constitución Nacional (1961)** - the nation's magna carta - establishes that the Venezuelan state must pay attention to the defence and conservation of natural resources. It also states that exploitation of resources must be directed towards "the collective benefit" and, accordingly, Venezuelans must defend and protect their natural resources (Congreso de la República de Venezuela, 1961). In accordance with this statement, the **Ley Orgánica del Ambiente (1976)** was promulgated. The law's objective was to establish guiding principles for the conservation, defence and improvement of the environment for the benefit of quality of life (Congreso de la República de Venezuela, 1976 (a)). In this context, conservation, defence and improvement of the environment constitute the orientation of the Venezuelan environmental educational process. Its recognized task is to foster an environmental conscience and to promote public and private initiatives for stimulation of citizen participation in problems relating to the environment. Further, the **Ley Orgánica de Administración Central (1976)** establishes that the Venezuelan state must exercise its environmental jurisdiction through its Ministry of Environment (MARNR). This law confers on that ministry the responsibility for the planning and fulfilment of activities relating to the promotion of quality of life, the environment and renewable natural resources

management, as well as the elaboration and performance of conservation, defence and improvement programmes for the nation (Congreso de la República de Venezuela, 1976 (a)). In addition to these activities, the law calls for the reorientation of the nation's educational and cultural processes in order to promote an "environmentally conservationist conscience".

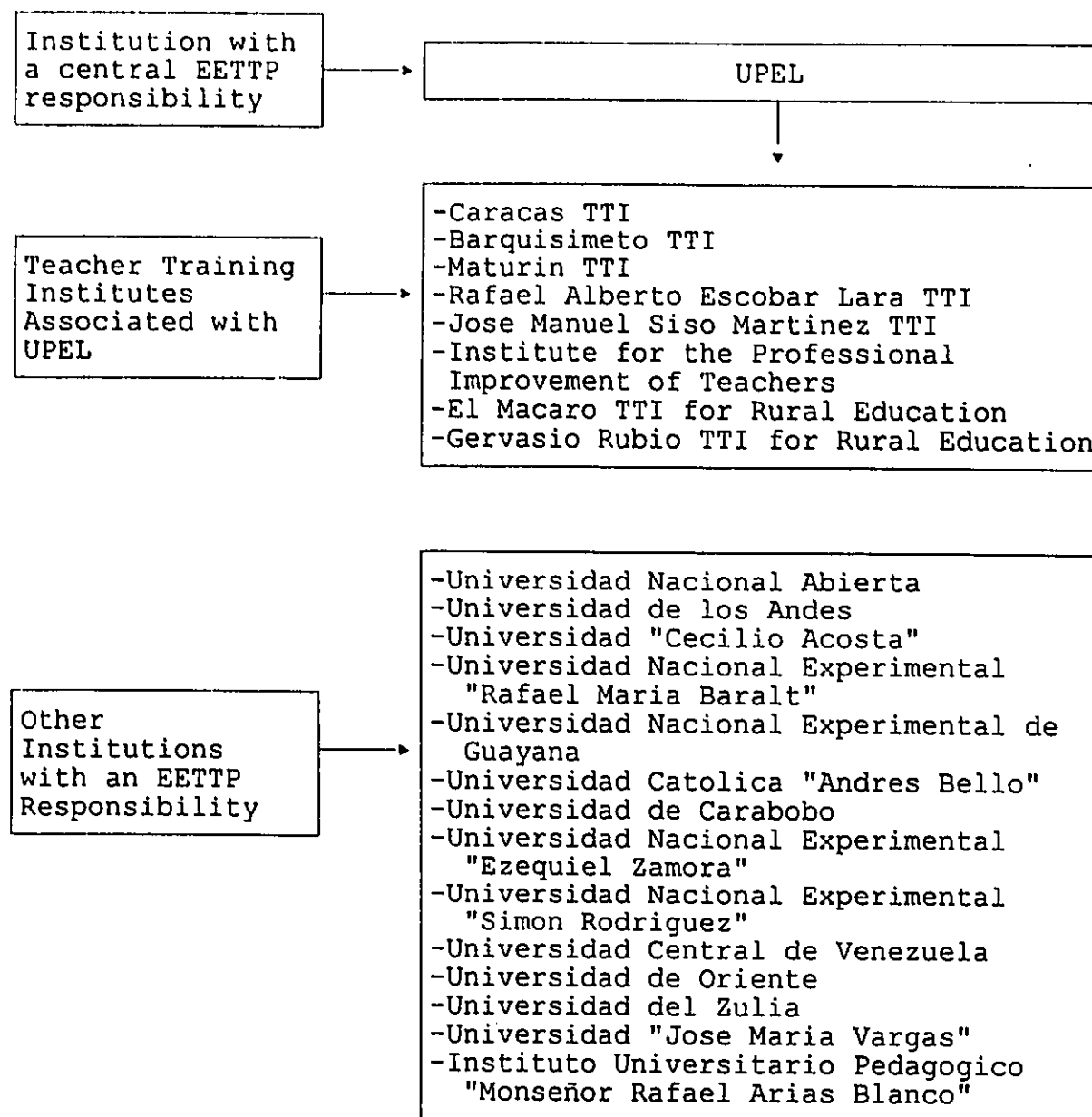
The **Ley Orgánica de Educación (1980)** establishes that the educational objective in Venezuela is the full development of the individual, as well as the training of citizens suitable for the life and practice of democracy and the promotion of culture and development of a spirit of human solidarity (Congreso de la República de Venezuela, 1980). This law also states that national education must promote the development of a citizen educated for conservation, defence and improvement of the environment, quality of life and rational use of natural resources. It also establishes that national education shall contribute to the training of human resources which are needed for the country's integrated, autonomous and independent socio - economic development.

Detailed content analysis of these laws indicates that the environmental education process in Venezuela is the domain of the Ministries of Environment and Education. In view of this situation, an **Environmental Education Agreement between Environment and Education Ministries (1980)** was reached. This agreement was designed to promote the coordinated incorporation of environmental education into the curriculum structure of formal and non-formal education levels, the training of human resources (teachers) in

environmental education, the dissemination of environmental information to a national audience, and the organization of communities so that they can participate in a meaningful way in environmental education (Brito, 1990). However, coordination of these activities between both ministries has been a difficult task. Mutual accusations of intransigent attitudes on the part of representatives of both ministries leaves one with the clear impression that there are many obstacles in the way of such coordination.

In order to satisfy national education demands, the Ministry of Education promulgated **Resolución Numero 12 (1983)**. This resolution defined the general guidelines which constitute Venezuelan state policy in teacher training. It prescribed the training of "a teacher of integrated education who is capable of facilitating the social, cultural, scientific and technological improvement of the country" (Ministerio de Educación, 1983). The resolution brought about the establishment of a **National Teacher Training Programme (1985)**. The programme created the opportunity to include an environmental education component in the formal training of the nation's teachers. It recognized the importance of an environmental educator in facing and solving environmental problems (CICA/PNFD, 1989). Fourteen (14) public and private universities and one (1) pedagogic university associated institute participated in this National Teacher Training Programme (Figure 6.1). These institutions have a common **Teacher Training Study Plan**

Figure 6.1 University Institutions which Participate in the National Teacher Training Programme in Venezuela



Source: Adpated from UPEL, 1991; MARNR-DEA, 1989, Brito, 1990.

(1985), and they all offer a compulsory **environmental education course** to teaching novices.

The foundation of Venezuelan environmental education, as stated in the introduction, also has been influenced by international events. The **United Nations Conference On The Human Environment in Stockholm (1972)** recommended to United Nations organizations that they take the necessary steps to establish an international environmental education programme which would encompass all levels of education (UNESCO-UNEP, 1980; 1987). In response to this recommendation, the **International Environmental Education Seminar in Belgrade (1975)** created the International Environmental Education Programme. Environmental education aims, characteristics and strategies were subsequently laid down by the **Intergovernmental Conference on Environmental Education, Tbilisi (1977)**. This conference also strongly recommended the training of teaching staff for environmental education. It stated that training programmes will have to be designed for the teaching personnel responsible for formal and non-formal education (Unesco, 1980). These international events were influential because Venezuelan participants returned home with the influence of their associated messages and strategies, and they realized that there was the possibility of enriching the environmental education experience in Venezuela.

6.3 ACTORS, AGENCIES AND INSTITUTIONAL ARRANGEMENTS OF THE ENVIRONMENTAL EDUCATION TEACHER TRAINING PROGRAMME

Environmental education is characterized by actors, agencies and institutional arrangements which have specific responsibilities related to legislation, planning, implementation and evaluation of teacher training activities (Table 6.2).

The Ministry of Education is fundamentally the most important and senior administrative institution in the National Teacher Training Programme. It is also, therefore, the most noteworthy in the context of the more specific environmental education teacher training programme. By the authority of the Education Law (1980), this institution has the direct responsibility for educational planning and administration at all levels, including teacher training and environmental education. The Education Law stipulates that teachers are active agents in carrying out state education policy. In order to make this philosophy operational, the Ministry of Education promulgated Resolución Numero 12 (1983) which demanded an improvement in the quality of graduating teachers. This resolution was ultimately responsible for the creation of the National Teacher Training Programme, under the direction of a Teacher Training Executive Committee (1984). The Committee is composed of the director of the Planning and Budget Office of the Ministry of Education; the director of the Upper Education Office of the Ministry of Education; and Academic and Extension Vice-Chancellors of UPEL. The Director of the Planning and Budget Office serves as the coordinator of this Committee. The committee

TABLE 6.2 Venezuelan Environmental Education Teacher Training Programme Agencies, Actors and Institutional Arrangements

Legislation and Policies	Planning / Implementation	Development / Evaluation
Ministry of Education (ME)	Teacher Training Executive Committee	University with Education schools, departments or programmes
Ministry of Environment	Planning and Budget Office of the Education Ministry	Teacher Training Institutes
	Upper Education Office of the Education Ministry	Environmental Education Institutional Coordinator
	Academic and Extension Vice-chancellorships of UPEL	University Environmental Education Professors and Students
	Teacher Training Inter-institutional Commission	Environmental Education Office of the Ministry of Environment
	National University Council	
	Academic Vice-chancellorship Core	

SOURCE: Adapted from CICA/PNFD, 1989; Brito, 1990

appoints the **Teacher Training Interinstitutional Commission** which has as its mandate the elaboration of the teacher training study plan, previously identified (CICA/PNFD, 1989). The "Plan", in which environmental education is a key component, is generated from inter-institutional agreements. In this Interinstitutional Commission are represented the above referred to universities which have education schools, departments or programmes and teacher training institutes (Figure 6.1). An ad-hoc committee, which is constituted by the **Academic Vice-Chancellorship Core** presents the study plan to the **National University Council** (CICA/PNFD, 1989; CNU, 1985). The Academic Vice-Chancellorship Core is coordinated by UPEL and has the national administrative responsibility for the common course block in which environmental education is included (CICA/PNFD, 1989; CNU, 1985). The National University Council is composed of the Ministry of Education, Deans of national and private universities, three faculty representatives (one from national non-experimental universities, one from national experimental universities, and one from private universities), three student representatives (selected in the same way as are professors), two university professors (selected by the Venezuelan Congress), and one representative of the National Board of Scientific and Technology Research (Congreso de la República de Venezuela, 1970). This Council is presided over by the Ministry of Education and approves or disapproves the study plan for teacher training programmes in Venezuela.

Universities with Education Schools, Departments or Programmes and Teacher Training Institutes are upper tier educational institutions involved in the National Teacher Training Programme (Figure 6.1). The participation of these institutions in environmental education teacher training comes from their role in the process of planning, implementation and development of the study plan for the common course block which embraces environmental education. In this process, each university has a representative in the Interinstitutional Commission, which determines the national and institutional policies in teacher training, including environmental education (CICA/PNFD, 1989). However, the environmental education teacher training programme's implementation is the responsibility of the education school, department or programme of each university and pedagogic institute (Figure 6.1).

Each of these institutions has an **environmental education coordinator** who coordinates the environmental education activities at the institutional and interinstitutional levels. The control of academic and administrative performance of university environmental education professors and students is part of the responsibilities of this coordinator.

The **Ministry of Environment (MARNR)** is also involved in the environmental education teacher training programme. The Environmental Law (1976) defines the domain of the Venezuelan state in all aspects related to environmental education. The Ministry of Environment shares with the Ministry of Education the responsibilities for establishing guidelines for national

environmental education. A 1986 agreement between the Ministry of Education and the Ministry of Environment calls for coordinated activities and resources for training environmental education teachers. These ministries, in theory, cooperatively carry out diverse non-formal environmental education activities for in-service teacher training through the **Environmental Education Office** of the Ministry of Environment (Brito, 1990).

6.4 CURRICULUM FOUNDATIONS OF THE ENVIRONMENTAL EDUCATION

TEACHER TRAINING PROGRAMME

The Venezuelan environmental education teacher training programme is built around a conceptual framework. The framework embraces a set of essential curriculum elements, including aims and objectives, professional profile, curriculum structure and study plan.

6.4.1 Aims and Objectives of the Teacher Training Programme

Environmental education plays a very important role in the teacher training programme. The programme emphasizes that teachers must serve as community leaders. In their roles as leaders, they are expected to contribute to the ethical and moral values of the Venezuelan population. This position is supported by literature review findings (Chapter III). In addition, they are expected to question the present model of society, which is progressing towards accelerated environmental deterioration, irreversible squandering of resources, and an alarmingly low quality of life for the

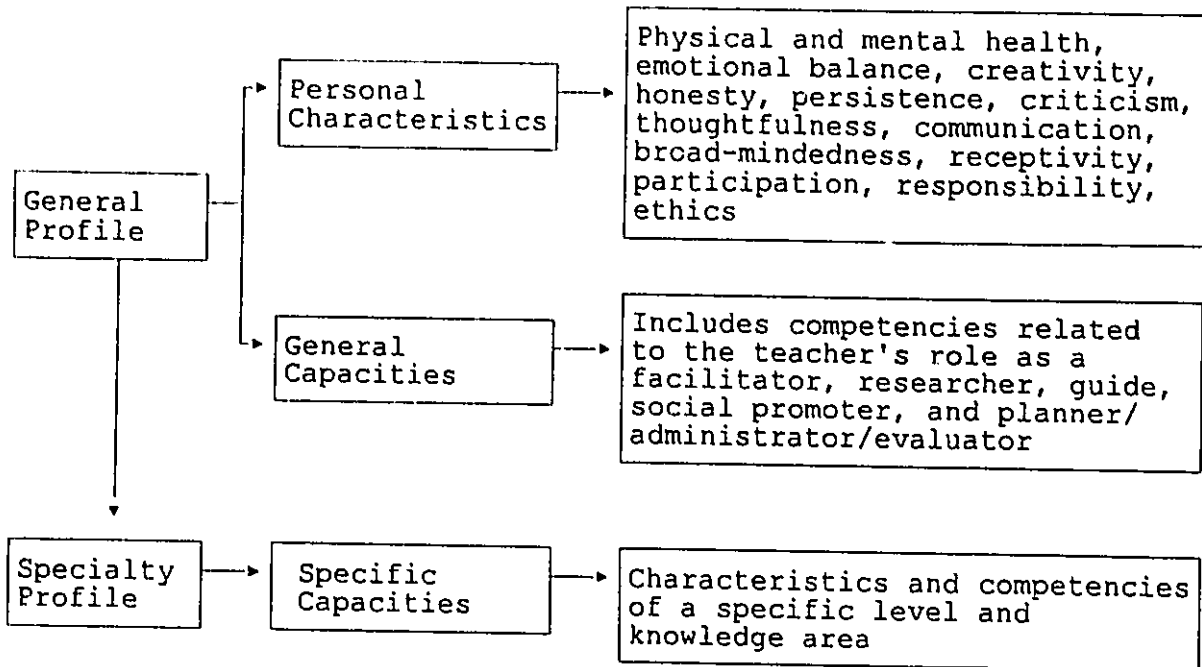
majority (CICA/PNFD, 1989). These programme statements are entirely consistent with general norms that define the policies of the Venezuelan state in matters of teacher training (Resolución Number 12). These ambitions are commendable. However, one can not help but wonder if such ambitions can be achieved.

6.4.2 Professional Profile of the Venezuelan Teacher

The professional profile of the environmental educator or teacher is established by Resolution Number 12 (1983) and made operational by the National Teacher Training Programme (1985). The professional profile of the Venezuelan teacher consists of three aspects: personal characteristics, general capacities and specific capacities (Figure 6.2). Personal characteristics and general capacities constitute the general profile of the teacher, which is used as a guiding principle in developing the curriculum. Specific capacities are associated with the speciality profile of the teacher (Table 6.3). It is related to individual characteristics and competencies in a specific level and knowledge area (CICA/PNFD, 1989; Ministerio de Educación, 1983). In other words, this profile determines the education level and area in which teacher candidates have been trained. Interestingly, environmental education is not included as an option. It is considered mandatory for all teachers.

In relation to personal characteristics, Figure 6.2 reveals the qualities that a Venezuelan educator must possess in order to fulfil his/her work. Apart from the basic conditions of physical and mental health and emotional balance, a teacher must develop a

Figure 6.2 Professional Profile of the Venezuelan Teacher



Source: Adapted from CICA/PNFD, 1989 and UPEL, 1991.

TABLE 6.3 Diploma and Specialty Options in the Teacher Training Programme in Venezuela

Diploma Options	Specialty Options
Teacher of Preschool Education	Natural Sciences
Teacher of Integral Education, with special mention in one or several areas of basic education	Social Sciences
Teacher of one area of Knowledge with special mention in one or several disciplines of basic, and diversified and professional education	Mathematics
Teacher of Special Education with mention in slow mental capacity, learning difficulties, hearing deficiencies, and language problems	Language
Teacher of a specific modality or specialty according to requirements and approvals of the Ministry of Education	Training for Working
	Music and Arts
	Others

SOURCE: Adapted from Ministry of Education, 1983; CICA/PNFD, 1989

set of personal attributes which are intrinsically linked to his/her function as an educator. Accordingly a teacher must be creative, honest, critical, communicative, receptive, responsible and ethical, among others. These personal characteristics should also be inherent in environmental teachers' make up.

The general capacities of the teacher are described in terms of five professional roles (Figure 6.2). These roles are as facilitator, guide, researcher, social promoter, and planner/administrator/evaluator. In accordance with these roles, a set of basic competencies for each role is established by the National Teacher Training Programme (Appendix F).

The teacher's role as a facilitator involves training students as designers, performers and evaluators of the educational process. The teacher's role as a researcher means preparing students for analyzing social and educational reality and for proposing solutions which would improve the teaching-learning process. The role as a guide signifies consultative training so that teachers can help students in their personal, social and educational problems. The teacher's role as a social promoter enables him/her to integrate both school and community, helping the community to identify its common problems and to find solutions. This competency is the expertise directly related to the environmental education teacher training programme. It focuses on community problems and the development of values, particularly in the development of positive attitudes toward defense and conservation of the environment. The teacher's role as an administrator trains teacher

candidates for the fulfilling of integrative activities concerning their roles as facilitator, researcher, guide and social promoter in order to administer educational action. These competencies are congruent with the literature review findings (Chapter III).

Environmental educators, at the end of their training, should be able to facilitate the development of knowledge, skills, attitudes and values relating to environmental education; investigate environmental education problems; guide students in their environmental education activities; promote the participation of the community in environmental activities; and plan, administer and evaluate environmental education programmes. However, the competency attached to each role must be obtained.

6.4.3 Curriculum Structure of the Teacher Training Programme

In order to achieve the teacher product objectives of the general and specific profiles, a formal curriculum structure has been established in the National Teacher Training Programme. This structure is organized in terms of four education components: general, pedagogic, speciality and professional practice (Table 6.4). Each component strives to achieve specific objectives in teacher training.

The components are presented as an integrated package in the teacher training programme.

TABLE 6.4 Curriculum Structure of the National Teacher Training Programme in Venezuela

Education Components	Description
General	Directed to attain in students: self-learning, self direction, effective communication, enlargement of cultural education and improvement of physical and mental development; organic and critical understanding of the realities to be faced as a human being and citizen; a critical and responsible position in terms of the surrounding physical world, in terms of the world of living beings, in relation to other human beings and in terms of the country's reality - recognizing the latter's rich cultural tradition, hopes, difficulties and problems - so that they can contribute to, and participate actively in, creating solutions.
Pedagogic	Directed to equip students with the necessary sensitivity to value the ethical aspects involved in the practice of teaching and acquire the knowledge, methods and technologies which permit them to: develop the personal characteristics, abilities and skills required for the practice of teaching; achieve a better understanding and handling of interpersonal relationships in the classroom, school and community; plan teaching activities and student learning in the short, middle and long terms; understand the evolutionary process and the dynamic of personal development of the student; relate and adapt instructional objectives to psychological characteristics of the learner as well as the peculiarities of the workplace; select, produce and use proper means in order that the students can achieve their objectives in such a way that their learning is significant, active and creative; fulfil diagnosis and evaluation of students, of their learning and of variables which condition such learning, in terms of personal, school, and environmental factors; improve and incorporate relationships between school and community in the learning and teaching processes; pay attention to students' learning problems; understand the administrative process of education in order to carry out tasks relating to teaching practice; use results of investigations in reformulating objectives and procedures and in enriching methodologies and techniques in order to improve educational activity.
Speciality	Directed to the education of students for the: acquisition of specific knowledge, abilities and skills required for teaching practice in a particular level or modality of the education system or in a specific area of knowledge; development of a permanent research attitude in order to incorporate different areas of knowledge and contribute new elements to enrich a specific area of educational action and generate different approaches to solving problems; acquisition of a positive attitude to the valuing of ethical implications relating to the application of knowledge in their areas of speciality.
Professional Practice	Directed to equip students with the capacity for: identifying themselves with the role of teacher and its functions; demonstrating abilities and skills in analyzing and solving real cases in their profession, and in using, with more accuracy, the theoretical-practical knowledge acquired in their training; fulfilling social and civic activities in the community which are appropriate to their role as social promoter.

SOURCE: Adapted from Ministry of Education, 1983; CICA/PNFD, 1989

6.4.5 Study Plan of the Teacher Training Programme

The above mentioned curriculum structure of the National Teacher Training Programme has been transformed into a study plan. The plan consists of two fundamental course blocks: a common, or standardized course block and a specific institutional and regional course block (CICA/PNFD, 1989; CNU, 1985). The common block is a response to the need to have all Venezuelan teachers exposed to the same educational/instructional materials. The standardized study plan includes such block courses which are grouped by component and discipline (Table 6.5). Environmental education forms part of this common block and it is integrated with the general education component and natural science discipline. It has three (3) academic credits out of total of nine credits assigned to the discipline of which it forms part.

A specific institutional and regional course block permits each university to attend to its own institutional, regional and local needs as well as to the demands of specific profiles not covered in the common standardized course block. The specific study plan is designed by each university (CICA/PNFD, 1989; CNU, 1985).

The National Teacher Training Programme also allows upper educational institutions to bring their curriculum structure and study plan up to date in order to improve and adapt it to specific needs. In this way universities can try new curriculum models which can be adjusted to regional characteristics. In all cases, however, curriculum components must retain the common or mandatory components which satisfy the established requisites of teacher

TABLE 6.5 Standardized Common Course Block of the Venezuelan National Teacher Training Programme

SUBJECT MATTER																	
Acad. Term	Infant Literature	Geometry	Educational Orientation	Educational Research	Learning Psychology	General Statistics	Educational Sociology	Curriculum	Universal History	Venezuelan History	Venezuelan Geography	Science I	Science II	Plastic Arts	Physical Education & Sports	Third Phase	P R O F E S S I O N A L P R A C T I C E
6	3 ⊖		3 ⊕					3 ⊕	3 ⊕	3 ⊕	3 ⊖				3 ⊖	7 ⊕	
5		3 ⊖		3 ⊕		Educational Research				Venezuelan History			Science II	Plastic Arts			
4	Reading Writing								Universal History			Science I				Second Phase	
3	3 ⊖		Math II		Learning Psychology	General Statistics	Educational Sociology	Curriculum			General Geography					4 ⊖	5 ⊕
2	Spanish Language II				Development Psychology	Research Introduction	Pedagogic Thought Streams		Citizen Education					Music & Scenic Arts			First Phase
	3 ⊖		3 ⊕	3 ⊖	3 ⊕	3 ⊖	3 ⊕	3 ⊕	3 ⊖					3 ⊖		4 ⊕	
1	Spanish Language I	Math I	Development Cognitive Process		Basic Education								Environ. Education				
	3 ⊖	3 ⊖	3 ⊖		3 ⊕		3 ⊕					3 ⊖					
Area	Language & Literature	Math	Psychology	Research	Educational Theory	Planning	History & Citizen Education	Geography	Natural Sciences	Aesthetics	Physical Education	Educ. for working					

Education Components:

- General ⊕
- Pedagogic ⊕
- Specialty ⊕
- Professional Practice ⊕

SOURCE: Adapted with considerable modification from CHU, 1985.

training (CICA/PNFD, 1989). This flexibility for modifying existing programmes represents a great opportunity for improving the areas of weakness in the environmental education teacher training programme in Venezuela. However, modifications must come from serious evaluations.

6.5 SUMMARY

A framework of legal, institutional and conceptual foundations of the environmental education teacher training programme in Venezuela has now been produced. Analysis of these elements reveals that this programme has strong legal and conceptual support in terms of policies. But, there appears to be little congruency between the legal/conceptual foundation and operational levels. There is lack of coordination and a deep distrust among organizations that share administrative and academic responsibilities for environmental education.

It is now opportune to move forward in the research presentation to a critical consideration of competencies in teacher training. This theme is a neglected realm of comparative - evaluative research in education, as the literature review has revealed. The UPEL model is considered representative, as UPEL is the university leader in teacher training in Venezuela. The UPEL model is the final product of interinstitutional consensus (García, 1992, Personal Communication). This model includes a set of twenty-one (21) environmental education competencies which are presented

in the next chapter. The following bridging question is offered:
to what extent has the environmental education theoretical
framework been taken into account in designing the UPEL model and
in putting it into practice?

Chapter VII

THE UPEL ENVIRONMENTAL EDUCATION TEACHER TRAINING COMPETENCIES MODEL

7.1 PURPOSE

The purpose of this chapter is to describe and critically analyze the environmental education competencies considered mandatory for Venezuelan teachers. These teacher attributes are contained within the environmental education programme of the "Libertador Experimental University for Teacher Training" (UPEL). As described earlier, UPEL is a national university conceived as the union of teacher training institutes. The data and information used for describing and analyzing environmental education teacher training competencies are derived from a systematic content analysis of strategic documents describing these competencies. The content analysis procedure used is presented in detail in Appendix G.

The UPEL model is primarily composed of specific environmental education competencies. This model does not include or refer to any professional education competencies relevant to environmental education. However, its general curriculum includes a professional education component. Since this education component is compulsory for each teacher candidate of UPEL, it is also analyzed.

7.2 COMPETENCIES IN PROFESSIONAL EDUCATION

The UPEL professional education component provides teacher candidates with the ethical aspects, knowledge, methods and methodologies involved in the teaching profession. The model embraces a set of thirty-three (33) statements that suggest the professional competencies required for teaching any science or discipline (Table 7.1). As previously stated, no correlation between these competencies and the UPEL environmental education competencies model is established. As a consequence, the environmental education teacher training model lacks application to educational practice. It is the researcher's opinion that a correlation between the environmental education and professional education components should be undertaken. Many general education theories, philosophies and methodologies are entirely consistent with environmental education. They provide the kind of comprehensive information on which effective environmental education programmes are made.

A detailed description of professional education competency statements in terms of their areas, subject matter, taxonomic domains and skill levels is presented in Appendix G.

7.2.1 Competency Areas

The UPEL professional education component includes a description of thirteen (13) competency areas related to professional education (Table 7.2). As previously indicated, they have been identified by means of content analysis of the "Pedagogic

Table 7.1 Pedagogic Competency Statements included in the UPEL Curriculum

The Venezuelan Teacher should be able to:	
1	analyze factors which contribute to effective inter-personal communication
2	evaluate styles of leadership and their effect on the productivity and growth of groups
3	use group techniques which might be applicable to the educational field
4	analyze theoretical approaches in explaining the evolution and the cognitive, personal, social, psychomotor and language development of the individual, from his/her prenatal stage until adolescence and maturity
5	analyze characteristics of each stage of the evolutionary development of the individual
6	analyze the influence of characteristics of the Venezuelan environment on the evolutionary development of the child and the adolescent
7	apply theoretical and methodological instruments which are peculiar to educational sociology in analyzing, interpreting and evaluating educational policies as a means of social transformation of the national reality
8	develop positive attitudes towards the investigation of community social and educational problems
9	evaluate education as a factor of control and social change
10	apply philosophical criteria in analyzing different streams of pedagogical thought
11	identify philosophical and pedagogical streams of Venezuelan education in terms of its theory and practice
12	develop a rational and critical attitude in relation to philosophical and social concepts which determine the educational policies of Latin America, especially Venezuela
13	analyze theories, forms and procedures of administration
14	analyze the administrative process of the Venezuelan education system in light of its theoretical foundations and the practical reality of the existing system and educational institutions
15	analyze theoretical approaches to learning and their applicability to the educational context
16	apply learning principles and theories applicable to educational practice
17	relate the peculiar characteristics of learner developmental stages to school progress and social adaptation
18	value the importance and meaning of guidance as an inherent function of the teaching

Table 7.1 (cont'd.)

19	apply methodological principles, techniques and instruments peculiar to guidance activities in analyzing situations and cases and in proposing practical solutions
20	demonstrate abilities in performing individual or group guidance activities
21	analyze curriculum theories, foundations and approaches
22	analyze curriculum designs in light of curriculum foundations, principles, and approaches and their implications in the process of teaching-learning
23	elaborate evaluation plans referred to concrete evaluation of educational situations in accordance with theoretical and pedagogical criteria and appropriate techniques, procedures and instruments for their fulfilment
24	analyze principles of communication in conducting the teaching-learning process
25	apply general principles and foundations in selecting instructional strategies which allow an efficient and effective teaching-learning process
26	apply technical and didactical principles in selecting, designing, elaborating, using and evaluating instructional resources
27	elaborate instructional designs based on theories and models studied previously, and where the selection and organization of their components are justified in terms of design purpose and characteristics of knowledge area, learner and environment
28	value the importance of statistics as a fundamental instrument in analyzing educational problems
29	apply concepts, techniques, methods and procedures in collecting, organizing, analyzing, interpreting and presenting data arising from concrete educational situations
30	analyze approaches in studying and understanding education as an object of knowledge
31	identify major problems in the education field which are feasible for investigation
32	elaborate an educative research project
33	value investigation as an inherent activity in the teaching function

SOURCE: Adapted from UPEL, 1987

TABLE 7.2 Professional Education Competency Areas, Taxonomic Domains and Skill Levels of the UPEL Model

Areas and Associated Competency by Number ¹	Taxonomic Domains										
	Cognitive Skill Levels						Affective Skill Levels				
	1	2	3	4	5	6	1	2	3	4	5
I. Dynamics of the Group	1			✓							
	2					✓					
	3		✓								
II. Evolutionary Psychology	4			✓							
	5			✓							
	6			✓							
III. Educational Sociology	7		✓								
	8									✓	
	9					✓					
IV. Philosophy and Education	10		✓								
	11	✓									
	12									✓	
V. Educational Administration	13			✓							
	14			✓							
VI. Educational Psychology	15			✓							
	17		✓								
	17			✓							
VII. Educational Guidance	18								✓		
	19		✓								
	20		✓								
VIII. Curriculum	21			✓							
	22			✓							
IX. Educational Evaluation	23				✓						
X. Instructional Strategies and Resources	24			✓							
	25		✓								
	26		✓								
XI. Instructional Planning	27				✓						
XII. General Statistics	28								✓		
	29		✓								
XIII. Educational Research	30			✓							
	31	✓									
	32				✓						
	33								✓		
TOTAL No.	33	2	-	9	12	3	2	-	-	3	2

¹ Number after each specified "area" refers to the competency identified in Table 7.1

Recognized Cognitive Domain dealing with skills in:

1 knowledge 2 comprehension 3 application 4 analysis 5 synthesis 6 evaluation

Recognized Affective Domain dealing with skills in:

1 receiving 2 responding 3 valuing 4 organization 5 characterization

SOURCE: Adapted with modifications from UPEL, 1987

Competency Statements" (Table 7.1). These areas range from Dynamics of the Group (#1) to Educational Research (#13). Collectively, they represent a set of principles, theories and methods associated with the expected roles of teachers in Venezuelan society - as a learning facilitator, researcher, guide, and planner/administrator/evaluator. A relationship between these professional areas and their associated subject matter, and environmental education competencies, seems to be a necessary task. It would help prospective environmental education teachers to plan, develop, implement and evaluate environmental education learning experiences and programmes.

7.2.2 Competency Subject Matter

The subject matter of these thirteen professional education competencies is associated with a set of topics or themes. Subject matter analysis reveals that many topics contained in the professional areas can be easily associated with the environmental education teaching-learning process. However, a relevant professional content is also missing from the UPEL professional education component. Specific comments related to these aspects are presented in the analysis of each competency area.

Dynamics of the Group. This competency area is associated with basic concepts, principles and techniques of interpersonal communication. This subject matter is relevant to the training of environmental education teachers since group methodologies are needed to achieve specific environmental education objectives.

Leadership styles is an emphasized theme of this area. This purposeful bias supports the UPEL concern that teachers become future social leaders. In playing this role, teachers work in the community in order to encourage participation and organize projects (Ministerio de Educación, 1983). This Venezuelan position is perfectly consistent with environmental education philosophy. What is necessary is to suggest to UPEL professors that they make the required connection between this subject-matter and the training of environmental leaders.

Evolutionary Psychology. This competency area focuses on theories of bio-psycho-social development of the individual. Exposure to the associated subject matter should enhance teachers' ability to adjust teaching activity to different development stages. This subject-matter is important to environmental education planners since it justifies the formulation of different environmental education programmes, materials and strategies for different target groups. The consideration of psychological maturity and culture in the teaching-learning process of environmental education is also a fundamental information module.

However, a major deficiency in this competency area is the omission of theories related to moral development and valuing processes. These theories are a major concern of environmental education when teachers deal with attitudes and processes in the affective domain.

Educational Sociology. This area focuses on the application of theoretical and methodological instruments in defining and

diagnosing socio-educational problems and their associated alternative solutions. Special emphasis is afforded the Venezuelan case. The analysis of national, regional and local education problems is required by this competency area. There is an opportunity here to correlate this competency with specific environmental education problems. Analysis of education as a factor of social control and change also provides opportunity to relate it to the need for environmental awareness.

Philosophy and Education. Philosophical foundations supporting different pedagogical trends and their manifestations in Venezuelan education are the dominant themes of this competency area. The consideration of Venezuelan and Latin American pedagogical thought is also quite apparent in the subject matter. However, this competency area does not approach any educational philosophy supporting such pedagogical trends and thoughts. Educational philosophy justifies not only goals and objectives but also content and strategies of an education programme. In the context of environmental education programmes, specific educational philosophies such as experimentalism and reconstructionism are relevant since they are consistent with environmental education goals and objectives. More precisely, "experimentalism and reconstructionism" reinforces the need for problem solving skills. The problem-solving role of the teacher is perhaps the most emphasized by environmental education leaders. Therefore, it is suggested that philosophies dealing with problem-solving approaches be included in the teacher training curriculum.

Educational Administration. Students are provided with the theoretical basis of administrative systems and processes applied to education. In this context, attention is given administrative theory and practice in the Venezuelan educational system. This area is the foundation for roles as future administrators of education. Key authors stress the need for teachers to develop administrative skills to manage effectively the space, resources, time and students, which ensure the programme's success (Berliner, 1980; Frazier, 1976; Heck and William, 1984) In the context of environmental education, this need is critical. Most problems of environmental education programmes are laid on the back of management.

Educational Psychology. This focuses on the basic knowledge, principles, and theories of psychology in the education field. More specifically, this competency area is closely associated with the teaching-learning process. The intention is to train teacher candidates for roles as learning facilitators and planners. Part of this training involves the analysis and application of major learning principles and theories. In this context, behavioral, cognitive and humanist approaches are included in this competency area. Theories involved in these approaches are consistent with environmental education goals and objectives. For example, they address key environmental issues such as moral development, cognitive and affective development and problem solving skills. Interestingly, this competency area also stresses social learning theory. This theory, based on learning by modelling, is relevant

to environmental education.

Educational Guidance. Subject matter is related to methods and techniques of individual and group guidance. This area should facilitate teachers in their role as guides not only in the educational realm but also in the family and the community domains. The need for a support system based on the family and community is critical to the enhancement of a cooperative and supportive climate for students in environmental education. Coordination between this competency area and environmental education seems to be wise. For example, when students discuss issues related to self-evaluation of their beliefs, feelings and behaviour, or the family's role in the teaching-learning process, a connection of these issues with environmental values should be made.

Curriculum. This competency area refers to processes of curriculum planning, organization, administration and evaluation. These curriculum processes are basic in the educational practice of every discipline or study area. In the context of environmental education, this content is also relevant. Environmental teachers need to plan, organize, administer and evaluate environmental education learning experiences and programmes.

Educational Evaluation. The evaluation of the teaching-learning process is the central theme. More specifically, this area refers to methods, techniques, procedures and instruments associated with the evaluation of cognitive, affective and psychomotor learning. Teacher candidates are expected to elaborate evaluation plans related to concrete educational experiences.

Evaluation is an essential part of the environmental education process. Environmental educators need to apply proper evaluation techniques in order to assess not only students' cognitive and affective learning, but also the achievement of environmental education programmes.

Instructional Strategies and Resources. This area deals with two major aspects of the teaching-learning process: methodologies and materials. The first aspect relates to general principles for selecting instructional strategies. The second one relates to general principles for selecting, designing, producing, using and evaluating instructional resources. The theoretical orientation of this area is evident. The subject matter refers only to a set of theoretical elements, such as principles and theories associated with strategies and resources. However, identification, description and application of instructional strategies and resources required in the teaching-learning process are not included. A variety of methodologies (such as case study, outdoor activities, individual and group study, values clarification, simulation games) and resources (such as audiovisual aids, multimedia collections, games) are available in education to achieve both cognitive and affective learning. Training in instructional methodologies and resources has proven to be a key element in teacher training programmes. It is key because goals and objectives of educational programmes are achieved by means of these elements. Therefore, training in the appropriate selection and use of these elements is critical.

Instructional Planning. The elaboration of instructional design alternatives is the primary concern. Major topics refer to theories and models of instructional design. These theories and models involve basic learning principles, conditions and processes for the practical task of instructional design. A particular interest refers to cognitive strategies, especially those related to problem solving (Burner, 1971; Gagne, 1980, 1985; Gagne et al, 1988; Wickelgreen, 1974). The value of problem solving strategy for an environmental education instructional programme is critical (Chapter III). Unfortunately, this important issue is not expressed in the subject matter of the UPEL model. In consequence, UPEL teacher candidates have not had the opportunity to address this pivotal theme when analyzing and elaborating instructional designs.

In addition, instructional design involves teachers as decision makers for effective problem solving (Dewey, 1916). For example, in planning instruction teachers decide what to teach and how to teach. This requires a deep understanding of the discipline being taught, a comprehensive knowledge of human development and an ability to apply this knowledge. This theory is fully consistent with environmental education principles. Planning of learning experiences in this field should provide an opportunity for making decisions. This fundamental role of the teacher should be reflected in the UPEL professional education component.

General Statistics. This competency area is built on a set of basic statistics and data analysis concepts. Teacher candidates are expected to learn how to gather, process and interpret data

related to a variety of educational situations. This understanding is fundamental in investigating and evaluating environmental education problems. Therefore, a linkage between "general statistics" and "environmental education competencies" would facilitate the application of statistics concepts and methods to specific environmental problems liable to investigation and evaluation.

Educational Research. The subject matter deals with methodologies for the study and analysis of educational problems. A primary student assessment vehicle is the design and implementation of a research project. It is expected that teacher candidates complete their projects in the professional practice stage. Again, a wonderful opportunity for connecting this competency area with environmental education projects is presented. However, it demands coordination between the area of "educational research" and the "environmental education competencies" component.

7.2.3. Competency Taxonomic Domains

Content analysis of professional education competencies reveals that of thirty-three (33) competencies included in the UPEL teacher training programme, twenty-eight (28) are cognitive (Table 7.2). These cognitive competencies are associated with cognitive learning and processes which provide opportunities for use in specific learning situations.

7.2.4 Competency Skill Levels

Professional competencies related to the cognitive domain are shown to be associated with five skill levels: knowledge, application, analysis, synthesis and evaluation (Table 7.2). The skill level related to comprehension was not revealed by the content analysis.

Contrary to what a set of professional education competencies should be, the UPEL professional component shows a preference for theoretical competencies instead of favouring practical or applied competencies. In the researcher's view, this bias does not promote the transference nor application of pedagogic knowledge and skills to specific learning experiences contained in different disciplines of the UPEL curriculum, including environmental education.

7.3 COMPETENCIES OF ENVIRONMENTAL EDUCATION

The UPEL model has established twenty-one (21) environmental education competencies needed by Venezuelan environmental educators (Table 7.3). They enable practitioners to perform as environmental education teachers at each level of the Venezuelan education system (Figure 1.1). Environmental education competencies, like the professional competencies, are associated with specific competency areas, subject matter, taxonomic domains and skill levels. A detailed description of these elements is presented in Appendix G.

7.3.1 Competency Areas

The UPEL model embraces five (5) competency areas which

The Environmental Education Teacher should be able to:

- | | |
|-----|--|
| T.O | value the importance of preserving the balance of the environmental system, in order to guarantee the survival of humanity |
| 1 | differentiate the structure and function of the biospheric atmospheric, hydrospheric and lithospheric subsystems in order to attain a global understanding of the environmental system |
| 2 | analyze the energetic dynamic and nutrient cycles at the biosphere level |
| 3 | contrast characteristics of the earth's ecosystems at world and national levels |
| T.O | analyze the characteristics of different types of societies, emphasizing the management of natural resources and their implications for the environment |
| 4 | explain the geological eras, emphasizing the appearance of man on the earth |
| 5 | compare attributes between developed and developing countries' populations |
| 6 | explain trends in human population growth |
| 7 | analyze man's socio-cultural evolution, emphasizing environmental relationships |
| 8 | analyze the relationships between the dynamic of the Venezuelan population and its environmental impact |
| T.O | contrast solutions of technical alternatives to environmental problems once their causes and effects on the natural and social environment have been detected |
| 9 | select alternative technical solutions to problems of air, water and soil contamination which might be applicable to the Venezuelan case |
| 10 | analyze strategies in managing vegetation and fauna which might be applicable to the Venezuelan case |
| 11 | relate alternative solutions to energy needs at the national and world levels emphasizing potentialities, advantages and disadvantages |
| 12 | relate marginality causes to consequences on the quality of human life in order to propose alternative solutions |
| T.O | value interdependence among administrative, legal and educational measurements which tend to conserve, defend and improve the environment in order to guarantee a better quality of life |
| 13 | emphasize ecodevelopment principles as an alternative in achieving a better quality of life |
| 14 | analyze environmental legislation characteristics, emphasizing their importance in different countries |
| 15 | evaluate the evolution of the administrative and legal reality of Venezuela in terms of environmental conservation, defense and improvement |
| 16 | relate education, conscience and conservation through community actions in order to promote a better quality of life |
| T.O | communicate, through written and oral reports, the results of an investigation based on the selection of a community environmental problem and performance of an action plan |
| 17 | identify each stage in the research-action process of community environmental problems |
| 18 | fulfil a descriptive study of the student's community in order to collect the necessary information in selecting the problem of research-action |
| 19 | design an action plan based on alternative solutions to a defined and delimited environmental problem |
| 20 | carry out a project aimed at solving an environmental problem |
| 21 | evaluate the procedure used in the research process in terms of objectives achieved, resources used, timetable fulfilled and results obtained |

In this Table "T.O." means "Terminal Objective" and the numbers (1 - 21) represent competencies.

SOURCE: Adapted from UPEL, 1987; Garcia, Anez and Figueroa, 1980

capture the essence of the twenty-one competency statements (Table 7.4). The areas range from the Structure and Dynamic of the Natural Environment to Action-Investigation Based Community Environmental Problems. Analysis reveals little relation among areas. The content of the competency statements is not classified and arranged in a sequential manner and there is much organizational incoherence in the manner in which the statements and areas are presented. A convergence of interrelated issues would be more consistent with the interdisciplinary nature of environmental education.

In addition, another major problem is that the UPEL model is organized in terms of content units instead of goal levels. Curriculum centred on content units alone often fails to integrate the programme goals and objectives with the teaching-learning process. This is the case in this situation. As a consequence, such goals and objectives are not achievable. The basic reason for designing instruction is to make possible the attainment of a set of educational goals (Gagne et al, 1988). These goals, reflecting societal needs, are expressed in the way of performance statements. In designing instruction, goals should lead the organization and development of courses and programmes. Certainly the UPEL model establishes environmental education objectives, but the organization of the model is strongly focused on content units. In this context, the model focuses on five large content units. They relate mainly to issues of natural environment, population, environmental problems, and investigation.

TABLE 7.4 Environmental Education Competency Areas, Taxonomic Domains and Skill Levels of the UPEL Model

Areas and Associated Competency by Number ¹		Taxonomic Domains										
		Cognitive Skill Levels						Affective Skill Levels				
		1	2	3	4	5	6	1	2	3	4	5
I. Structure and Dynamic of Natural Environment	1		√									
	2				√							
	3				√							
II. Human Population	4		√									
	5				√							
	6		√									
	7				√							
	8				√							
III. Environmental Problems	9	√										
	10				√							
	11				√							
	12				√							
IV. Solutions to Environmental Problems	13	√										
	14				√							
	15						√					
	16				√							
V. Research Based Action	17	√										
	18					√						
	19					√						
	20					√						
	21						√					
TOTAL No.	21	3	3	-	10	3	2	-	-	-	-	-

¹ Number after each specified "area" refers to the competency identified in Table 7.3

Recognized Cognitive Domain dealing with skills in:

1 knowledge 2 comprehension 3 application 4 analysis 5 synthesis 6 evaluation

Recognized Affective Domain dealing with skills in:

1 receiving 2 responding 3 valuing 4 organization 5 characterization

SOURCE: Adapted with modifications from UPEL, 1987; Garcia, Anez and Figueroa, 1980

7.3.2 Competency Subject Matter

The subject matter of environmental education competencies is a set of specific environmental topics or themes. Content analysis of these topics reveals considerable variety and detail (Appendix G). A close correlation between the subject-matter proposed by the UPEL model and statements of competencies is also observed. There is, at the conceptual and operational level of the programme, subject matter consistency.

Structure and Dynamic of the Natural Environment. Important aspects related to the structure and function of ecosystems are the foci of this area. More specifically, it addresses topics related to major ecosystems. However, neither a clear distinction between terrestrial and aquatic ecosystems is established, nor a consideration of functional aspects of ecosystems, such as periodism, or ecological succession, are included in the study. These ecological concepts are important in understanding the structure of the environment (Kormondy, 1984; Odum, 1975; Whittaker, 1974). In addressing the dynamic of ecosystems, this area deals properly with energy flow and biogeochemical cycles.

Human Population. Competency statements in this area deal with demographic, social and cultural issues which are treated here in such a disconnected fashion that their relevance to environmental education is obscured. In other words, competency statements fail to present a logical content sequence and fail to relate content to environmental issues. For example, in addressing human population concepts, the UPEL model remains at the level of

description without application of these concepts to specific environmental problems such as disruption and change in ecosystems. This deficiency makes it difficult to understand the practical use of these issues in the model. Human population concepts, for example population growth and its associated problems, natality and mortality, are critical when they are studied from an ecological and environmental perspective. They facilitate the comprehension of interrelationships of man and environment and implications of these interrelationships on the quality of life (Hawley, 1986; Kormondy, 1984; Sponsel, 1987; Tomera, 1979).

It is desirable that human population concepts be discussed in the light of major problems associated with population growth - pollution, food production and availability and natural resources allocation. Analysis of these issues is particularly relevant to developing countries, such as Venezuela, where environmental problems are associated with these very issues (Flores, Personal Communication, 1992; Gabaldon, Personal Communication, 1992; Tobito, Personal Communication, 1992).

In addition, no connection between "structure and dynamic of the natural environment" area and "human population" is observed. There exists a wonderful opportunity to stress that humankind is part of the ecosystem structure and as such it interacts with the rest of the elements in ecological processes. The power of humans to alter ecosystems and ecological processes should be a major concern of the UPEL model. Discussion of these aspects should be accompanied by moral statements. This is precisely the kind of

information that teachers need in order to develop environmental awareness. Descriptions of geological eras, population characteristics, growth tendencies and a long list of isolated demographic concepts (as is proposed by the UPEL model) contribute little to the training of environmental education teachers.

Environmental Problems. The origins, effects and technical solutions to environmental problems are the major foci. Certainly environmental problems and alternative solutions are a major environmental education issue encountered in the literature review (Chapter III). However, content analysis of the UPEL model competency areas reveals several conceptual and technical deficiencies.

There is little consistency between the content associated with the name of this area and the subject matter of its competency statements. More specifically, environmental problems included in the competency statements do not always deal with origins, effects and technical solutions. These elements are only discussed in the first competency associated with air, water and soil problems. Discussion of problems related to vegetation, fauna, energy and social marginality are not consistent with these elements.

In addition, there is also a lack of consistency in applying the geographic scale to the study of each problem. In some cases the scale is national, in others global, and in the worst case the scale is not mentioned. Inconsistency is also observed in relation to the terminology used to describe technical solutions to environmental problems. Sometimes statements of competencies refer

to technical solutions and other times they refer to strategies or alternatives which are not necessarily technical in orientation (Appendix G). More specifically, the name of the area suggests the analysis of technical solutions to environmental problems, however such subject matter is in fact clearly not included in the competency statements of this area. It is obvious that the name of the area is misleading as to its content. This inconsistency can be the result of a lack of understanding of what technical solutions are applicable to specific environmental problems. In any case, it is the researcher's opinion that technical solutions should not be the only generic type suggested for solving environmental problems. Many environmental problems have their roots in environmental regulation, management and education deficiencies. Therefore, technical solutions themselves are not the sole answers to these problems if other deficiencies exist. In addition, why should an environmental education teacher training programme emphasize technical solutions if the major concern of an environmental educator should be educational solutions to environmental problems? The researcher agrees that teachers should know different types of solutions to environmental problems, including technical ones. However, the largest time and effort should be concentrated in analyzing the educative ones. It is the *raison d'être* of environmental education.

It is the researcher's opinion that a better reorganization of these competencies in terms of major Venezuelan environmental problems and categories of causes, effects and solutions of

problems should be undertaken by UPEL environmental education curriculum designers. Discussion of these aspects should involve environmental attitudes and behaviour.

Solutions to Environmental Problems. This area focuses on administrative, legal and educational solutions to environmental problems. It presents problems similar to those identified in the previous section. A lack of curriculum criteria in writing competency statements and in dealing with environmental issues is also observed in this area. A major deficiency relates to the lack of connection between this area and the previous one. In spite of the fact that both areas refer to environmental problems and solutions, no relationships are established between major environmental problems studied in the previous area and solution categories considered in this area. In addition, technical solutions to environmental problems are separated from the remaining solution categories. Again, one wonders why there is this bias in the UPEL model.

In addition to the isolated way in which solutions are discussed, poor organization and presentation of these categories are observed. For example, the first competency appears to emphasize the confusing concept of "ecodevelopment principles" as an "alternative" for improving the quality of life. There is a conceptual deficiency in the understanding of principles and alternatives. Legal solutions are more focused on environmental regulation characteristics than on the content of these regulations. Discussion of environmental regulations includes the

United States, the former USSR and European countries. However, environmental regulations produced in Latin American countries are not considered. National environmental legislation is treated together with administrative measures. Both solution categories are focused on the theoretical and historical aspects of the evolution of the legal and administrative framework of environmental conservation, defense and improvement. Unfortunately, critical themes related to the lack of legal enforcement and inappropriate resources management are not stressed in the UPEL model. These aspects have been revealed as major causes of the environmental deterioration of Venezuela (Flores, 1992, Personal Communication; Hernández, 1992, Personal Communication; Moya, 1992, Personal Communication; Salazar, 1992, Personal Communication).

The preventive character of education in the context of environmental problems is not emphasized in the UPEL model. In addition, the model does not include discussion of educational alternatives to environmental problems. Unfortunately, the theoretical orientation of the model contributes very little to the training of active and creative teachers. The UPEL model states that in order to promote a better quality of life, teachers must relate education, conscience and conservation through community actions. This concept is totally confusing and vague.

It is believed that education is the best alternative and preventive solution to environmental problems. This process facilitates public awareness of the problem causes and consequences. Education is not only an effective solution, but is

also less expensive than technical solutions applied in remedial action programmes. It involves the training of teachers in roles as problem solvers and community leaders which are critical in developing community environmental concern, commitment and responsibility.. An effective environmental education teacher training programme should reflect these roles in its competencies and this should be considered and adopted by Venezuelan curriculum designers. The environmental law of that country confers on communities the right to organize and manage boards for the conservation, defence and improvement of the environment. Here, teachers have a pivotal role to play as natural leaders of their communities.

In summary, the restructuring of this competency area seems to be a necessary task. It is suggested that there be integration and correlation between areas of environmental problems and solutions to environmental problems. Major attention should be paid to educational alternatives as solutions to environmental problems.

Action-Investigation Based Community Environmental Problems. This last area includes five competencies specifically related to mastering research project design and implementation. Special emphasis is put on projects related to community problem solving.

The project method in problem solving has been demonstrated to be a purposeful educational activity (Hass, 1987; Hewton, 1985; Lawry, 1985; Yambert and Donow, 1986). It is concerned with the investigation and study of a situation or problem associated with students' needs and interests. Its application to environmental

education is extremely important in involving students in investigation and action.

Projects in the UPEL model are developed according to five research phases (Appendix G). These phases include: problem diagnosis, action plan, plan performance, report elaboration and result communication. Unfortunately these phases are not clearly presented in the competency statements. In other words, these competencies do not explicitly express the knowledge, skill or behaviour to be demonstrated by students in each phase. The competency dealing with descriptive study of the community should stress not only problem identification but also problem causes and effects.

Another important observation relates to the plan performance phase. The competency statement associated with this phase establishes that students must "carry out the project" in order to solve the selected community problem. How, in a short period of three months, can a UPEL student identify a community study, design an action plan and implement such a plan? What meaningful projects can be undertaken by UPEL students working under such a constraint? One hopes that the quality of knowledge and skill involved in this process is not sacrificed in order to fulfil administrative requirements.

It is the researcher's opinion that coordination between this environmental education area and other areas associated with research and project activities should be undertaken. Areas associated with the professional education component, such as

educational sociology, general statistics and educational research, have much to contribute to environmental education projects. The UPEL professional practice component is also a wonderful means for coordinated work in the context of environmental education projects. This component demands the fulfilment of a research project aimed at solving community problems (UPEL, 1987).

7.3.3 Competency Taxonomic Domains

All twenty-one (21) environmental education competency statements contained within the UPEL model are associated with cognitive learning (Table 7.4). This bias means that environmental education competencies are related to the acquisition of knowledge or information. Affective learning is not considered a major objective in the model. The implication of this void is a critical lack of development of environmental values and attitudes. This situation represents a critical model weakness. Development and growth of positive environmental values need to be promoted in learners. Therefore, as environmental educators, teachers require solid knowledge and skills necessary to deal effectively with affective learning. One is left wondering why this important component is omitted from the UPEL model.

7.3.4 Competency Skill Levels

The skill levels of environmental education competencies refer to the aptitudes or abilities involved in the cognitive and affective domains. Environmental education competencies in the UPEL

model are only associated with five cognitive skill levels: knowledge, comprehension, analysis, synthesis and evaluation (Table 7.4). However, most of them attempt to develop "analysis skills" alone (10). Interestingly, "application skills" is the only cognitive level not included in the UPEL model. This omission ultimately determines the performance expected of Venezuelan environmental educators. It is primarily related to recalling information, knowing the meaning of material or ideas and examining material in a non - critical way. Unfortunately, the application of information and material to new and different situations is not considered in the UPEL model. This bias reveals the analytical character of this model which represents a barrier to the practical education of Venezuelan teachers.

7.4 SUMMARY

This chapter has focused on description and analysis of the UPEL environmental education teacher training competencies model. The residual message is that Venezuelan educators are acquiring cognitive learning related to the analysis of environmental issues in order to teach environmental education. Lack of skills associated with application and affective learning distinguish the UPEL model as a model focused on analysis of cognitive learning. The absence of a professional education competency component in the model structure indicates a serious lack of association between professional and environmental education competencies. The implications of the findings concerning the UPEL model are explored

in the concluding section of this thesis. The next chapter focuses on the comparison of the UNESCO and UPEL models.

Chapter VIII

A COMPARISON OF THE UNESCO AND UPEL ENVIRONMENTAL EDUCATION TEACHER TRAINING COMPETENCIES MODELS

8.1 PURPOSE

The purpose of this chapter is to compare environmental education teacher training competencies established in the UPEL and UNESCO models. The ultimate intent is to determine congruency or lack of congruency between both models. These tasks, therefore, fulfil critical obligations outlined in the introduction to this thesis. A comparison of the competencies contained within the models may help to improve the quality of future Venezuelan environmental educators. This improvement, of course, is contingent upon needed change and adjustments being recognized and acted upon by education planners.

Comparison is organized in terms of research questions, variables and their associated measurement criteria (Figure 4.1). The data and information used are derived from a comparative analysis device which in turn is based on the content analysis presented in two earlier chapters (Appendix H).

8.2 COMPETENCIES IN PROFESSIONAL EDUCATION

The comparison of the UNESCO and UPEL models reveals a major difference in the expression of professional education competencies (Table 8.1). More specifically, the UNESCO model clearly specifies

TABLE 8.1 Comparison Between UNESCO and UPEL Model Structures

Competency Components	Areas and Associated Competencies by Number ¹	
	UNESCO Model	UPEL Model
Foundational Competencies in Professional Education	I Educational Philosophy (1) II Theories of Moral Reasoning (2) III Theories of Knowledge/Attitude/Behaviour Relationships (3) IV Theories of Learning (4) V Theory of Transfer of Learning (5) VI Instructional Methodologies (6, 7) VII Instructional Planning (8) VIII Infusion of Environmental Education Curricula and Methods (9) IX Evaluation of Environmental Education Curricula and Methods (10)	Hidden in "general curriculum component"
Environmental Education Content Competencies	I Ecological Foundations (11, 12, 13, 14) II Conceptual Awareness (15, 16, 17, 18, 19, 20, 21) III Investigation and Evaluation (22, 23, 24, 25, 26, 27) IV Environmental Action Skills (28, 29)	I Structure and Dynamic of Natural Environment (1, 2, 3) II Human Population (4, 5, 6, 7, 8) III Environmental Problems (9, 10, 11, 12) IV Solutions to Environmental Problems (13, 14, 15, 16) V Research Based Action (17, 18, 19, 20, 21)

¹ Number after each specified "area" refers to the competency identified in Tables 5.1, 5.3, 7.1 and 7.3

SOURCE: Adapted from Content Analysis

ten (10) basic professional education competencies needed by environmental education teachers. On the other hand, the UPEL model does not contain a single professional education competency statement associated with environmental education. The UPEL model does not explicitly have a professional competencies section. But, in fact, it hides this competency orientation in a general curriculum component. This implies that each UPEL teacher candidate must acquire the professional competencies required in the practice of teaching. An examination of this component in the UPEL model reveals the existence of thirty-three (33) mandatory professional education competencies (Table 7.1). The statements of these competencies are very general. They are designed to facilitate the acquisition of the pedagogic knowledge and skills necessary to conduct the teaching-learning process regardless of discipline or subject matter, including environmental education. Therefore, although the UPEL competencies are too general they can still be the basis of a comparison. A comparative analysis involving similarities and differences between both models is presented in Appendix H. The major residual message is that each model serves the objectives of institutional educational policy. It is obvious that in structuring the professional competencies component the intention of both models has been different. Comparison of professional education competency areas, subject-matter, taxonomic domains and skill levels between UNESCO and UPEL models, is presented in the following sections.

8.2.1 Competency Areas

Comparison of the UNESCO and UPEL models in terms of professional areas also reveals a difference. The UNESCO model presents nine (9) whereas the UPEL model presents thirteen (13) professional competency areas (Table 8.2). In addition, a comparison reveals that three UNESCO areas are entirely omitted in the UPEL model - theories of moral reasoning, the theory of transfer of learning and infusion of environmental education curricula and methods (Table 8.3). This omission represents a critical weakness of the UPEL model, especially the exclusion of the area of theories of moral reasoning. This is a pivotal area since it provides a solid grounding for effectively handling values education. The absence of the area of infusion of environmental education curricula and methods leaves Venezuelan educators without training in approaches for installing environmental education into the educational curriculum disciplines. The theory of transfer of learning is another area missing in the UPEL model. This represents a failing since this theory prepares teachers to deal with the transfer of learned knowledge, attitudes and skills to students' life styles and the process of decision making. Without training in learning transfer practices, general professional competencies relevant to environmental education cannot be applied to this discipline.

In addition to these omissions, the UPEL professional component excludes one of two competencies proposed by the UNESCO model in the area of instructional methodology. This refers to the

TABLE 8.2 Comparison Between UNESCO and UPEL Professional Competency Areas

UNESCO Model	UPEL Model
1. Educational Philosophy 2. Theories of Moral Reasoning 3. Theories of Knowledge/Attitude/ Behaviour Relationships 4. Theories of Learning 5. Theory of Transfer of Learning 6. Instructional Methodologies 7. Means of Planning for Instruction 8. Infusion of Environmental Education Curricula and Methods 9. Evaluation of Environmental Education Curricula and Methods	1. Dynamics of the Group 2. Evolutionary Psychology 3. Educational Sociology 4. Philosophy and Education 5. Educational Administration 6. Educational Psychology 7. Educational Guidance 8. Curriculum 9. Educational Evaluation 10. Instructional Strategies and Resources 11. Instructional Planning 12. General Statistics 13. Educational Research

SOURCE: Adapted from Content Analysis

TABLE 8.3 Congruency Between Professional Areas and Associated Competencies of UNESCO and UPEL Models

Areas and Associated Competency by Number ¹	Congruency with UPEL Model		
	Explicit	Implicit	None
I. Educational Philosophy 1		✓	
II. Theories of Moral Reasoning 2			✓
III. Theories of Knowledge/Attitude/Behaviour Relationships 3		✓	
IV. Theories of Learning 4		✓	
V. Theory of Transfer of Learning 5			✓
VI. Instructional Methodologies 6		✓	
			✓
VII. Means of Planning for Instruction 8		✓	
VIII. Infusion of Environmental Education Curricula and Methods 9			✓
IX. Evaluation of Environmental Education Curricula and Methods 10		✓	
Total 10	-	6	4

¹ Number after each specified "area" refers to competency identified in Table 5.1

SOURCE: Adapted from Content Analysis

implementation of a set of methodologies relevant not only to environmental education but also to teachers in general. In the specific case of environmental education, some of these methodologies, such as outdoor and values methods, are critical in dealing with specific environmental issues. For example, outdoor education methods increase students' environmental perception and sensitivity by facilitating direct experience with the environment. In addition, the education literature confirms that most students enjoy outdoor activities such as field trips, making this method one of the most preferred. Role playing and simulation games are also effective educational techniques, especially in dealing with the examination of values. These games help to develop affective and attitudinal change which is one of the objectives of environmental education. Omission of discussion of these specific instructional methodologies represents a serious deficiency in the UPEL teacher training programme since it leaves teachers without the proper training in teaching methods required for achieving environmental education objectives.

A comparison of areas also reveals an implicit or partial congruency between six (6) UNESCO and seven (7) UPEL areas (Table 8.4). Detailed information as to similarities and differences involved in congruency areas is presented in sections related to competency subject matter, taxonomic domains and skill levels.

8.2.2 Competency Subject Matter

Content analysis results reveal major similarities and

TABLE 8.4 Identification of Partial Congruency between UNESCO and UPEL Professional Areas

Areas with Partial Congruency	
UNESCO Model	UPEL Model
I. Educational Philosophy	I. Philosophy and Education
II. Theories of Knowledge/Attitude/Behaviour Relationships	II. Evolutionary Psychology
III. Theories of Learning	III. Educational Psychology
IV. Instructional Methodologies	IV. Instructional Strategies and Resources
V. Means of Planning for Instruction	V. Instructional Planning
VI. Evaluation of Environmental Education Curricula and Methods	VI. Curriculum
	VII. Educational Evaluation

SOURCE: Adapted from Content Analysis

differences of subject-matter between the UNESCO and UPEL professional areas (Appendix H).

More specifically, the **educational philosophy** area of UNESCO and the **philosophy and education** area of UPEL refer to the application of philosophical knowledge. However, although the titles are similar, the themes under each are different. The UNESCO model focuses on the application of educational philosophy to the selection and development of curricular programmes and strategies. The UPEL model on the other hand, focuses on the analysis of pedagogic thought streams and their implications in Venezuelan education. The demand for a background in philosophy in both models is obvious. But, unlike the UNESCO model which focuses on practical environmental philosophical issues, the UPEL model is oriented towards a theoretical background in educational philosophy. In other words, competency statements dealing with this issue do not suggest application of educational philosophy criteria to the selection, development, implementation or evaluation of specific curriculum programmes. This exercise justifies the need, existence and nature of determined educational policies. In the case of environmental education, a theoretical and practical background in philosophies consistent with environmental goals and objectives will enable teachers to better understand, select, implement and develop environmental education content, approaches, methods and materials. Further, there is a strong UNESCO model emphasis on the analysis of specific philosophies, such as Experimentalism and Reconstructionism (Chapter V). Since these philosophies focus on

problem solving approaches they are fully consistent with environmental education goals. Such analysis is entirely absent from the content of the UPEL model which neglects the opportunity for teachers to understand and apply these theories when designing, implementing, developing and evaluating environmental education programmes.

The theories of knowledge/attitude/behaviour relationships area of UNESCO and the evolutionary psychology area of UPEL refer to characteristics of cognitive knowledge and process. However, the UPEL model neglects characteristics of attitudes and values, which are important aspects of environmental education. The need for a balanced curriculum in terms of knowledge, attitude and behaviour is also absent in the UPEL model. In the case of environmental education, it is very important to be assured that cognitive and affective competencies are included in the curriculum.

The theories of learning area of UNESCO and the educational psychology area of UPEL elaborate upon the linkage between learning theories and the selection, development and implementation of curricular materials and teaching strategies. The UNESCO model alone emphasizes the development of problem solving abilities. This UPEL omission constitutes a serious weak point, since many environmental education goals are related to problem solving. Environmental education is aimed not only at making individuals aware of environmental problems, but also at motivating them and providing them with the tools needed to participate effectively in their solution.

Another important aspect omitted by UPEL refers to theories of learning development. More specifically, the UNESCO model suggests the utilization of the theories of Piaget, Bruner and Gagne. These theories provide curriculum guidance for the development of problem solving approaches. In addition, they facilitate the selection of appropriate content and materials, and the implementation of strategies for specific receiver age levels. Unfortunately these theories are not clearly expressed in the competency statements of the UPEL model, eliminating the chance to increase teachers' effectiveness.

The instructional methodology area of UNESCO and the instructional strategies and resources area of UPEL establish the need for selecting effective instructional methodologies in order that the teaching-learning process can be effective. But, the UPEL model does not establish the relationships between the selection of instructional methodologies and appropriate cognitive and affective outcomes, receiver characteristics and available facilities which are stressed by the UNESCO model. These relationships assure learning success by encouraging appropriate decisions in relation to the most effective and suitable methodologies.

As previously indicated, another critical void in the UPEL model is the absence of specific methodologies which are pertinent to environmental education. For example, methods dealing with teaching awareness and citizenship action - values clarification and moral dilemmas; and persuasion, consumer, and political action

skills - are totally omitted in the curriculum of the UPEL teacher training programme. A similar situation is observed in methodologies of outdoor education, values clarification, and simulation games. These omissions represent a strong weakness in the UPEL model since training in instructional methodologies is vital to teaching practice.

The means of **planning for instruction** area of the UNESCO model is associated with two UPEL areas - **instructional planning and curriculum**. They all deal with the issue of instructional design. But, a significant difference between these areas exists. The UNESCO model refers to specific instructional model approaches, such as disciplinarity and interdisciplinarity. They are omitted, however, in the UPEL model. An emphasis on the advantages and disadvantages of these approaches should be stressed in both models. Analysis of various alternative approaches can help teachers in making better decisions regarding the selecting, implementing and applying of the appropriate approach to a specific case.

An important observation in comparing these models is that neither of them stresses systems for instruction delivery. For example, the UNESCO and UPEL models do not discuss approaches related to lecturing, tutoring, conducting of seminars, workshops, conferences or individualized instruction (Block and Anderson, 1975; Gage, 1974; Joyce, 1972; Joyce and Weil, 1980; Ryan, 1974; Skinner, 1968; Talmage, 1975). Environmental education can be delivered by any of these systems. Therefore, discussions of the

advantages and disadvantages of these instructional delivery systems are relevant to teacher training. In any case, a combination of these approaches appears to be the most appropriate to the diversity and nature of issues involved in environmental education.

The **evaluation of the environmental education curricula and methods** area of UNESCO and the **educational evaluation** area of UPEL refer to the evaluation of cognitive and affective achievements. Although both models refer to similar subject matter, the relevant application levels are different. The UNESCO model stresses the evaluation of curricula and methods, while the UPEL model stresses the evaluation of students' learning. In the realm of education, evaluation is a vital component in assessing both student and programme achievements (Braskamp and Brown, 1980; Eisner, 1985, 1979; Gagne et al, 1988; Gottman and Clasen, 1972; Raizen and Rossie, 1981; Scriven, 1977; Worthen, 1985). It helps to improve the quality of the educational process by assessing the effectiveness of these achievements and by introducing remedial measures if necessary. Evaluation of both types of achievement are also needed in environmental education in order to assess the effectiveness of this particular education process (Bennett, 1982, 1974, 1988/89, 1977; Nowak, 1984; Ramsey G, 1977; Robottom, 1985; Thomas, 1989/90). In this context, environmental educators need to acquire the necessary skills to assess the quality of the environmental education process by determining student performance and the value of the environmental education programme.

In summary, comparison of the subject matter of UNESCO and UPEL professional education competencies reveals little congruency. Content relevant to environmental education proposed by the UNESCO model is neglected in the UPEL model. However, the UPEL curriculum structure presents possibilities for making the necessary adjustments in its different competency areas. In other words, the UPEL curriculum already includes areas which might support the required adjustments. Six of nine areas proposed by the UNESCO model are included in the UPEL professional component (Table 8.4). The excluded three areas - theories of moral reasoning, the theory of transfer of learning, and infusion of environmental education curricula and methods - can easily be infused into existing related areas such as philosophy and education, educational psychology and instructional planning.

8.2.3 Competency Taxonomic Domains

Discussion is now to focus on a comparison of taxonomic domains involved in the UNESCO and UPEL competency statements. The UNESCO and UPEL models have, as integral components, competencies associated with cognitive domains (Table 8.5). The major difference between them is that the term "cognitive professional competencies" in the UNESCO model refers directly to those competencies linked to environmental education, whereas in the UPEL model they are stated in a very general way without this linkage. UPEL curriculum designers or professors of environmental education are alone responsible for stressing the basic professional competencies

Table 8.5 Comparison Between Taxonomic Domains and Skill Levels of Professional Competencies of UNESCO and UPEL Models

UNESCO Model													UPEL Model												
Areas and Associated Competency by Number ¹	Taxonomic Domains												Areas and Associated Competency by Number ¹	Taxonomic Domains											
	Cognitive Skill Levels						Affective Skill Levels							Cognitive Skill Levels						Affective Skill Levels					
	1	2	3	4	5	6	1	2	3	4	5	6		1	2	3	4	5	6	1	2	3	4	5	
Educational Philosophy			✓										Philosophy and Education	10 11	✓		✓								
Theories of Knowledge/ Attitude/ Behaviour Relationships			✓										Evolutionary Psychology	4 5			✓ ✓								
Theories of Learning			✓										Educational Psychology	15 16		✓	✓								
Instructional Methodologies	✓												Instructional Strategies and Resources	24 25 26		✓ ✓ ✓	✓								
Means of Planning for Instruction			✓										Curriculum	21 22		✓ ✓	✓ ✓								
Evaluation of Environmental Education Curricula and Methods						✓							Instructional Planning and Resources	27				✓							
													Educational Evaluation	23				✓							
Total No. %	6 100	1 16.5	- 0	- 0	- 0	1 16.5	- 0	- 0	- 0	- 0	- 0	- 0	Total No. %	13 100	8 16.5	- 0	4 31	6 46	2 15	- 0	- 0	- 0	- 0	- 0	

¹ Number after each specified "area" refers to the competency identified in Table 5.1

Recognized Cognitive Domain dealing with skills in: 1 knowledge 2 comprehension 3 application 4 analysis 5 synthesis 6 evaluation

Recognized Affective Domain dealing with skills in: 1 receiving 2 responding 3 valuing 4 organization 5 characterization

SOURCE: Adapted from Content Analysis

necessary to properly teach environmental education.

8.2.4 Competency Skill Levels

The UNESCO and UPEL professional competencies models are entirely associated with the cognitive domain. Yet, the skill levels inherent in these models are different (Table 8.5). Most professional competencies of the UNESCO model are associated with application skills (#3). Professional competencies focusing on application skills qualify teacher candidates to use proper pedagogic theories, methods and materials when they are teaching any discipline. This general pedagogic knowledge and skill is transferred to specific disciplines through "learned application abilities". UPEL competencies on the other hand, are related to analysis skills (#4). Professional competencies focusing on analysis skills prepare teacher candidates to examine pedagogic theories, methods and materials. Unfortunately, students are not asked to transfer this general knowledge to any specific educational discipline. In this context, the UPEL professional competencies model appears to be a theoretical model. This orientation prevents the teacher from having the opportunity of applying pedagogic content to the teaching-learning process of specific subject matter.

8.3 COMPETENCIES OF ENVIRONMENTAL EDUCATION

The comparison of the UNESCO and UPEL models also reveals a competency component related to environmental education content in

both designs (Table 8.1). The components of each model contain a similar number of competencies. More specifically, the UNESCO model embraces nineteen (19), and the UPEL model twenty-one (21), competencies. A feature that distinguishes UPEL from UNESCO is that competencies of the UPEL model are organized in terms of five (5) large content units, whereas the UNESCO competencies are organized in four (4) goal levels. These content units and goal levels serve as orientation in delineating the competency statements in both models. A comprehensive comparative analysis of both designs is presented in Appendix H.

8.3.1 Competency Areas

The UNESCO and UPEL models have within them several environmental education areas (Table 8.1). More specifically, the UNESCO model embraces four (4), and the UPEL model five (5), areas with quite different descriptive titles or names. A comparative content analysis indicates that the UNESCO environmental action skills area (IV) is entirely absent in the UPEL model (Table 8.6). This UPEL model omission is significant as this competency area is devoted to the provision of teaching strategies for skills related to individual and group environmental action. As stated in Chapters VI and VII, training teachers as social leaders of the community is both an aspiration of the Venezuelan state and an objective of UPEL. Environmental leadership is the best expression of this role and unfortunately it is not expressed in the UPEL environmental education competencies.

TABLE 8.6 Congruency Between Environmental Education Content Areas and Associated Competencies of UNESCO and UPEL Models

UNESCO Areas and Associated Competency by Number ¹		Congruency with UPEL Model		
		Explicit	Implicit	None
Ecological Foundations	11 12 13 14		✓	✓ ✓ ✓
Conceptual Awareness	15 16 17 18 19 20 21		✓ ✓ ✓	✓ ✓ ✓ ✓
Investigation and Evaluation	22 23 24 25 26 27		✓ ✓	✓ ✓ ✓ ✓
Environmental Action Skills	28 29			✓ ✓
Total	19	-	6	13

¹ Number after each specified "area" refers to competency identified in Table 5.1

SOURCE: Adapted from Content Analysis

Comparative content analysis does indicate a partial congruency of the remaining UNESCO competency areas (3) with each UPEL area (5) (Table 8.7). Detailed information as to similarities and differences involved in this partial congruency is presented in sections related to competency subject matter, taxonomic domains and skill levels.

8.3.2 Competency Subject Matter

A subject matter comparison of the UNESCO and UPEL models indicates a real polarity, as similarities between them are very few (Appendix H). For example, the **ecological foundations** of UNESCO and the **structure and dynamic of the natural environment** of UPEL show a concern for a select group of ecological concepts and principles. However, major concepts and principles in ecology considered by UNESCO are not included in the UPEL model. More specifically, concepts and principles associated with individuals, population, communities and ecosystems are not clearly established. In addition, ecological concepts of similar concern for both models, such as those associated with energy flow in ecosystems, do not have the same focus. These concepts in the UNESCO model have a strong "applied context", whereas in the UPEL model they are expressed in an abstract, non-applied sense. This lack of application implies a lack of usefulness of the ecological concept in understanding man-environment relationships.

There is also a significant difference between models in terms of the human population themes, such as human population growth,

**TABLE 8.7 Identification of Partial Congruency between UNESCO and UPEL
Environmental Education Content Areas**

Congruency Areas	
UNESCO Model	UPEL Model
I. Ecological Foundations	I. Structure and Dynamic of the Natural Environment
II. Conceptual Awareness	II. Human Population
III. Investigation and Evaluation	III. Research Based Action

SOURCE: Adapted from Content Analysis

birth rates, and mortality rates. These concepts are stressed by the UPEL model in the area of human population, while the UNESCO model neglects these concepts throughout the design. Human population concepts are important in establishing interrelationships between man and natural ecosystems, as well as exploring consequences of these interrelationships. Unfortunately, in discussing human population concepts, the UPEL model emphasizes descriptions instead of interrelationships.

Similarity between the **conceptual awareness** area of UNESCO and the **human population** area of UPEL is observed. This similarity exists since both models refer to humankind's socio-cultural activities. However, the influence of these activities on the environment is not stressed in the UPEL model. Most of UNESCO's conceptual awareness competencies are omitted in the UPEL model. More specifically, competencies dealing with individual behaviour and its impact on the environment, the roles played by differing human values in environmental issues, the need for personal values clarification as an integral part of environmental decision making and the need for responsible action in the remediation of environmental issues, are not included in the UPEL model. The omission of these topics in the UPEL model represents a large gap since personal and environmental values clarification is a major concern in the discussion of Venezuelan environmental problems.

The area of **investigation and evaluation** of UNESCO presents partial congruency with the area of **research based action** of UPEL. Similarity between these areas exists since both models refer to

investigation of environmental problems and alternative solutions. However, contrary to the UNESCO model, the UPEL design does not stress an "evaluation" of alternative solutions to environmental problems. This aspect is presented in a very analytic and descriptive way. Evaluation, implicit in the investigation process, is relevant to environmental education. It prepares teachers as effective decision makers by investigating and evaluating alternative solutions to problems from which they can choose.

Another difference established in areas associated with the investigation and evaluation of environmental problems and solutions refers to value perspectives and value positions involved in these issues. They are strongly emphasized in the UNESCO model and fully omitted in the UPEL model. Analysis and clarification of values when analyzing environmental issues are important for environmental educators. They help students make value choices and to act, behave, and live in accordance with their choices. These exercises are essential to environmental education as they develop environmental commitment. Environmental educators can profit from studying these processes in order to apply them to specific learning experiences.

As stated in Section 8.3.1, a major difference between the UNESCO and UPEL models refers to environmental action skills. Teacher training in techniques dealing with individual and group environmental actions is a primary concern in the UNESCO model. Unfortunately, this key environmental education area is completely neglected in the UPEL model. This omission represents a large gap

in the Venezuelan education system since this area might help to increase social responsibility and changes in values by involving students in active problem-solving and decision-making settings. This gap needs to be filled by UPEL in order to give enforcement to regulations related to teacher training policy and organization, and the performance of boards for the conservation, defense and improvement of the environment (Congreso de la República de Venezuela, 1977; Ministerio de Educación, 1983).

8.3.3 Competency Taxonomic Domains

Environmental competencies of the UPEL model are not associated with affective domains. This differentiates it from the UNESCO model (Table 8.8). In other words, not one competency attempts to develop the needed set of attitudes or values in the student group. The opinion expressed in antecedent research (Chapter IV) suggests an urgent need to develop an ethical base within the fabric of society's environmental literacy. All comprehensive and serious environmental education teacher training programmes should emphasize this type of competency. The UNESCO model shows a strong emphasis in this regard.

8.3.4 Competency Skill Levels

The cognitive domain of the UNESCO environmental education competencies is associated, mainly, with application skills (#3), whereas the UPEL model is entirely devoid of this type of skill training. The UPEL environmental education competencies have a

Table 8.8 Comparison Between Taxonomic Domains and Skill Levels of Environmental Content Competencies of UNESCO and UPEL Models

UNESCO Model													UPEL Model															
Areas and Associated Competency by Number ¹	Taxonomic Domains												Areas and Associated Competency by Number ¹	Taxonomic Domains														
	Cognitive Skill Levels						Affective Skill Levels							Cognitive Skill Levels					Affective Skill Levels									
	1	2	3	4	5	6	1	2	3	4	5	6		1	2	3	4	5	6									
Ecological Foundations 11 12 13 14	✓		✓	✓										✓			✓	✓										
Conceptual Awareness 15 16 17 18 19 20 21	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				✓	✓	✓								
Investigation and Evaluation 22 23 24 25 26 27	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				✓	✓	✓	✓								
Environmental Action Skills 28 29	✓		✓		✓									✓			✓	✓			✓							
																				✓	✓	✓	✓					
Total No.	16	1	17	6	15	6	7	1	-	2	1	3	3	-	10	3	2	-	-	-	-	-	-	-	-	-	-	-

Number after each specified "area" refers to the competency identified in Table 5.1

Recognized Cognitive Domain dealing with skills in: 1 knowledge 2 comprehension 3 application 4 analysis 5 synthesis 6 evaluation

Recognized Affective Domain dealing with skills in: 1 receiving 2 responding 3 valuing 4 organization 5 characterization

SOURCE: Adapted from Content Analysis

strong bias toward the development of analysis skills (Table 8.8). These types of skills (#4) are needed in understanding environmental problems. However, application skills are also needed in designing, implementing, developing and evaluating similar competencies in environmental education programmes. As mentioned earlier in the review of professional education competencies, there is a great difference in the approach taken in the models. The UNESCO model has a practical approach whereas the UPEL model is theoretical. Teacher training in environmental education needs to be more than the analysis of conceptual foundations since educators are required to become active in the resolution of environmental problems.

Comparison of skill levels also reveals no resemblance in relation to affective skills between both models. Since the UPEL model does not include competencies in the affective domain, no skills related to this domain are considered. As opposed to the UPEL model, the UNESCO model is associated with four affective skills. However, the most frequently used is the receiving skill which is associated with the development of awareness. This skill is critical in environmental education since it contributes to the training of concerned individuals about the environment and its correlated problems.

8.4 SUMMARY

This chapter has focused attention on a comparative analysis of the UNESCO and UPEL environmental education teacher training

competency models. Certainly, these models vary widely in content. However, the residual message is that any model planned for training effective environmental educators should demonstrate a set of basic competencies in professional education and environmental education. Professional education competencies should provide teachers with theories and methodologies needed for planning, implementing, developing and evaluating the teaching-learning process of environmental education. Environmental education competencies should provide teachers with the environmental knowledge, values, attitudes, behaviour and skills needed in analyzing and evaluating environmental problems and preventing and solving such problems.

In summary, the UPEL model has been found deficient in both professional education and environmental education content competencies. However, a major and critical deficiency is the absence of an affective domain of environmental education competencies (Table 8.8). These competency types assist students to develop environmental awareness and positive attitudes toward the environment, which is a primary goal of environmental education. Therefore, this void alone represents a failure to help students to develop environmental awareness and sensitivity to defend, protect and improve the environment, and also a failure to help teachers develop the necessary skills to handle the values, attitudes and behaviour involved in these issues.

Chapter IX

THE UPEL MODEL AS PERCEIVED BY KEY VENEZUELAN INDIVIDUALS

9.1 PURPOSE

The purpose of this chapter is to describe and analyze the views of key Venezuelan individuals in relation to both the relevance of the UPEL model to Venezuelan environmental reality and the UPEL model's strengths, weaknesses and adjustments. This descriptive and analytic exercise is guided by research questions, variables and their associated measurement criteria (Figure 4.1). Data and information used to develop answers to these questions are derived from a survey of key Venezuelan individuals - professionals engaged in environmental management in Venezuela, and UPEL environment, 1 education professors and teacher candidates.

9.2 THE UPEL MODEL AND ITS RELEVANCE TO VENEZUELAN ENVIRONMENTAL PROBLEMS AND NEEDS

In an attempt to determine the relevance of the UPEL model to Venezuelan environmental reality, twenty-four (24) key Venezuelan individuals were surveyed (Table 4.5). These individuals were asked to answer four questions concerning the relevance of the UPEL model to major Venezuelan environmental problems (Appendix B). Table 9.1 displays the thematic data contained in the answers to these questions.

TABLE 9.1 Major Environmental Problems of Venezuela; Their Causes, Impact and Solutions - According to Key Individuals

Major Environmental Problems	Specific Environmental Problems Associated with Each Major Concern	Causes of Environmental Problems	Major Body Impacted	Major Alternative Solutions
1. Water Quality	Contamination of continental coastal lagoon, beach and ocean waters. Low quality of drinking water. Deficiency of the drinking water supply.	Contamination by agricultural, domestic, industrial and mining activities (waste generation: fertilizers, pesticides, plaguicide, heavy metals, oil and by-products, sewage waters). Poor operation of aqueducts and treatment plants for drinking water. Occupation of river basins. Lack of law enforcement. Lack of environmental consciousness.	Rivers: Tuy, Yaracuy, Neveri, Manzanares, Turbio, Tocuyo, Tobes, Caroni. Lakes: Valencia, Maracaibo Coastal lagoons in protected areas Sanctuaries: Ciénaga de los Olivitos, Refugio de Fauna de Cuare, Parque Nacional Laguna de Tacarigua, Parque Nacional Laguna de la Restinga, Monumento Natural Laguna de Las Marites, Laguna de Los Patos Beaches: Zulia, Sucre, Distrito Federal, Falcon, Aragua, Carabobo. Ocean: zone of the Golfo Triste. River basins: Caroni, Venamo, Cimacon and Guaniamo	Increase the level of knowledge of the population in relation to the proper use of water. Improve the sanitary level of waters. Establish national methodologies and standards of universal application in measuring and controlling contamination in waters. Involve local communities in the process of decision-making associated with the management of water resources and protection of fragile aquatic ecosystems. Stop the development of industrial and urban complexes in zones of scarce water resources. Develop control mechanisms in spilling oil. Establish control, penalty and incentives for a harmonious industrial development in terms of water resources.
2. Waste Production and Disposal	High generation of solid waste. Aesthetic and health problems in major cities by accumulation of large quantities of garbage on streets. Discharge of municipal waste into open rubbish dumps without control. Improper deposit, collection and treatment of toxic and radioactive waste. Attempts to receive imported sewer, toxic and radioactive waste.	Residential, commercial and industrial activities. Lack of population education. Wrong habits and attitudes of the Venezuelan population. Poor waste management system. Lack of a proper technology of waste disposal. High corruption. Lack of proper areas of landfill.	Caracas Metropolitan area, Axis Barcelona-Puerto La Cruz, Zulia, Ciudad Bolívar	Law reinforcement. Improvement of waste management systems. Increase of Environmental Education programmes dealing with waste reduction and recycling.
3. Biodiversity Loss (Vegetation and Fauna)	Extinction of species: mammals, birds, reptiles, amphibians, fishes, plants. Irrational exploitation of forests. Reserved forests invaded and destroyed. Deforestation. Destruction of marine fauna and vegetation by trawler fishing activities.	Reduction and destruction of habitats. Over-exploitation of species. Introduction of exotic species. Mortality by shooting, contamination and disruption of habitats. Exportation of species to other countries. Illegal and permitted indiscriminate deforestation. Bureaucracy. Corruption. Construction of hydraulic plants. Mining activities.	Whales, dolphins, tuna, felinas, deer, cardenalito, parrots, loros, cotorras, macaws, flamingos, tucanes, guacharacas, pautjes, caymans, babas, turtles. Reserves of San Camilo, Ticoporo, Turen, Rio Tocuyo, Caparo	Law enforcement. Development of a strong ethic for the preservation of species. Stop corruption in conferring illegal permits and licenses. Better management of protected areas. Control the natural areas and commercialization of species. Incorporate local communities in the protection and management of natural areas.

TABLE 9.1 (cont'd)

4. Soil Degradation	Soil erosion, desertification and salinity.	Urban and industrial processes. High rate of deforestation. Improper use of agriculture techniques (fire, clear cutting). Use of heavy agricultural machinery. Irrational use of irrigation systems. Use of slope areas. Reversed use of agricultural lands by industrial activities. Lack of law enforcement. Lack of specific Environmental Education programmes.	Caracas valley, Tuy valleys, Valencia Lake basin, area south of Maracaibo Lake, Falcon, Lara, Sucre, Anzoategui, Andes, Guarico, islands, Tocuyo River basin, Valley of Quibor, axis Aragua-Siquisique, Goajira Peninsula, Unare basin, Neveri, Manzanares, Motatan, Chama Rivers, areas of sand dunes in Apure and Guarico	Make the population aware of the present situation of erosion and desertification of Venezuelan soils. Modify the conditions of local climates. Establish green belts. Irrigate and zones. Establish controls in relation to use of soils. Avoid over-pasturing activities, development of inappropriate crops and the use of erosive elements.
5. Air Quality	High level of air contamination in major cities by automobile and industrial activities. Considerable level of acid rain. Generation of gases that destroy the ozone layer of Venezuela. Production of gases that generate the greenhouse effect	Lack of policies and legal control. High level of vehicular traffic. Inefficient public transport system. Excessive and improper allocation of industries in major cities operating without control and discharging waste with absolute freedom. No enforcement of laws for controlling the emission of toxic gases. Lack of technical controls in preventing the generation of gases. Deforestation and urban activities.	Caracas Metropolitan Area, Axis Tejerias-Maracay, Valencia, Maracaibo, Barquisimeto, Axis Barcelona-Puerto La Cruz, Ciudad Bolivar, Moron y el Tablazo	Improve the production and divulgence of knowledge in relation to air contamination in Venezuela. Legal enforcement of national regulations and international agreements. Decrease vehicular traffic. Improve the collective transport system.
6. Population Concentration and Social Marginality	Extreme concentration of the population. Social marginality areas. Lack and deterioration of public services (collective transport, water supply, waste collection, health and education assistance). Insufficiency of recreational areas (parks and green areas). Housing shortage. Unemployment. Malnutrition. High rate of delinquency. Critical poverty.	Unequal allocation of the population in the geographical space (50% of the Venezuelan population inhabits 4% of the national territory which is not more than 100 km.) Lack of an adequate territorial plan. Unequal wealth distribution. High bureaucracy. Low level of community participation. Lack of environmental awareness programmes.	Coastal area above the Caribbean sea (the axis Barcelona-Puerto La Cruz, Caracas Metropolitan Area, Maracay, Valencia, Maracaibo). Low income people are the most affected.	Increase the Environmental Education of the population. Improve the management of the natural resources of the country. Increase the participation of the community in the solution of their own problems.

SOURCE: Adapted from survey of key Venezuelan individuals

Response analysis revealed six (6) **major environmental problems in Venezuela**. They were related to (1) water quality decline; (2) waste production and disposal; (3) biodiversity loss (vegetation and fauna); (4) soil degradation; (5) air contamination; and (6) population concentration and social marginality. Respondents also identified **specific environmental problems** associated with each of the types of environmental problems (Table 9.1). These problems provide a comprehensive panorama of the present Venezuelan environmental situation. This panorama is alarming, and is characterized by several specific problems such as: contamination of major rivers, lakes, lagoons and beaches; low quality and supply of drinking water; high generation of solid waste and associated health and aesthetic problems; several endangered and exterminated species of animals and plants; soil erosion, desertification and salinity; high levels of air contamination and associated health problems; and poverty and deficient public services. Survey participants also identified **major impact targets of these problems** (Table 9.1). Thus, several natural environments and resources, major Venezuelan cities and large population sectors, especially low income groups, are seriously affected. It is obvious that specific environmental problems affecting particular environments and resources identified by key Venezuelan individuals are not addressed by the UPEL model (Table 9.1). This represents a serious deficiency of the Venezuelan environmental education teacher training programme because awareness of local environmental problems is a key condition for

educating environmentally responsible citizens.

Major causes of Venezuelan environmental problems were also identified by respondents (Table 9.1). Such causes as an inefficient administrative system, lack of law enforcement, irrelevance of environmental education programmes to Venezuelan environmental problems and needs and lack of community involvement in management were identified. Unfortunately these causes are not emphasized in the UPEL model. This leaves teachers without the opportunity to analyze the specific reasons for the environmental problems of Venezuela; an exercise which is mandatory for their avoidance and solution. The respondents stressed that immature natural resources management, supported by high administrative corruption, is an important cause of many environmental problems in the country (Castellano, 1992, Personal Communication; Flores, 1992, Personal Communication; Hernández, 1992, Personal Communication; Luzardo, 1992, Personal Communication; Moya, 1992, Personal Communication; Salazar, 1992, Personal Communication; Tobito, 1992, Personal Communication). But again, this important concern expressed by key Venezuelan individuals is not reflected in the competency statements of the UPEL model. It indicates a lack of relevance of the programme to the real problems and needs of the country.

In addition, key individuals also identified a lack of ethics in the environmental administration of Venezuela. The "ethics theme" is not advanced in the UPEL model. It is contended that if these environmental problems continue unabated, then the quality

of life of Venezuelans will decline and the possibilities of achieving a better future will be remote. Effective action is needed to change the present Venezuelan environmental situation. In this context, a set of **solutions to Venezuelan environmental problems**, as perceived by survey participants, is presented (Table 9.1).

As expected, solutions to Venezuelan environmental problems are closely related to their major causes. Respondents addressed the critical and urgent need for better environmental management, legal enforcement of environmental laws and regulations, greater investment in environmental education programmes, development of strong moral ethics and values, and encouragement of community participation in environmental improvement, defense and protection. These specific solutions are not addressed by the UPEL model. This model deals with general environmental problems and their associated general solutions which can be widely applicable to other contexts. The implication of this is that teachers are losing the opportunity to consider environmental issues particular to Venezuela.

The potential for education to contribute to changing the Venezuelan environmental situation was recognized as great. But this change demands the appropriate training of human resources. This training of effective environmental education teachers represents an immense challenge since teachers are key vehicles for facilitating the growth of positive environmental attitudes and behaviour among learners. In this context, a primary task is to

introduce adjustments to the UPEL model in terms of competencies dealing with specific local environmental problems and their causes. Respondents were asked to consider the **UPEL model's content and its relevance to present environmental problems and needs of Venezuela**. A list of issues or topics related to the UPEL model was provided in this exercise (Appendix B). Data relative to this aspect are presented in Table 9.2. It is strongly perceived that the UPEL model's content has little relevance to Venezuela's environmental problems and needs. More specifically, the consensus among respondents was that the UPEL model stresses neither the development of environmental awareness about major national and local environmental problems, nor environmental values. As a result, it is contended that Venezuelans have little understanding of national and local environmental problems and possess negative environmental attitudes and behaviours. These traits are displayed in the form of corruption and extravagant habits of squandering and resource consumption (Buroz, 1992, Personal Communication; Flores, 1992, Personal Communication; González, 1992, Personal Communication; Moya, 1992, Personal Communication; Romero, 1992, Personal Communication; Salazar, 1992, Personal Communication).

Responses displayed in Table 9.2 reveal respondent dissatisfaction with the UPEL model's content. Respondents stated that the UPEL model's content is incoherent in terms of its sequential presentation, too ambitious in terms of the long list of themes to be examined, and too theoretical in nature, among many others.

TABLE 9.2 Summary of Statements of Key Venezuelan Individuals Regarding the Relevance of the UPEL Model's Content to Venezuelan Environmental Problems and Needs

The UPEL Model's Content:

- does not emphasize major Venezuelan environmental problems
- does not address causes associated with the existing administrative corruption and negative environmental attitudes and behaviour
- lacks aspects relating to community participation, territorial planning and spatial unbalance
- emphasizes only energy, flora and fauna, ignoring aspects relating to water and soil
- is incoherent and confused
- is very theoretical
- is too ambitious in terms of the scope of its subject matter; however, it leaves out important topics
- is more appropriate for a specialization than for teacher training
- approach is markedly objectivist in which students do not identify themselves with their own problems nor with the need for resolving them
- is coherent
- is appropriate to teacher training
- is very focused on the development of cognitive knowledge
- does not promote affective experiences
- lacks environmental ethical and moral values
- does not promote the development of environmental conscience and awareness
- is weak in establishing relationships among ecology, technology, regulation and social and economic impact
- is very centred on ecological aspects
- is very weak in aspects relating to contaminant technologies and their social and economic impact
- does not use an interdisciplinary approach

SOURCE: Adapted from survey of key Venezuelan individuals

9.3 STRENGTHS AND WEAKNESSES OF THE UPEL MODEL

Each model has its own strengths and weaknesses. An assessment of these aspects is critical in evaluating environmental education models. The attempt to identify the UPEL model's strengths and weaknesses was based, in part, on a survey of UPEL environmental education professors and teacher candidates. The survey participants were asked to identify and describe major strengths and weaknesses of the UPEL model (Appendices C and D). Responses from professors involved in the programme were very disappointing in terms of quality and quantity. Their responses were not only superficial and incomplete, but also inconsistent. This situation reflects a lack of understanding of the problem and hesitation to criticize the UPEL model.

Responses from survey participants reveal four major types of strengths of the UPEL model (Table 9.3). They relate to the model's adequacy, structure, approach, and content. Most of the positive responses came from professors. However, examination of these programme endorsements reveals much ambiguity in the expressions used by professors to describe the model's strengths. Such expressions as "the UPEL model is complete, balanced, appropriate, flexible and up to date" were included. However, no explanation of these expressions was provided. In addition, the messages involved in these phrases are fully inconsistent with those indicated in the list of weakness statements they themselves provided. (Table 9.4). For example, opinions related to the overcrowding of subject matter and lack of some important issues contradict the complete

TABLE 9.3 Major Strengths of the UPEL Model

UPEL Environmental Education Professors	UPEL Teacher Candidates
1. ADEQUACY • Appropriate for the level of the Teacher Training Programme in each UPEL institute • Up to date • Relevant to Venezuelan and Latin American problems 2. STRUCTURE • Balanced and dynamic • Content is presented in a sequential way, starting from macro problems and finishing with specific problems • Flexible and makes innovation possible 3. APPROACH • Stimulates critical attitudes • Involves students in planning and solving community environmental problems • develops a set of personal competencies such as creativity, participation, and critical attitudes • Facilitates the use of drama, case study, and conferences • Encourages creativity for both professors and students • Contributes to the training of teachers in their role as a facilitator, social promoter, planner, adviser, administrator, and valuator 4. CONTENT • Content is complete • Includes the elaboration of a community project • develops a set of personal competencies such as creativity, participation, and critical attitudes • Contributes to the training of teachers in their role as a facilitator, social promoter, planner, adviser, administrator, and valuator	• Gives students the opportunity of contact with communities • Arouses great concern about environmental problems

SOURCE: Adapted from survey of UPEL Environmental Education Professors and Teacher Candidates, 1992

TABLE 9.4 Major Weaknesses of the UPEL Model

WEAKNESS CATEGORIES		UPEL PROFESSORS	UPEL TEACHER CANDIDATES
1.	TIME - Not in accordance with the number of teaching hours - Four hours per week is not enough for delivering the content of the course - Too many lost classes due to strikes - Time for delivering the course is very short	✓ ✓ ✓	✓
2.	SCOPE AND CONTENT - Course is too ambitious - Course is so vast that it is only delivered to the extent of 60% - Some units have such a vast content that they go beyond the course objectives creating an attitude of rejection in students towards the course - Environmental regulation is a large theme which demands several hours	✓ ✓ ✓ ✓	
3.	APPROACH - Represents a single course in the teacher training curriculum - Course has a strong ecological approach - Emphasizes man as a social being but not as a cultural being - Not strong in developing environmental awareness - Community issues are developed in a very theoretical way - Weak in promoting investigation based on action - Weak in making critical statements about the enforcement of environmental regulations - Weak in establishing relationships among society, environment, development and quality of life - Lack of content relating to environmental awareness and values education	✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓	✓
4.	INSTRUCTIONAL METHODOLOGY - Course is very theoretical - Lack of methodologies for teaching issues - No outdoor activities		✓ ✓ ✓
5.	TRANSPORTATION - UPEL institutes lack transportation systems to fulfil outdoor and field work activities - No budget allocated for free transportation of students	✓ ✓	
6.	FUNDING No funding for the financial support of environmental education activities	✓	
7.	INSTRUCTIONAL RESOURCES - Many difficulties in doing field work - Lack of an audiovisual room - Lack of proper classrooms and labs - Poor library service with a very rigid schedule - Course does not involve the mass media - Instructional material is not varied	✓ ✓ ✓ ✓	✓ ✓
8.	COMMUNITY PROJECTS - Many obstacles in carrying out environmental projects - Unit relating to projects is not focused on students' concerns nor on their local communities - Topics of projects and investigations are imposed by professors - Little contact with communities	✓	✓ ✓ ✓
9.	EXTRACURRICULAR ACTIVITIES - No environmental activities in UPEL institutes - No environmental action group		✓ ✓
10.	CLASS SIZE Instruction groups are very large	✓	
11.	ATTITUDINAL Lack of support from professors in overcoming obstacles and limitations	✓	

SOURCE: Adapted from survey of UPEL Environmental Education Professors and Teacher Candidates, 1992

and balanced character attributed to the model. Most strength statements appear to be inadequately based on facts. This situation does not help to make an objective evaluation or to improve the UPEL model.

Responses provided by teacher candidates were short in number, but rich in message quality (Table 9.3). They considered the environmental education course to be a positive learning experience despite its several weaknesses. In their view, this experience aroused great concern about environmental problems and gave them the opportunity to work in communities.

The elaboration of community projects seems to be the strongest element of the UPEL model. Professors and teacher candidates emphasised the importance of projects which involve students in planning and solving community environmental problems. However, they expressed the view that limitations of time and resources make the success of such projects difficult to realize.

Table 9.4 displays the responses addressing **major weaknesses of the UPEL model**. An analysis of these responses reveals consistency of opinion between both respondent groups. Thus, a set of weaknesses related to time, scope and content, approach, instructional methodologies, logistical support, research projects, and attitudes of environmental education professors were mentioned by these survey participants.

Time was indicated as a major weakness of the UPEL model. The number of hours assigned to the mandatory course work was not considered adequate. The delivering of the material called for by

the UPEL model is expected to be completed in a period of twenty-eight (28) hours. This time becomes shorter due to the various interruptions of lectures such as those experienced by UPEL in the last ten years. As a result, the UPEL teacher candidates do not achieve all competencies expected by the model.

Time problems were also associated with the **scope and content** of the course. Professors stressed that the model and its obligations are too vast and ambitious - that it is only possible to fulfil 60% of all requirements. Professors also expressed that this situation can influence UPEL students' perceptions. It is evident that there is no correlation between course content breadth and the time available for its delivery.

An interesting recurring comment made by professors relates to the strong ecological **approach** of the UPEL model. The course has an ecological focus that neglects the social or human dimensions underlying all environmental problems. In fact, professors and teacher candidates stated that the model is too focused on the natural and engineering sciences. An additional weakness mentioned by professors relates to the fact that environmental education is a single course in the teacher training curriculum. This imposes constraints in content and the time for developing it.

Further, respondents considered the theoretical nature of the environmental education course a weakness. They associated it with **instructional methodologies** focused on the conventional classroom and printed instructional material. The lack of field work, outdoor activities and community activities characterize the UPEL model

course as a traditional study programme. Professors indicated that **transportation** system costs obstruct the fulfilment of outdoor and field work activities. Most UPEL institutes do not own or operate motor vehicles (buses). In addition, the budget allocated for these kinds of activities is very meagre. The UPEL environmental education programme does not have a special **fund** available for the financial support of field work and community projects. As a Venezuelan educator, the researcher recognizes that these statements are unquestionable. However, when professors are very well trained and motivated, these problems should not be a complete obstacle to carrying out effective learning experiences in environmental education. Environmental educators should be able to deal with a set of instructional strategies, methodologies and resources which allow achievement of environmental education objectives in spite of the lack of some technical support.

Instructional resources supporting the teaching-learning process of environmental education presents a serious problem in implementing the UPEL model. There is lack of, (and an inefficiency in) environmental classrooms, laboratories, audiovisual rooms and library services. In addition, the printed instructional materials are very poor in quantity and quality. A weakness mentioned by teacher candidates is the lack of involvement of the mass media in the environmental education teaching process of UPEL institutes. The role of this instructional resource is central to environmental education programmes.

In spite of the opinion of UPEL professors regarding **community projects** as the strongest point of the UPEL model, teacher candidates' responses revealed several critical weaknesses even in these activities. Community projects are advertised as being the major course elements and are compulsory. But these stipulations are not exercised in reality. Information provided by UPEL students related to these activities indicated that the community project is not the major research activity undertaken by the environmental education students of UPEL (Table 9.5). Student literature research projects on environmental issues seems to be the most common activity addressed. Interestingly, teacher candidates indicated that both the research topics themselves and the communities where such research is carried out were not relevant to their concerns. Most of the time professors impose on the students the topics and communities for work in the research and projects.

Lack of **extracurricular activities** was a strong criticism of the UPEL model made by teacher candidates. They indicated that the environmental education programme does not include lectures and conferences related to global and national environmental issues. Certainly these types of instructional activities enrich students' learning experiences. Lectures with special guests may contribute to filling the course gaps produced by the lack of time and professor expertise on a specific issue. As a result of the lack of extracurricular activities, no action groups exist in the UPEL institutes. Therefore little environmental action is observed in this educational community.

TABLE 9.5 Activities and Topics Developed by Teacher Candidates in the Area of Projects and their Relationships to Student Communities

Activity	Topic	Relationship	
		Yes	No
1 Essay	Contamination of Valencia Lake		✓
2 Cleaning	Gardening and painting of UPEL walls	✓	
3 Project	Maintenance of school facilities	✓	
4 Investigation	Contamination of waters		✓
5 Project	Garbage around school	✓	
6 Not Undertaken			
7 Project	Recycling of cans		✓
8 Not Undertaken			
9 Field work	Environmental analysis of an area		✓
10 Field work	Study of ecosystems		✓
11 Not Undertaken			
12 Investigation	The cacao tree		✓
13 Investigation	Trawler fishing		✓
14 Investigation	Contamination of waters		✓
15 Investigation	Environmental issues		✓
16 Project	Cleaning of beaches	✓	
17 Project	Maintenance of school facilities		✓
18 Investigation	Lead and mercury problems		✓
19 Investigation	Lead contamination		✓
20 Investigation	Recovery of paper		✓
21 Investigation	Study of habits in parks		✓
22 Project	Maintenance of school facilities	✓	
23 Project	Rain problems		✓
24 Investigation	Present state of parks		✓
25 Project	Cleaning of a public square	✓	
26 Project	Waste contamination		✓
27 Investigation	Green areas and shacks		✓
28 Report	BIOMA lecture		✓
29 Investigation	Contamination of rivers		✓
30 Investigation	Air contamination		✓

Numbers from 1 to 30 refer in turn to each of the 30 teacher candidates surveyed.

SOURCE: Adapted from survey of UPEL Teacher Candidates, 1992

Class size is another weakness which was indicated by environmental education professors of UPEL. They expressed that instruction groups are very large making the teaching-learning process less effective. It must be remembered that the UPEL environmental education teacher training programme is delivered by means of seminars which involve small instruction groups.

Professors blamed pedagogic institutes for the failures of the environmental education programme. However, an interview with a key individual responsible for the UPEL programme revealed that environmental education professors in UPEL are perceived as having a **negative attitude**. This attitude is associated with overcoming obstacles and limitations confronted in the implementation and development of the environmental education course (García, 1992, Personal Communication). The researcher agrees with these comments based on her experience in coordinating environmental education activities in one of the UPEL institutes. Professors' negative attitudes are "excuses rather than action".

Identification and description of the UPEL model's weaknesses demands discussion regarding necessary adjustments.

9.4 NECESSARY ADJUSTMENTS TO THE UPEL MODEL

The need to improve the UPEL model, and to make it more sensitive to Venezuelan reality, demands the analysis of a set of adjustments. This analysis is based on the responses provided by the survey participants alone. Examination of this information reveals three major types of adjustments (Table 9.6). They are

TABLE 9.6 Major Adjustments to the UPEL Model

1.	Content Adjustments	
		• Extent of the Subject Matter
		• Issues Covered by the Subject Matter
2.	Logistical Adjustments	
		• Timing
		• Instructional Methodologies
		• Instructional Materials
		• Instructional Media
		• Local Community Resources
		• Mass Media
		• Transportation
		• Funding
		• Class Size
3.	Attitudinal Adjustments	
		• UPEL Decision Makers' Attitudes
		• UPEL Environmental Education Professors' Attitudes

SOURCE: Adapted from Content Analysis and Survey

associated with content, logistical and attitudinal improvements.

Content Adjustments. Examination of the information contained in the surveys reveals that content adjustments are associated with the extent of the subject matter and the issues covered by the subject matter of the UPEL environmental education competencies.

In relation to **subject matter adjustments**, respondents proposed to cut away the extensive number of issues or themes included in the model. They also suggested adaptation of the extent of the subject matter to the time available for its delivery. The researcher agrees with these proposals because a balance between programme subject-matter and the time for its delivery must be determined when educational experiences are planned. Otherwise these experiences fail in achieving their objectives. But, it is also critical to keep in mind that in determining the extent of the subject-matter, key environmental goals and objectives must be included. They must not be reduced for the sake of the time involved in delivering the programme. What is important is to avoid overcrowding the programme with unnecessary subject-matter.

In relation to adjustments to **issues covered by the subject matter**, respondents proposed emphasis on a set of issues dealing with environmental awareness, environmental values, community participation, enforcement of environmental regulations and quality of life.

In addition, the responses of teacher candidates revealed that issues related to community projects can be improved in substantive ways. One way is to have students select for themselves the

community related environmental problems. Students believe that a meaningful relationship between the project and the place where they reside and/or work will develop.

Another important adjustment to the issue of community projects relates to the need for facilitating and encouraging the culmination of research projects. This activity should be beyond the simple requirements of a passing grade in the environmental education course. Carrying out community projects demands a greater period of time than that established in the course. These projects should continue beyond the time required as much as is needed. The major objective of this activity should be to involve teachers in community action skills. In addition, this approach would establish a link between UPEL and the communities, which was a special recommendation of the professors.

Interestingly, the environmental education professors of UPEL did not propose adjustments to the area of projects. Perhaps this attitude is due to their strong emphasis on pointing out community projects as the strongest area of the environmental education course of UPEL. Certainly, the project technique as a learning methodology is intended to assist in the mitigation of environmental problems by promoting student involvement in community affairs. This also favours the process of integration of education into the community, which is a concern of most educational system. Professors are proud of these research projects. They recommended the presentation of these projects in national and international environmental education fora. However,

it is the researcher's opinion, based on the survey of UPEL teacher candidates (Table 9.5), that most of these community projects do not meet requirements for presentation at such events. Most of them deal with superficial activities, such as the cleaning and painting of schools where community members have little involvement.

Logistical Adjustments. Logistical adjustments refer to measures which can have a critical influence on effective and efficient environmental education implementation. They relate to the time for delivering the environmental education course; instructional methodologies, materials and media; funding of environmental education programmes; and class group sizes.

The time for delivering the environmental education course is related to course scope and content. In this context, responses of UPEL professors and teacher candidates revealed two adjustments: the enlargement of the number of hours allocated to the present environmental education course, and the creation of a second environmental education course. Implementation of these two adjustments may be difficult because of curriculum inflexibilities and cost implications (García, 1992, Personal Communication). Certainly, curriculum changes demand the investment of effort, time and money. This investment is not easy to procure, especially from organizations that do not consider environmental education activities important. In any case, it is the researcher's opinion that a more feasible alternative is to make the subject matter of the model relevant to critical competencies dealing with major Venezuelan environmental problems and needs. In this context,

programme subject matter must be well adjusted to the content expressed in each competency statement.

In addition, coordination work between the environmental education programme and other disciplines of the UPEL curriculum seems to be a wise adjustment. It would help in solving the problem of lack of time in delivering the content of the course to insert subject matter and activities related to environmental issues into those curriculum areas of similar interest. Furthermore, this interdisciplinary work is both appropriate to the nature of environmental education and capable of being achieved.

Adjustments to **instructional methodologies** were a major concern revealed in the survey of teacher candidates. According to this respondent group, more participative and practical instructional methodologies should be used by environmental education professors. There is need for having contact with nature and the local community. Students also recommended the organization of lectures and conferences related to global and national environmental issues. These instructional activities enrich students' learning experiences. Lectures with special guests may contribute to filling the course gaps produced by lack of time and professor expertise on a specific issue.

Improvement of the quality and quantity of the **instructional materials** was an important adjustment proposed by UPEL professors and students. This recommendation was primarily directed to the textbook "Environmental Education" serving as a major instructional resource in the environmental education course. In the view of

survey respondents, this adjustment refers to more contemporary periodical and other literature.

Instructional media was another target of several adjustments. Most of these adjustments were recommended by UPEL environmental education professors. They suggested enhancing the supply of audiovisual equipment and material for making the environmental education learning experience more practical and efficient. Undoubtedly audiovisual materials are efficient instructional resources in teaching environmental education, thus they should be part of the basic instructional materials of the UPEL course. However, in addition to conventional instructional material - printed and audiovisual materials, there is a large variety of more complex and participatory resources which should be used in delivering the environmental education course. These refer to environmental kits, games and simulations. These resources have proven to be effective instructional materials, but have not yet become available to the UPEL institutes.

Surprisingly, no recommendations for using local community resources were proposed in the survey. One is wondering whether this omission was due to the fact that these resources are now fully utilized in the model or whether perhaps there is a total ignorance of their potential use by the UPEL institutes. In any case, it is important to remember that local communities have available a great number of valuable resources - parks, zoos, radio, newspapers, human resources and governmental and non-governmental organizations associated with environmental education,

which can be used in the development of environmental education programmes. It is wise for both UPEL professors and students to identify the location of these community resources.

Another omitted adjustment is the use of **mass media** as an important instructional resource in environmental education programmes. Was this omission also the result of the existing use of these means in the environmental education course? If this is not the case, then it is important to remember that television programmes, magazines, newspapers reports and radio programmes are powerful and useful instruments of environmental education. Recommendation of the use of these resources in the UPEL model should be a primary concern.

A logistical adjustment strongly emphasized by UPEL professors was the need for a **transportation** service to assist in carrying out field work activities. They indicated that most outdoor activities are obstructed because of the lack of a free transportation system. UPEL institutes need to have their own transportation available to allow students to fulfil field work activities related to environmental education. In addition, respondents proposed the creation of a **special fund** to help the financial cost of field work and community projects research.

Adjustment to **class size** was also proposed by professors of UPEL. In this context, they suggested a reduction in the number of students and an increase of teaching personnel in environmental education. The researcher, in her past role as an environmental education facilitator in one of the UPEL institutes, recognizes

this limitation as well as those related to the lack of logistical support. She also remembers the numerous times that recommendations for improving the quality of the environmental education programme were made to UPEL authorities. However positive decisions were never taken. This lack of support for environmental education activities from UPEL authorities reveals a lack of understanding of the importance that environmental education has for UPEL leaders.

Attitudinal Adjustments. Attitudinal adjustments are required to change negative perspectives and behaviour of individuals involved in the implementation of the UPEL model. As previously indicated, an important target group is the **UPEL decision makers**. The surveys revealed a critical need to make UPEL authorities aware of their responsibility in supporting environmental activities. Unfortunately, responses revealed the perception of a lack of environmental education support in the UPEL institutes. Thus, lobbying efforts designed to convince UPEL decision makers to support adjustments to the environmental education course were strongly proposed by survey participants.

A final adjustment relates to the negative **attitude of some environmental education professors** in overcoming obstacles and limitations confronted in the process of implementation and development of the environmental education programme. Respondents proposed the implementation and development of a permanent programme aimed at improving the competence of environmental education professors.

9.5 SUMMARY

In an attempt to assess the relevance of the UPEL environmental education teacher training programme to Venezuelan environmental problems, this study surveyed key Venezuelan individuals, UPEL environmental education professors, and UPEL environmental education teacher candidates. The findings revealed dissatisfaction with the model amongst these respondent groups.

Based on the responses of survey participants, it seems that there is relatively little relevance of the UPEL model to Venezuelan environmental reality. Major Venezuelan environmental problems, as well as their causes, effects and possible solutions, are not properly addressed by the UPEL model. In addition, lack of logistical support of environmental education activities makes more difficult the achievement of sound environmental education objectives.

The study also revealed the need for content, logistical and attitudinal adjustments to the UPEL model. In general, respondents proposed: (1) greater emphasis on environmental awareness of major Venezuelan environmental problems, solid moral ethics and values education, and community participation; (2) better planning of the time, instructional methodologies and resources required in delivering the environmental education course; and (3) positive change in the attitudes of UPEL decision makers and environmental education professors in order to obtain the required environmental education support.

In summary, this study strongly suggests that the UPEL model does not contain the substance needed to enrich the training of environmental education teachers. It also suggests that if adjustments to the UPEL model are not made, then teachers won't be prepared to help Venezuelan society to address major environmental problems. The implications of these findings and others from previous chapters are briefly explored in the concluding chapter of this thesis.

CHAPTER X

CONCLUDING REMARKS AND MESSAGES

10.1 PURPOSE

The purpose of this final chapter is to present a summary of the major residual messages based on evidence and testimony emanating from content analysis, survey research, and the researcher's experience as an educator. A discussion of the implications of these messages for environmental education generally and the Venezuelan case specifically is also included in this chapter. The discussion concludes with recommendations directed to addressing major needs and deficiencies of the UPEL model.

This chapter is organized in terms of the three major themes linked to the research objectives and questions. They relate to the comparison between the Venezuelan and UNESCO models, the relevance of the Venezuelan model to the country's environmental reality, and the Venezuelan model's strengths, weaknesses and necessary adjustments.

10.2 COMPARISON OF THE VENEZUELAN AND UNESCO MODELS

A major conclusion emerging from the comparison between the Venezuelan and UNESCO models is that significant differences in their structures and content make the UNESCO model a more organized and balanced one. Critical deficiencies in professional and

environmental education competencies make the UPEL model too weak to accomplish the training of effective environmental educators. This situation implies the need for an urgent revision of the UPEL model's structure and content. Therefore, it is recommended that an environmental education coordinating body be created, with representation from each UPEL institute. It would promote discussion of these differences and deficiencies and would champion necessary adjustments for implementation.

Teacher training in environmental education demands a set of professional education competencies to train effective environmental educators. The professional education component of UPEL fails to include basic competencies that reflect theories concerned with goals and methods of general education and which are fully consistent with environmental education. In general, alternative educational philosophies, such as experimentalism and reconstructionism, learning theories dealing with problem solving such as Piaget and Gagne, moral reasoning theories such as Kohlberg's and valuation processes, and instructional methodologies such as outdoor education, simulation games, role playing, values clarification and moral dilemma, are lacking. Application of these theories in the selection, implementation, development and evaluation of environmental education programmes help to achieve goals related to environmental awareness and problem solving. These deficiencies imply that the UPEL model fails to meet the basic professional education competencies required to achieve environmental education goals and objectives. Therefore, it is

recommended that the existing professional education component of UPEL be infused with those competencies required to meet environmental education needs. This infusion could use, as a discussion guideline, the foundational competencies in professional education established by the UNESCO model.

The UPEL environmental education competencies component is deficient in its organization, approach and content. This situation casts doubt on the quality of the training of Venezuelan environmental education teachers. Thus, it is recommended that a review of the organization, approach and content of the competencies be undertaken by UPEL environmental education planners. Specific conclusions, implications and recommendations concerning these deficiencies are presented below.

Organization of environmental education competencies in terms of goal levels provides a proper sense of direction in expressing and developing environmental education competencies. The UPEL model is organized in terms of content units. This indicates that the UPEL model is placing strong emphasis on subject-matter instead of on goals which can guide the training of knowledgeable, concerned and participating environmental education teachers. Therefore, it is recommended that organization of the environmental education competencies component be focused on specific goal levels such as ecological foundations, conceptual awareness, investigation and evaluation of environmental problems, and environmental action and participation.

Teacher candidates need to acquire a strong ecological foundation in order to deal with the many and complex environmental issues. Ecological concepts and principles must be closely related to those environmental issues and included in the programme. A partial list of ecological concepts and principles presented in the UNESCO model could serve as a reference for selecting major ecological concepts and principles required by the UPEL environmental education teacher training programme. In any case, it is recommended that over saturation of the programme with extensive ecological theory disconnected with the major issues addressed in the programme be avoided.

Environmental awareness is a major component of an environmental education teacher training programme. Competencies dealing with relationships between environmental values and individual attitudes and behaviour are critical needs for training environmental educators. This is particularly important to Venezuelan teachers since negative attitudes and behaviour on the part of citizens are a major cause of environmental problems in the country (Chapters III and IX). Teacher training based on a strong moral ethic is required to help citizens in both changing and developing environmental attitudes and behaviour. Therefore, the omission of competencies in the affective domain dealing with values and attitudes is a major weakness of the UPEL model. It is recommended that the UPEL model strongly stress competencies associated with this critical issue. Special emphasis must be put on the relationship between the country's environmental problems

and Venezuelan environmental values, attitudes and behaviour.

Investigation of environmental problems and evaluation of alternative solutions to these problems are essential elements of a teacher training programme since they enable teacher candidates to become active agents in the analysis, prevention and resolution of community problems. A strong link with values perspectives and positions must be involved in the investigation and evaluation area since most causes of environmental problems are rooted in wrong values. The UPEL model fails not only to link these elements with values issues, but also to include evaluation of alternative solutions. This implies that UPEL teacher candidates are not being given the opportunity to identify, clarify and evaluate their own values positions with respect to these problems and their possible solutions. It is recommended that attention to these aspects be paid when students investigate community environmental problems.

Citizenship action skills have proven to be extremely significant in the training of teachers in environmental education since they prepare teachers for taking proper individual or group environmental action in their role as environmental leaders. This means a great deal to Venezuela where boards for environmental conservation, defence and improvement have been established by law and citizenship action strategies to conduct environmental actions are needed. The UPEL model neglects these types of competencies, leaving Venezuelan teachers without the necessary preparation to take positive environmental action or to help their students and community members in taking similar action. It is recommended that

citizenship action skills be developed in the UPEL model. Special attention must be put on strategies to deal with consumerism, corruption, legal and political actions. The role that teachers should have as community environmental leaders must be strongly emphasized in this model.

10.3 RELEVANCE OF THE VENEZUELAN MODEL TO THE COUNTRY'S ENVIRONMENTAL REALITY

A primary conclusion arising from this research is that an environmental education teacher training model must be relevant to the country's environmental reality. This indicates a need for the discussion of major national and local environmental problems and needs. Since the UPEL model fails to contain the substance needed to address environmental problems in Venezuela, this model has little relevance to the country's environmental reality. The lack of emphasis on major national environmental problems and the omission of competencies related to environmental values education are primary reasons for this belief. This implies that if adjustments are not made to the UPEL model, then it will keep failing in its attempt to train effective environmental educators capable of helping to improve the existing environmental situation of the country. Thus, it is recommended that a review of the UPEL model's content be carried out by UPEL environmental education planners. This review must be focused on major Venezuelan environmental problems, the causes and effects of these problems, and alternative solutions to these problems. In this review, key

Venezuelan individuals have much to contribute. It is strongly recommended that educational solutions to environmental problems be a major concern of this review.

10.4 THE VENEZUELAN MODEL'S STRENGTHS, WEAKNESSES AND NECESSARY ADJUSTMENTS

A significant conclusion drawn from the perceptions of Venezuelan environmental education practitioners is that the UPEL model presents more weaknesses than strengths. This suggests that environmental education professors and students of UPEL are not satisfied with the model. Their opinions indicate that they have little influence on the decision making process of the UPEL environmental education programme. Thus, a greater commitment and involvement on the part of those individuals in the evaluation and decision-making processes of the Venezuelan environmental education teacher training programme is desired. More specifically, it is recommended that each UPEL environmental education professor participate in the model adjustment process. This exercise can be easily conducted through each UPEL environmental education coordination office and monitored by the UPEL academic vice-chancellorship's office.

The UPEL model possesses critical weaknesses associated with its approach. In general, the model has a disciplinary and theoretical approach guided towards the development of cognitive learning. These weaknesses indicate a lack of qualified environmental education planners which is affecting the quality of

the Venezuelan environmental education teacher training programme. It is recommended that readjustments to the UPEL model be undertaken by well qualified personnel.

Opportunities to make relevant adjustments to the UPEL model based on an interdisciplinary approach exist. The UPEL curriculum has the structure to make the adoption of this approach possible. More specifically, the UPEL model embraces general, pedagogic, speciality and professional practice education components dealing with areas where the environmental education dimension can easily be included (Chapter VI). It could retain the existence of a major environmental education course and at the same time infuse environmental content into the remaining competency areas of each education component - general, professional, and professional practice.

There is also a critical need for making the UPEL model more practical than theoretical. This implies the need for adjustments to the competency statements in terms of application skills. A review of skill levels expected in the model's competency statements is recommended. They must demand not only the development of descriptions and analyses but also practical applications of these competencies to solutions of Venezuelan environmental problems.

A serious weakness of the UPEL model is that its content or subject matter does not correspond with the time required for its delivery. The extensive content and the short time established for its development makes it difficult for professors and teacher

candidates to totally achieve the objectives established in the environmental education course. It is recommended that more realistic time limitations be imposed for delivering the course in relation to the selection and extent of the course content.

Despite the fact that elaboration of community environmental education projects is one of the major strengths of the UPEL model, it fails in its design and implementation. The lack of relevance of this activity to students' interests and their own communities, and a lack of logistical support for fulfilling community projects, are major barriers to the success of this important activity. It is recommended that topics and communities which are subject to these projects be selected by UPEL students, in consultation with their professors, instead of simply being imposed by UPEL professors. Additionally, it is recommended that environmental education coordinators and professors devote effort to the planning and location of resources required in carrying out community environmental education projects.

The UPEL model presents serious weaknesses associated with its implementation. Lack of institutional support in providing the necessary resources to achieve environmental education goals is a major barrier in the training of effective environmental education teachers in Venezuela. Thus, it is recommended that a commitment of logistical support and cooperation with environmental education activities be undertaken by the UPEL institutes. In this context, a special fund for carrying out environmental education activities must be established in the UPEL general budget.

The lack of qualified environmental education professors is a major constraint on the teacher training programme in Venezuela. The academic background of most professors is not strong in environmental education. Most of them have a bachelor degree in geography, biology or chemistry without special training in environmental studies. Teacher training institutions must pay more attention to this concern. A well-planned programme of professional improvement in the realm of environmental education is recommended to remedy these deficiencies. This improvement programme must emphasise critical aspects such as environmental education goals and objectives and their related content and instructional methods. Additionally, all professors seeking positions in these teacher training institutes should be expected to meet the requirements for new environmental education professors as to the knowledge, attitudes and skills needed to teach environmental education.

Recognition of the need to evaluate environmental education teacher training programmes appears to be a general concern among environmental experts. There is no progress without evaluation. This is particularly relevant to UPEL where until now the environmental education programme has not been evaluated and where for many years it has been preparing teachers with a number of serious programme weaknesses. In this context, it is recommended that evaluative research associated with the design and implementation of environmental education teacher training competencies be undertaken by teacher training institutes. In this context, this study attempts to develop an "international

standard/model" for evaluating environmental education teacher training competencies. This effort is made by comparing the expected knowledge, attitudes and skills contemplated by applicable professional and environmental education competencies and also by evoking the perceptions of national experts in environment and education as well as professors and students involved in the model to be evaluated. These perceptions relate to the relevance of the programme to the country's environmental reality and to the model's strengths, weaknesses and necessary adjustments. Specifically, this evaluation can be conducted by utilizing a content analysis device for undertaking the comparison together with a set of questionnaires in which experts, professors and students are directly assessed regarding their perceptions about the environmental education teacher training model and its true impact in the educational environment.

Finally, environmental education has proven to be one answer to the question of environmental degradation and quality of life. As global, national and local environmental problems continue to grow, the need for more environmental education programmes becomes more critical. However, implementation and development of these programmes rely on the training of effective environmental educators. This training must be consistent with the environmental problems and needs of each country. Therefore, more research and evaluation activities must become major concerns in the future. They will be a prerequisite for the building of new environmental education teacher training models and the re-adjustment of existing

ones. It is expected that UPEL will recognize this need. Otherwise, the leaders needed for further development in the field of environmental education will not emerge in Venezuela. As an environmental educator in UPEL for many years, the researcher hopes to convince the decision-makers there to adopt and implement the recommendations contained in this investigation.

APPENDICES

APPENDIX A. QUESTIONNAIRE TO KEY INDIVIDUALS AT FOCAL POINTS

Caracas, Junio de 1992

Estimado señor (a):

Me dirijo a Ud, en la oportunidad de solicitar su valiosa colaboración para identificar los 10 mejores expertos en el sector: ----- quienes puedan proveer información relacionada con Educación Ambiental en Venezuela. La colaboración de estos expertos es fundamental para la evaluación del Programa de Formación de Maestros en Educación Ambiental, de la Universidad Pedagógica Experimental Libertador (UPEL). Esta evaluación es parte de la tesis doctoral que actualmente realizo en el Departamento de Geografía en la Universidad de Ottawa, Canadá.

Similar comunicación está siendo enviada a otras personas claves como Ud. en diferentes sectores. Por favor, siéntase libre de revisar la lista de categorías de sectores donde el survey va a ser aplicado. Ud. puede modificar la lista, añadiendo o eliminando categorías, así como también nombrando otras personas para esta misma actividad.

Una vez que la data de estas listas es procesada, una lista global será enviada a Ud. para su consideración y reajuste. Muchas gracias por su cooperación en responder y regresarme esta información tan pronto sea posible.

Atentamente,

Saide Saud

CUESTIONARIO

Nombre:	Profesión:
Institución:	Cargo:
Dirección:	Teléfono:

Identifique 10 (diez) expertos en su sector quienes podrían proveer información relacionada con ambiente y educación en Venezuela.

Nombre y Apellido / Institución a la cual está afiliado / Teléfono

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.
- 9.
- 10.

Identifique otro experto en su area o en otras areas para la realización de esta misma actividad:

Nombre y Apellido / Institución a la cual esta afiliado / Teléfono

LISTA DE SECTORES

Por favor lea la lista de las categorías de sectores seleccionados para la identificación de expertos. Sugiera la eliminación o adición de categorías. Elabore sus comentarios al lado de cada sector o al final de la lista.

Sectores**Comentarios**

- 1 Ambiente
- 2 Educación
- 3 Educación Ambiental
- 4 Ecología
- 5 Grupos Ambientales
- 6 Organizaciones No-Gubernamentales
- 7 Académico
- 8 Investigación
- 9 Parlamentario/Político
- 10 Empresarial
- 11 Medios de Comunicación

Comentarios:

Caracas, Junio de 1992

Estimado señor (a):

Gracias por su valiosa colaboración al proporcionar la lista de expertos para la investigación relacionada con Ambiente y Educación en Venezuela. Anexo a esta correspondencia yo estoy enviándole la lista global de los expertos identificados por cada una de las personas claves como Ud. en los diferentes sectores.

La intención es darle a Ud. la oportunidad de revisar la lista en términos de visión de conjunto, interés, cantidad y balance entre los grupos. Por favor, añada, elimine y/o reemplace nombres; y reubique los expertos según las categorías si Ud. considera necesario.

Su colaboración en esta actividad es fundamental para la selección final de los entrevistados en cada sector y por supuesto en el éxito de esta investigación. Muchas gracias.

Atentamente,

Saide Saud

LISTA GLOBAL DE EXPERTOS POR CADA SECTOR

SECTOR\EXPERTOS

REVISIONES Y COMENTARIOS

Ambiente:

Hercilio Castellanos
Aristides Romero
Omar Carrero
Marlene Arias
Freddy Hermoso
Norka Rojas

Educación:

Milagros Villasmil
Germán Flores

Educación Ambiental:

Fanny Parilli
María Hernández
Noris Salazar
Gloria Luque

Organizaciones No-Gubernamentales:

Jose Moya
Celestino Flores
Rafael Nuñez
Eduardo Buroz
Susana Ponds
Angel Zambrano
P. Perrone
Omaira Delgado
Cecilia Blohn
Sergio Antillano
Antonio de Licio
Alexander Luzardo
Erik Quiroja
Aldemaro Romero
Francisco Quero
Giovanna Merola

Investigación:

Manuel Correa Cruz
Ricardo Hernández
Ketty Navarro
Augusto Tobito
Dolores González

Parlamentario/Político:

Arnoldo Gabaldón

Académico:

Omar Ovalles
Sonia Barrios
Maria Pilar García
Pedro Durán
David Bone
Freddy Lozada
Andrés Banzart
Tomás Bandes
Lenín Herrera
Sara Aniyar
Lucía Antillano
Dinna Guitián
Luis Trócolis
Isbelia Sequera Tamayo

Industrial:

Carlos Corrie
Juan Carlos Sánchez
Aníbal Alarcón
Haydee Franklin
Maria del C. Polanco

Medios de Comunicación:

Asdrúbal Barrios
Marta Aguirre

Caracas, June 1992

Dear:

This letter is written to seek your collaboration in identifying 10 (ten) key individuals in the sector of -----
-----each of whom might provide information relating to environmental education in Venezuela. The contribution of these experts is fundamental for the evaluation of the environmental education teacher training programme of the Universidad Pedagógica Experimental Libertador (UPEL). This evaluation is part of the requirements for obtaining my Ph.D. degree at the Department of Geography, in the University of Ottawa, Canada.

I am sending similar letters to other key persons like you in other sectors. Please feel free to review the list of sector categories in which the survey is going to be applied. You may modify such list, adding or subtracting categories, as well as naming other key persons for this same activity.

Once data on the lists is processed, a global list will be sent to you for your consideration and readjustment. Thank you very much for all your cooperation in answering and returning to me this information as soon as possible.

yours sincerely,

Saide Saud

QUESTIONNAIRE

Name:	Profession:
Organization:	Status:
Address:	Telephone:

Please, identify 10 (ten) key individuals in your sector who might provide information in relation to environment and education in Venezuela.

Name	Organization	Telephone
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		

Please, identify other individuals in your sector or in other sectors who might cooperate in doing this same activity.

Name	Organization	Telephone
------	--------------	-----------

LIST OF SECTORS

Please, review the following list of sectors which has been selected as key focal points of research relating to environment and education in Venezuelan. Please, suggest the addition and/or subtraction of sector categories making your comments beside each sector or at the end of the page.

SECTOR	COMMENTS
1 Environment	
2 Education	
3 Environmental Education	
4 Ecology	
5 Environmental Groups	
6 Non-Governmental Organizations	
7 Academic	
8 Research	
9 Parliamentary/Political	
10 Industrial	
11 Media	

Comments:

Caracas, June 1992

Dear:

Thank you very much for your cooperation in providing the list of key individuals for conducting the survey. I am now sending you a global list of those key individuals who were identified by persons like yourself at other key focal points.

The intention is give you the opportunity to revise the list in terms of interest, quantity and balance among groups. Please, add and/or subtract names, and replace names according to sectors if necessary.

Your cooperation in this activity is fundamental in selecting the final key individuals by each sector and of course in the success of this research. Thank you for your valuable cooperation.

yours sincerely

Saïde Saud

GLOBAL LIST OF KEY VENEZUELAN INDIVIDUALS BY SECTOR

SECTOR\EXPERTS	COMMENTS
----------------	----------

Environment:

Hercilio Castellanos
Arístides Romero
Omar Carrero
Marlene Arias
Freddy Hermoso
Norka Rojas

Education:

Milagros Villasmil
Germán Flores

Environmental Education:

Fanny Parilli
María Hernández
Noris Salazar
Gloria Luque

Non-Governmental Organizations:

Jose Moya
Celestino Flores
Rafael Nuñez
Eduardo Buroz
Susana Ponds
Angel Zambrano
P. Perrone
Omaira Delgado
Cecilia Blohn
Sergio Antillano
Antonio de Licio
Alexander Luzardo
Erik Quiroja
Aldemaro Romero
Francisco Quero
Giovanna Merola

Research:

Manuel Correa Cruz
Ricardo Hernández
Ketty Navarro
Augusto Tobito
Dolores González

Parliamentary/Political:

Arnoldo Gabaldón

Academic:

Omar Ovalles
Sonia Barrios
Maria Pilar Garcia
Pedro Durán
David Bone
Freddy Lozada
Andrés Banzart
Tomás Bandes
Lenín Herrera
Sara Aniyar
Lucía Antillano
Dinna Guitián
Luis Trocólis
Isbelia Sequera Tamayo

Industrial:

Carlos Corrie
Juan Carlos Sánchez
Aníbal Alarcón
Haydee Franklin
María del C. Polanco

Media:

Asdrúbal Barrios
Marta Aguirre

APPENDIX B. QUESTIONNAIRE TO KEY VENEZUELAN INDIVIDUALS

Caracas, Junio de 1992

Estimado Señor (a):

Me dirijo a Ud. en la oportunidad de solicitar su valiosa colaboración para proveer información requerida para la evaluación del Programa de Formación de Maestros en Educación Ambiental de la Universidad Pedagógica Experimental Libertador (UPEL). Esta evaluación constituye la tesis para la obtención de mi grado doctoral en el Departamento de Geografía, en la Universidad de Ottawa, Canadá.

Anexo a esta comunicación un cuestionario el cual está estructurado en dos partes: (1) estado del ambiente en Venezuela, y (2) evaluación del modelo de educación ambiental de la UPEL para la formación de maestros en Venezuela.

Agradezco a Ud. su cooperación en responder cada una de las preguntas incluídas en el cuestionario y devolverlo a la mayor brevedad.

Atentamente,

Saide Saud

CUESTIONARIO

Este cuestionario está dividido en dos aspectos: estado del ambiente en Venezuela, y evaluación del modelo de educación ambiental de la UPEL. Use el cuestionario como una guía, añadiendo páginas para responder las preguntas formuladas. Por favor, sea completo en sus respuestas.

Parte I: Estado del Ambiente en Venezuela.

En su opinión:

1. Cuáles son los principales problemas ambientales en Venezuela actualmente?
2. Cuáles son las principales causas de esos problemas?
3. Cuáles deberían ser las principales soluciones de esos problemas?

Parte II: Evaluación del modelo de Educación Ambiental de la Universidad Pedagógica Experimental Libertador (UPEL) para la formación de maestros en Venezuela.

Esta es la sección final del cuestionario. Usted ha identificado los principales problemas ambientales en Venezuela, sus causas y posibles soluciones. Ahora por favor, lea el contenido del modelo de Educación Ambiental que existe para la formación de maestros en la UPEL y elabore comentarios en términos de su relevancia a la realidad y necesidades ambientales del país. Un bosquejo de ese contenido es anexado.

CONTENIDO DEL MODELO DE ENTRENAMIENTO DE MAESTROS EN EDUCACION AMBIENTAL DE LA UPEL

UNIDAD 1: ESTRUCTURA Y DINAMICA DEL AMBIENTE NATURAL:

- . la idea de sistema
- . la biósfera
 - . la atmósfera: capas de la atmósfera. insolación sobre el globo terrestre. movimiento de las masas de aire
 - . la hidrósfera
 - . la litósfera: topografía, tiempo, clima, actividad biológica
- . dinámica energética
 - . energía y atmósfera
 - . transferencia de energía en los ecosistemas: ciclos de nutrientes: ciclos de carbono, nitrógeno y fósforo
- . ecosistemas terrestres
 - . consideraciones generales sobre algunos ecosistemas mundiales: tundra, bosque boreal de coníferas, bosque decíduo templado, pradera templada, desierto, bosques pluvial tropical, sabana tropical
 - . ecosistemas de Venezuela: bosque xerófilo macrotérmico, sabanas, páramos, bosques tropicales, bosques higrófilos mesotérmicos, bosques tropófilos, bosques hidrófilos
- . Productividad

UNIDAD 2: POBLACION HUMANA:

- . escalas de tiempo humano, histórico y geológico
- . aparición del hombre sobre la tierra
- . propiedades de la población: densidad, natalidad, tasa de crecimiento natural, distribución por edad y sexo, formas de crecimiento poblacional
- . crecimiento de la población humana. transición demográfica
- . evolución sociocultural del hombre: relaciones entre sociedad y ambiente
- . dinámica de la población venezolana: natalidad, mortalidad, tasa de crecimiento, composición por edad y sexo, inmigración, población económicamente activa, desempleo, educación

UNIDAD 3: PROBLEMAS AMBIENTALES: ORIGEN, EFECTOS Y SOLUCIONES TECNICAS:

- . contaminación del aire
 - . fuentes de contaminación del aire: monóxido de carbono, óxidos de azufre, óxidos de nitrógeno, hidrocarburos, partículas
- . cambios climáticos
- . la alteración de la capa de ozono
- . control técnico de la contaminación del aire: cámara de precipitación gravitatoria, colector ciclónico, purificadores húmedos, precipitadores electrostáticos
- . contaminación del aire en Caracas

- . contaminación sónica
 - . transmisión del sonido
 - . escala de medición del sonido
 - . sonido Vs. ruido
 - . fuentes de ruido: tráfico vehicular y aéreo, actividad hogareña, actividad industrial y de construcción, actividad comercial
 - . efectos del ruido en: el hombre y en otros seres vivos, los recursos naturales y materiales
 - . medidas para disminuir el ruido
- . contaminación del agua
 - . origen de contaminación: térmica, química, por actividades agropecuarias y domésticas
 - . tratamiento del agua: tratamiento primario, secundario y terciario
 - . tratamiento del agua destinada al consumo humano
 - . contaminación acuática en Venezuela
- . contaminación del suelo
 - . contaminación por desechos sólidos. procesos para recuperar materiales de la basura
- . Diversidad biológica
 - . beneficios de la diversidad biológica
 - . origen de los problemas de la diversidad biológica
 - . consecuencias de las alteraciones de la diversidad biológica y algunas soluciones técnicas del problema
 - . problemática de la diversidad biológica en Venezuela
- . alternativas energéticas
 - . combustibles fósiles: petróleo, gas natural, arenas alquitranadas y exquistos bituminosos
 - . energía geotérmica
 - . energía eólica
 - . hidroenergía
 - . energía nuclear
 - . energía solar
 - . bioenergía
- . los problemas sociales y la calidad de la vida
 - . marginalidad y hacinamiento

UNIDAD 4: SOLUCIONES ADMINISTRATIVAS, LEGALES Y EDUCATIVAS DE LOS PROBLEMAS AMBIENTALES:

- . ecodesarrollo
- . legislación ambiental en los Estados Unidos, Union Soviética, Inglaterra y Francia
- . medidas administrativas y legales de carácter ambiental en Venezuela. ordenamiento territorial: parques nacionales, monumentos naturales, refugio de fauna silvestre, reservas forestales, zonas protectoras
- . educación, conciencia y conservación
- . asociaciones de la comunidad y calidad de vida

UNIDAD 5: INVESTIGACION-ACCION: PROBLEMAS AMBIENTALES DE LA
COMUNIDAD:

- . estrategias para diseñar el proyecto: fase I, diagnóstico de los problemas de la comunidad; fase II, diseño del plan de acción; fase III, ejecución del plan de acción; fase IV, elaboración del informe; fase V, comunicación de resultados.
- . consideraciones generales para la elaboración del informe.
recomendaciones para la presentación escrita del informe.
aspectos estructurales del informe

Caracas, June 1992

Dear:

This letter is written to seek your cooperation in providing information required for the evaluation of the environmental education course of the Universidad Pedagógica Experimental Libertador (UPEL). This evaluation forms part of a research thesis for attaining my Ph.D degree in the Department of Geography, University of Ottawa, Canada.

Attached to this letter is a questionnaire which is structured in two parts: (1) the current state of the environment in Venezuela, and (2) evaluation of the UPEL environmental education teacher training course.

I would be grateful if you would answer each question included in the questionnaire and return it as soon as possible.

yours sincerely,

Saide Saud

QUESTIONNAIRE

This questionnaire is divided into three aspects: (1) the state of the environment in Venezuela, (2) environmental education, and (3) evaluation of the UPEL environmental education teacher training model. Please use the questionnaire as a guideline, adding pages to answer each question. Please be explicit in your answers.

Part I: State of the Environment in Venezuela

In your opinion:

1. what are the major environmental problems in Venezuela at the present time?
2. What are the major causes of these problems?
3. What should be the major solutions to these problems?

Part II: Evaluation of the UPEL Environmental Education Teacher Training Model

This is the final aspect of the questionnaire. You have already identified major environmental problems in Venezuela, its causes and possible solutions. Would you please make comments about the relevance of the content of the UPEL environmental education teacher training model to Venezuelan environmental reality and needs? An outline of such a content is enclosed.

CONTENT OF THE UPEL ENVIRONMENTAL EDUCATION TEACHER TRAINING MODEL

UNIT I: STRUCTURE AND DYNAMIC OF THE NATURAL ENVIRONMENT:

- . the concept of system
- . the biosphere
 - . the atmosphere: layers, sunshine over terrestrial globe, air mass motions
 - . the hydrosphere
 - . the lithosphere: topography, weather, climate, biological activity
- . the energy dynamic
 - . energy and atmosphere
 - . transference of energy into ecosystems. cycles of nutrients: carbon, nitrogen and phosphorus cycles
- . terrestrial ecosystems
 - . general considerations of world ecosystems: tundra, coniferous forests, temperate forests, temperate grasslands, deserts, tropical rain forests, tropical savannahs
 - . ecosystems of Venezuela: macrotermic xerophile forests, savannahs, uplands, tropical forests, mesotermic hygrophile forests, tropophil forests, hydrophile forests
 - . productivity

UNIT II: HUMAN POPULATION:

- . time scales: human, history and geology
- . the appearance of humans on earth
- . population attributes: density, birth rate, natural growth rate, distribution by sex and age, forms of population growth
- . human population growth. demographic transition
- . man's sociocultural evolution: relationships between society and environment
- . the dynamic of the Venezuelan population: birth rate, mortality, growth rate, arrangement by age and sex, immigration, working population, unemployment, education

UNIT III: ENVIRONMENTAL PROBLEMS: ORIGINS, EFFECTS AND TECHNICAL SOLUTIONS:

- . air contamination
 - . Sources of contamination: carbon monoxide, sulphuric acid, nitrogen oxides, hydrocarbons, particles
- . climatic changes
- . ozone layer changes
- . technical control of air contamination: chamber of gravitational precipitation, cyclone collector, humidity purifiers, electrostatic precipitation
- . air contamination in Caracas
- . sonic contamination:
 - . sound transmission

- . sound measurement scales
- . sound versus noise
- . noise sources: terrestrial and aerial transportation, domestic, commercial, industrial and construction activities
- . noise effects on: human and other living beings, natural resources and materials
- . measurements in decreasing noise
- . water contamination:
 - . sources of contamination: thermic, chemical, agricultural activities, and domestic activities.
 - . water treatment: primary, secondary and tertiary treatments
 - . treatment of water for human consumption
 - . aquatic contamination in Venezuela
- . soil contamination
 - . contamination by solid waste. processes for recovering waste materials
- . biological diversity
 - . benefits from biological diversity
 - . source of problems
 - . consequences of alterations. some technical solutions
 - . biological diversity problems in Venezuela
- . energy alternatives
 - . fossil fuel: oil, natural gas, tar sands, and bituminous exquiste
 - . geothermic energy
 - . wind energy
 - . hydroenergy
 - . nuclear energy
 - . solar energy
 - . bioenergy
- . social problems and quality of life
 - . marginality and overcrowding

UNIT IV: SOLUTIONS TO ENVIRONMENTAL PROBLEMS: ADMINISTRATIVE, LEGAL AND EDUCATIONAL SOLUTIONS

- . ecodevelopment
- . environmental legislation in the United States, USSR, england, and france
- . environmental administrative and legal measures in Venezuela: territorial planing: national parks, natural monuments, wild fauna sanctuaries, forest reserves, protected areas
- . education, awareness and conservation
- . community associations and quality of life

UNIT V: ACTION-INVESTIGATION BASED COMMUNITY ENVIRONMENTAL
PROBLEMS:

- . strategies in designing a project: phase I, diagnosis of community problems; phase II, design of an action plan; phase III, performance of an action plan; phase IV, elaboration of a report; phase V, Communication of results
- . general considerations in elaborating a report.
recommendations in presenting a report in written form.
structural aspects of a report

APPENDIX C. QUESTIONNAIRE TO UPEL ENVIRONMENTAL EDUCATION
PROFESSORS

Caracas, Junio de 1992

Estimado Profesor (a):

Me dirijo a Ud. en la oportunidad de solicitar su valiosa colaboración para responder el cuestionario anexo. El cuestionario tiene el propósito de recabar información para la evaluación del programa de Educación Ambiental de la Universidad Pedagógica Experimental Libertador (UPEL). Esta evaluación es el foco de la investigación para la obtención de mi grado doctoral en el Departamento de Geografía, de la Universidad de Ottawa, Canadá.

Agradezco a Ud. su cooperación para responder cada una de las preguntas formuladas en el cuestionario y devolverlo a la mayor brevedad. Su opinión es de fundamental importancia para el mejoramiento del programa de Educación Ambiental de la UPEL. Gracias por su tiempo y por su invaluable colaboración.

Atentamente,

Saide Saud

CUESTIONARIO

Instituto:

Profesión:

Especialidad:

Cargo:

Este cuestionario contiene cuatro preguntas, úselo como una guía, añadiendo páginas para responder las preguntas formuladas. Por favor, sea completo en sus respuestas.

1. Ha sido Ud formado para enseñar Educación Ambiental? Si su respuesta es afirmativa, especifique donde recibió esa formación y que tipo de formación recibió.
2. Qué opinión le merece el programa de Educación Ambiental para la formación de docentes en la UPEL. Un resumen del modelo es anexado.
3. A su criterio, cuáles son los puntos fuertes del programa de Educación Ambiental de la UPEL?
4. A su criterio, cuáles son los puntos débiles del programa de Educación Ambiental de la UPEL?
5. Qué ajustes al programa considera Ud necesario introducir?

Caracas, June 1992

Dear Professor:

This letter is written to seek your valuable collaboration in answering the annexed questionnaire. The purpose is to gather information for evaluating the environmental education course of the Universidad Pedagógica Experimental Libertador (UPEL). This evaluation forms part of a research thesis for the attainment of my Ph. D. degree in the Department of Geography, University of Ottawa, Canada.

I would appreciate your cooperation in responding to every question stated in the questionnaire and returning it as soon as possible. Your opinion is fundamental to the improvement of the UPEL environmental education teacher training programme.

Yours sincerely,

Saide Saud

QUESTIONNAIRE

Institute:

Profession:

Speciality:

Status:

This questionnaire contains four questions. Please use it as a guideline, adding pages to answer each question. Please be explicit in your answers.

1. Have you been trained for teaching environmental education? If your answer is positive, please specify the place (s) where you received the training and the type of training that you received.

2. What is your opinion of the UPEL environmental education teacher training programme? A resume of the model is enclosed.

3. What are the major strengths of the UPEL environmental education course?

4. What are the major weaknesses of the UPEL environmental education course?

5. What kinds of adjustments are necessary for improving the environmental education course of UPEL?

**APPENDIX D. QUESTIONNAIRE TO UPEL TEACHER CANDIDATES WHO HAVE
ALREADY TAKEN THE ENVIRONMENTAL EDUCATION COURSE**

CUESTIONARIO

- 1 Cuál fué la principal actividad de aprendizaje desarrollada en el curso de educación ambiental, particularmente en el area de investigación y proyecto?
- 2 Cuál fué el principal foco de esa actividad?
- 3 Estuvo esa actividad relacionada con tu propio interés y con tu comunidad?
- 4 Después que tu terminastes el curso de educación ambiental, has estado involucrado en actividades de educación ambiental en tu instituto, lugar de trabajo o comunidad?
- 5 Cuáles son los puntos fuertes del curso de educación ambiental de la UPEL?
- 6 Cuáles son los puntos débiles del curso de educación ambiental de la UPEL?
- 7 Cuáles son los principales ajustes necesarios para mejorar el curso de educación ambiental de la UPEL?

QUESTIONNAIRE

- 1 What was the major learning activity developed in the course of environmental education, particularly in the area of investigation and projects?
- 2 What was the major focus of that activity?
- 3 Was that activity related to your own interest and community?
- 4 After you finished the environmental education course, have you been involved in environmental education activities in your institute, place of work or community?
- 5 What are the major strengths of the UPEL environmental education course?
- 6 What are the major weaknesses of the UPEL environmental education course?
- 7 What are the major adjustments needed for improving the UPEL environmental education course?

MODEL: UNESCO ENVIRONMENTAL EDUCATION TEACHER TRAINING COMPETENCIES MODEL

CATEGORIES					
Components	Areas	Competencies (statements)	Taxonomic Domain	Skill Level	Subject Matter - Topics
A Professional Education	I Educational Philosophy	1 to apply a knowledge of educational philosophy to the selection and (and/or development) of curricular programmes and strategies to achieve both general education and EE goals	cognitive	application	- the need for EE locally, regionally, nationally, globally - the logic behind a holistic view of the environment which looks not only at ecological principles but also at man as a culturally contributing activist - either positively, negatively, or passively - the goals of EE as endorsed by the world's first Intergovernmental Conference on EE - the differences and similarities of EE, conservation education, outdoor education, outdoor recreation, ecology, and nature study - the role of experimentalism in EE, e.g., the critical need for receivers to be active problem solvers in EE - the need for highly skilled teachers in EE
	II Theories of Moral Reasoning	2 to utilize current theories of moral reasoning in selecting, developing and/or implementing EE curricula which will effectively achieve accepted goals of EE with selected receiver groups	cognitive	application	- theories of moral development such as Kohlberg's and valuing process theories goal components which have applicability to effective education, e.g., goals dealing with values clarification - benefits of effective education and common objections raised concerning the use of values clarification and moral education strategies - research related to effective education and the implications of this research for EE teaching strategies appropriate for use in effective education including knowledge based strategies such as case studies and issue position simulation activities, episodic/situational values clarification activities, moral dilemmas, value continuums, etc. - performance characteristics of an effective teacher
	III Theories of Knowledge, Attitude and Behaviour Relationships	3 to utilize current theories of knowledge, attitude, behaviour relationships in selecting, developing and/or implementing a balanced curriculum which maximizes the probability of desired behaviour changes in receivers	cognitive	application	- characteristics of cognitive knowledge with special emphasis on the concept of development - characteristics of cognitive process, i.e., intellectual skills such as inferring, hypothesizing, data collection and analysis, drawing conclusion, etc. - characteristics of attitudes and values - relationships existing between knowledge, skills, values, and human behaviour
	IV Theories of Learning	4 to utilize current theories of learning (e.g., Piaget, Bruner, Gagné) in selecting, developing, and/or implementing curricular materials and teaching strategies to effectively achieve EE goals with selected receiver groups	cognitive	application	- consideration of both physical and intellectual development in the planning of EE experiences for receivers - theories of learning - Piaget, Bruner, Gagné - implications of special student populations for EE, e.g., disadvantaged, gifted, disabled, etc.
	V Theory of Transfer of Learning	5 to apply the theory of transfer of learning in selecting, developing or implementing curricular materials and strategies to ensure that learned knowledge, attitudes, and cognitive skills will be transferred to life style decision-making by receivers	cognitive	application	theory of transfer of learning, principles of transfer associated with transfer of learning and learning implications for EE

VI	Instructional Methodology	6 to select effective instructional methodologies which are appropriate for desired cognitive and affective outcomes, receiver characteristics, and available facilities (e.g. time, money, personnel) 7 to implement the following methodologies to achieve EE goals: (A) outdoor education methods (B) effective education methods e.g., values clarification, Bank's inquiry model, moral dilemma model (C) simulation games (including role playing) (D) case study methods (E) community resource use (ecological, issue related, human resources) (F) methods of autonomous student and/or group investigation, evaluation and action planning for resolving environmental issues (G) appropriate teacher behaviours while handling controversial environmental issues	cognitive	Knowledge	• outdoor education methods • effective education methods (e.g., values clarification, Bank's inquiry model, moral dilemma model) • simulation games (including role playing) • case study methods • methods of autonomous student and/or group investigation, evaluation and action planning for resolving environmental issues • rationales for using field experiences with receivers, e.g., ecological knowledge, issue investigation and evaluation, etc. • panel discussions/formal debates • films and other audio-visual modes • appropriate teacher behaviours while handling controversial environmental issues • community resource use (ecological, issue related, human resources) • local and regional resources available for use in EE • human resources available for use in EE • types of resources inventories available for use in EE, i.e., generic vs specific models • inventorying procedures for a resource survey in EE, i.e., how to conduct a resource education in their use • guidelines for teachers in the methods of resource utilization • instructional strategies for resource utilization, i.e., alternatives available for effective instructional outcomes
VII	Means of Planning	8 to develop and use effective means of planning for instruction	cognitive	application	• key foundational components to be considered for curriculum development in EE - prerequisites to effective EE including critical ecological concepts and sensitivity to the environment • goals - by levels - for curriculum development in EE: • the conceptual awareness level including the impact of both cultural and individual activities on the environment, critical issues, the need for issue investigation and evaluation, the role of human values in issues, and the need for responsible citizenship action with respect to issues • the investigation and evaluation level including the knowledge and skills necessary to identify and investigate issues, the ability to participate in values clarification, and the ability to modify solutions, the ability to participate in values clarification, and the ability to modify values in light of new information • the environmental action skills level including citizenship action skills, the ability to make decisions concerning action strategies, the ability to evaluate actions with respect to their impact on issues • analyzing goal components with respect to developing performance objectives needed in curricular packages/programmes rationale for using a syntactically sound instructional model, i.e., where objectives relate to goals, where instruction relates to objectives, and where evaluation relates to instruction • the general teaching model and permutations of that model, i.e., the combination of performance objectives, preassessment, instruction, and postassessment strategies involved in the production of objectives, pretests, instructional sequences, and posttests. Alternative patterns of instruction and evaluation which function effectively within the general teaching model • case studies illustrating successful EE programmes fitting both monodisciplinary and interdisciplinary patterns
VIII	Infusion of EE Curricula and Methods	9 to infuse appropriate EE curricula and methods into all disciplines to which the teacher is assigned	cognitive	application	• advantages and disadvantages of EE as a monodisciplinary curriculum, i.e., one course, typically taught by one instructor • advantages and disadvantages of EE as an infused, interdisciplinary curriculum, i.e., infusing environmental content into existing content areas throughout the school • problems and strategies associated with the implementation of an infused environmental curriculum • problems and strategies associated with the evaluation of an infused environmental curriculum

IX	Evaluation of EE Curricula and Methods	10	cognitive	evaluation	• evaluation of EE curricula and methods achievements in both cognitive and affective domains • problems and strategies associated with the evaluation of an infused environmental curriculum
B Environmental Education	I Ecological Foundations	1	to apply a knowledge of ecological foundations to the analysis of environmental issues and identify key ecological principles involved	knowledge application	• ecological principles and concepts, including: • individuals, populations, communities, and ecosystems represent legitimate organizational levels in nature which must use homeostatic mechanisms to cope with the law of the universe (e.g., laws of thermodynamics) and the forces of change in the environment, in order to survive • changes in the environment or the internal structure of these organizations will predictably cause responses within, as the organization attempts to maintain a homeostatic existence • populations are organizations of interacting individuals of the same species inhabiting the same geographical area at the same time • ecological communities are organizations of populations interacting (e.g., competition, symbiotic relations, predation/parasitism) within a specified geographical region and time • communities interact with non living (abiotic) factors as a more complex organizational level (ecosystems) • energy flows through and matter must recycle in ecosystems • succession is the process of ecosystems changing with time, generally from a less complex stage to a more complex and mature stage • there is a general decrease in excess potential energy and in energy flow per unit of biomass as ecosystems change to more mature stages • when the organization of an ecosystem is disrupted as through exploration, the maturity of the ecosystem declines • the population as an organizational level is the basic unit of the ecosystem. Each population occupies a specific functional niche which "fits" into the organization of the ecosystem (e.g., as part of the energy flow and biogeochemical cycles)
		2	to apply a knowledge of ecological foundations to predict the ecological consequences of alternative solutions to environmental problems	application	
		3	to be sufficiently literate in ecology to identify, select, and interpret appropriate sources of scientific information in a continuing effort to investigate, evaluate and find solutions for environmental problems	knowledge comprehension	
		4	to communicate and apply in an educational context, the major concepts in ecology	application synthesis	
II	Conceptual Awareness		The effective EE teacher should be able to select, develop and/or implement curricular materials which will effectively make receivers aware of:	knowledge application synthesis receiving	• the impact of both cultural and individual activities on the environment from an ecological perspective • critical environmental issues at local, regional, national and international level • the need for environmental issue investigation and evaluation as a prerequisite to sound decision making • the role of human values in environmental issues, the need for personal values clarification • the need for responsible citizenship action in the remediation of environmental issues • research related to awareness education and the implications of the research for EE teaching methods appropriate for use in awareness instruction including: • case study analyses • simulations • panel discussions/formal debate • outdoor experiences including the field trip • films and other audio-visual modes
		5	how man's cultural activities (e.g. religious, economic, political, social etc.) influence the environment from an ecological perspective		
		6	how individual behaviours impact on the environment from an ecological perspective		
		7	a wide variety of local, regional, national and international environmental issues and the ecological and cultural implications of these issues		
		8	the viable alternative solutions available for remedying discrete environmental issues and the ecological and cultural implications of these alternative solutions		
		9	the need for environmental issue investigation and evaluation as a prerequisite to sound decision making		

			affective			
10	the roles played by differing human values in environmental issues and the need for personal values clarification as an integral part of environmental decision making					
11	the need for responsible citizenship action (e.g. persuasion, consumerism, legal action, political action, economanagement) in the remediation of environmental issues					
III	Investigation and Evaluation		cognitive	knowledge application analysis synthesis evaluation organization characterization		• investigation and evaluation of environmental issues, alternative solutions and value perspectives associated to their ecological and cultural implications • research related to investigation and evaluation education and the implications of this research for EE • teaching methods appropriate for use in investigation and evaluation skill development as well as those methods appropriate when receiver groups are asked to apply those skills
12	The effective EE teacher should be competent: to investigate environmental issues and evaluate alternative solutions; and to develop, select and/or implement curricular materials and strategies which will develop similar competencies in receivers, including: the knowledge and skills needed to identify and investigate issues (using both primary and secondary sources of information and to synthesize the data gathered)		affective			
13	the ability to analyze environmental issues and the associated value perspectives with respect to their ecological and cultural implications					
14	the ability to identify alternative solutions for discrete issues and the value perspectives associated with these solutions					
15	the ability to autonomously evaluate alternative solutions and associated value perspectives for discrete environmental issues with respect to their cultural and ecological implications					
16	the ability to identify and clarify their own value positions related to discrete environmental issues and their associated solutions					
17	the ability to evaluate, clarify, and change their own value positions in light of new information					
	The effective EE teacher should be competent:		affective	responding		• citizenship action training application • research which has been conducted relative to environmental action skills training and environmental action competencies of teachers, the implications of this research for EE • the model of environmental action including modes of action, levels of action, and criteria for selecting specific actions • teaching strategies appropriate for the teaching of: • persuasion skills • consumer skills • political action skills • legal action skills • economanagement skills • combination of these categories • applying and evaluating citizenship action strategies with receiver groups environmental programmes: selection, implementation and evaluation
18	to take positive environmental action for the purpose of achieving and/or maintaining a dynamic equilibrium between quality of life and quality of the environment					
19	to develop, select and/or implement curricular materials and strategies to develop similar competencies in receivers to take individual or group action when appropriate (e.g. persuasion, consumerism, political action, legal action, economanagement, or combinations of these action categories)		cognitive	knowledge application synthesis		
IV	Environmental Action Skills					

						• environmental programmes available for adoption or adaption into existing elementary and secondary classrooms • criteria to be used in the selection of environmental programmes including: • learner characteristics • local, regional, or national needs and bias • whether the programme is consistent with the objectives stated in the Tbilisi Declaration or the goals for curriculum development in EE • whether or not the programme can be successfully implemented in the school • the extent to which the programme uses a sound instructional model and the extent to which the programme is syntactically accurate • implementing EE curricula, considering at least the following variables: • obtaining approval from in-school vested interest groups • obtaining approval from out-of-school vested interest groups • curriculum evaluation including at least the following variables: • evaluation of student outcomes with respect to both goals and objectives • evaluation of the effectiveness of instruction for meeting the goals and objectives • evaluation of student and faculty enthusiasm for programme • evaluating the effectiveness of inservice education • evaluating the effectiveness of programme coordination
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APPENDIX F. Basic Competencies of Venezuelan Teachers According to Teachers' Roles

Basic Teacher Competencies as a Learning Facilitator:

- . To use educational aims, purposes, principles, profiles and curriculum guidelines for planning, performance and evaluation of the teaching-learning process in a conceptual and operational way;
- . To identify and analyze the bio-psycho-social characteristics of the learner in order to serve as a basis for designing, planning, performing and evaluating teaching action;
- . To select, organize, perform and evaluate learning situations which lead to the consolidation and enrichment of values consecrated to the socio-cultural heritage of the country;
- . To conceive, design, perform and evaluate teaching-learning situations in order to integrate the different factors which interact in the teaching-learning process in a harmonic and functional way;
- . To select, organize, develop and evaluate cultural, scientific, humanistic and technological content which promotes the integral education of the learner;
- . To provide study techniques, procedures and methods which guarantee the pupils' learning and allow them to retain a permanent process of renovation;
- . To promote different communication situations which encourage the formal use of language;
- . To provide abilities and strategies to pupils which allow them to use reading as an essential instrument in their intellectual development;
- . To select and apply a variety of instructional strategies which promote the development of creativity; active participation of learning; transference of knowledge, abilities and skills to real life situations, and development of attitudes and values;
- . To conceive, select and use interactive strategies which generate a trusting and open atmosphere in order to facilitate spontaneity, cooperation and participation action of groups and individuals;
- . To select, adapt, produce, organize, use and evaluate learning resources on the basis of pedagogic and technical criteria which guarantee their feasibility and applicability;
- . To select and use concepts, tendencies, criteria and procedures of evaluation appropriate to the situation which is the object of evaluation, in order to orientate decision making.

Basic Teacher Competencies as a Researcher:

- . To interpret the educational research policies established by the Venezuelan state;
- . To use research methodologies which are appropriate to natural and social sciences, especially in the educational area;
- . To encourage the use of research as a way of attaining knowledge;
- . To design and carry out research projects which are linked to concrete problems relating to educational reality in order to improve the quality of Venezuelan education;
- . To use the results of research activities in the reformulation of procedures, and enrichment of methodologies and techniques of teaching and the evaluation which promote the learning;
- . To process, analyze, interpret and present information relating to concrete educational situations in order to facilitate the communication and decision making processes;
- . To try out learning strategies as work hypotheses in order to find means which contribute to the improvement of the quality of the teaching-learning process;
- . To participate in diagnostic studies relating to socio-educational problems which permit formulation of alternative solutions;

Basic Teacher Competencies as a Guide:

- . To encourage the development and consolidation of values relating to family, school and society;
- . To aid pupils in knowing themselves, in order to make them discover their potential and limitations, and to confront the latter so that they may be overcome;
- . To promote learners' self-esteem as well as the development of their capacities and interests;
- . To organize strategies which promote attitudes of respect, tolerance, honesty and receptivity of pupils towards persons with whom they interact;
- . To participate in pupils' school and social orientation; as well as in their vocational exploration;
- . To detect pupils' learning and adaptation problems and to advise them in the search for feasible solutions or, alternatively, to send them for special professional assistance when it is required;
- . To promote the development of study, work and health and environment conservation habits in pupils;
- . To promote pupils' self-evaluation of attitudes, convictions, beliefs, ideals and professional behaviour in the light of philosophy, laws, regulations and education policies of the Venezuelan state.

Basic Teacher Competencies as a Social Promoter:

- . To interpret the Venezuelan social dynamic as a frame of reference in educational action;
- . To participate in the solution of community problems where the school institution is placed in a fundamental role in attaining school-community integration;
- . To assume the role of leader, in order to promote the appraisal of democratic system values in pupils and the community;
- . To foster the growth and appraisal of values, traditions and artistic manifestations in order to contribute to the creation of a solid national conscience;
- . To incorporate pupils in the search for alternative solutions to community problems in a conscientious and cooperative way;
- . To develop a positive attitude towards environmental defence and conservation;
- . To implement strategies for integration and interaction among members of the school community and other community institutions and organizations;
- . To foster the development of reading habits for the proper use of free time, recreation and socializing of pupils and community members;
- . To assume a responsible attitude relating to habits of consumption, proper use of public services and knowledge and practice of citizen protection regulations;
- . To interpret the influence of mass media in the formative process of pupils and the behaviour of community members in a critical way;
- . To promote concrete action in the community in order to channel the influence of mass media through a critical and educational attitude;
- . To promote cohesion and esprit de corps in the professional work of teachers.

Basic Teacher Competencies as Administrator:

- . To apply basic knowledge and abilities in educational administration in order to participate in the efficient organization and functioning of institutions;
- . To carry out projects which permit formulation of alternative solutions to specific problems of school organizations;
- . To establish actions and evaluate administrative processes for decision making;
- . To design administrative systems for using institutional resources in a rational way.

Source: Diseno Curricular, UPEL, 1987

CATEGORIES					
Components	Areas	Competences (statements)	Taxonomic Domain	Skill Level	Subject Matter - Topics
A. Pedagogic	I Dynamics of the Group	1 to analyze factors which contribute to effective inter-personal communication	cognitive	analysis	- the group dynamic: principles, basic concepts, importance. The interpersonal communication process, group processes - leadership and decision making - group techniques
		2 to evaluate styles of leadership and their affect on the productivity and growth of groups	cognitive	evaluation	
		3 to use group techniques which might be applicable to the educational field	cognitive	application	
II Evolutionary Psychology		4 to analyze theoretical approaches in explaining evolution and the cognitive, personal, social, psychomotor and language development of the individual, from his/her prenatal stage until adolescence and maturity	cognitive	analysis	- principles and methods of evolutionary psychology - theoretical foundations and implications of behaviourism, humanist, cognitive and psychoanalyst theories in studying the child and the adolescent. - characteristics of evolutionary stages of development, the Venezuelan environment, family, socioeconomic level, education, breeding patterns, behaviour and development
		5 to analyze characteristics of each stage of the evolutionary development of the individual	cognitive	analysis	
		6 to analyze the influence of characteristics of the Venezuelan environment on the evolutionary development of the child and the adolescent	cognitive	analysis	
III Educational Sociology		7 to apply theoretical and methodological instruments which are peculiar to educational sociology in analyzing, interpreting and evaluating educational policies as a means of social transformation of the national reality	cognitive	application	- sociology: its study object and fundamental concepts - social characteristics of the educational process: the structural - functional and critical - marxist speeches as theoretical approaches to the social function of education and their contribution to social transformation - Venezuelan education in the Latin American and world contexts: the application of theoretical - methodological categories peculiar to investigation of national, regional and local educational problems - the Venezuelan educational system and its suitability to Venezuelan society's needs, economy and education-democracy and rural, urban and indigenous education, education and community
		8 to develop positive attitudes towards the investigation of community social and educational problems	affective	organization	
		9 to evaluate education as a factor of control and social change	cognitive	evaluation	
IV Philosophy and Education		10 to apply philosophical criteria in analyzing different streams of pedagogical thought	cognitive	application	- philosophy: metaphysical, ontological and epistemological assumptions, philosophy and education, education and society - streams of pedagogical thought - pedagogical ideas in Latin American education, especially in Venezuelan education
		11 to identify philosophical and pedagogical streams of Venezuelan education in terms of its theory and practice	cognitive	knowledge	
		12 to develop a rational and critical attitude in relation to philosophical and social concepts which determine the educational policies of Latin America, especially Venezuela	affective	organization	
V Educational Administration		13 to analyze theories, forms and procedures of administration	cognitive	analysis	- concepts of administration, administrative principles, types of administration, educational administration, the administrative process - the Venezuelan educational system: the theory and practice of its administration
		14 to analyze the administrative process of the Venezuelan education system in light of its theoretical foundations and the present practical reality of the existing system and educational institutions	cognitive	analysis	

VI	Educational Psychology	15	to analyze theoretical approaches of learning and their applicability to the educational context	cognitive	analysis	the variables, factors, process and dynamic of the learning process, learning, types of learning
		16	to apply learning principles and theories applicable to educational practice	cognitive	application	the behaviourism approach to learning: major principles and concepts, major representatives, teaching methods
		17	to relate the peculiar characteristics of learner developmental stages to school progress and social adaptation	cognitive	analysis	- the cognitive approach to learning: major principles and concepts: learning by discovering, solution of problems, receptive learning, logical and psychological meaning, transference, intelligence, the process of assimilation, accommodation and adaptation, inclusion and others, major representatives - the humanistic approach to learning: major principles and concepts: creativity, human relationships, acceptance, respect, comprehension, major representatives - the external and internal conditions of learning, the taxonomy of learning, processing information, major representatives - the theory of social learning, learning by modelling - the educator as a guide in the educational community (school-family-community)
VII	Educational Guidance	18	to value the importance and meaning of guidance as an inherent function of the teaching process	effective	valuing	guidance: conceptualization, foundations, principles and functions, detection of individual and group needs, its process, individual and group techniques, alternative solutions
		19	to apply methodological principles, techniques and instruments peculiar to guidance activities in analyzing situations and cases and in proposing practical solutions	cognitive	application	
		20	to demonstrate abilities in performing individual or group guidance activities	cognitive	application	
VIII	Curriculum	21	to analyze curriculum theories, foundations and concepts	cognitive	analysis	curriculum theories and foundations, different curricular concepts
		22	to analyze curriculum designs in light of curriculum foundations, principles, concepts and approaches and their implications in the process of teaching-learning	cognitive	analysis	- curriculum components - curriculum planning stages - the curriculum administration and evaluation process
IX	Educational Evaluation	23	to elaborate evaluation plans referred to concrete evaluation of educational situations in accordance with theoretical and pedagogical criteria and appropriate techniques, procedures and instruments for their fulfillment	cognitive	synthesis	- evaluative concepts and streams, evaluation of legal regulations, norms, evaluation criteria, principles, purposes, functions and uses, relationships among evaluation approaches, grading systems and comparison bases, evaluation and instruction, evaluation techniques, procedures and instruments of cognitive, effective and psychomotor learnings, the process of interpretation, validation and decision-making - designs of evaluation plans - the evaluation of the teaching-learning process - communication and learning, teacher's communication abilities - learning methodological strategies and procedures, instructional process components, factors and variables, student based strategies, teacher based strategies, the importance and classification of learning resources, factors, variables and basic criteria in selecting, adapting, producing, using and evaluating learning resources
		24	to analyze principles of communication in conducting the teaching-learning process	cognitive	analysis	instruction, instructional theories, relationships between instruction theories and learning instruction
X	Instructional Strategies and Resources	25	to apply general principles and foundations in selecting instructional strategies which allow an efficient and effective teaching-learning process	cognitive	application	models for instructional design, theories supporting them, feasibility applications, advantages and disadvantages
		26	to apply technical and didactical principles in selecting, designing, elaborating, using and evaluating instructional resources	cognitive	application	

B	Environmental Education	I	Structure and Dynamic of the Natural Environment	27	to elaborate instructional designs based on theories and models studied previously, and where the selection and organization of their components are justified in terms of design purpose and characteristics of knowledge area, learner and environment	cognitive		synthesis	instructional design, detection of needs, instructional objectives, content, its selection, the selection of instructional strategies and their justification, the selection of means and their justification, the selection of evaluation procedures and instruments, the evaluation of instructional design
				28	to value the importance of statistics as a fundamental instrument in analyzing educational problems	affective	valuing		basic concepts in statistics: statistics and its relationship to other sciences, especially education, the basic terminology of statistics, basic math concepts
				29	to apply concepts, techniques, methods and procedures in collecting, organizing, analyzing, interpreting and presenting data arising from concrete educational situations	cognitive	application		- data collection, organization and presentation - data analysis: measurements of central tendencies, position, variation and form, normal distribution, scoring, correlation; definition, graphical representation, coefficient of correlation of Pearson and Spearman
				30	to analyze approaches in studying and understanding education as an object of knowledge	cognitive	analysis		education as an object of investigation
B	Environmental Education	I	Structure and Dynamic of the Natural Environment	31	to identify major problems in the education field which are feasible for investigation	cognitive	knowledge		investigation as an inherent activity in the teacher's role as a researcher, investigation as a supportive activity in the administration and planning of educational programmes and institutions, the state of the educational research activity in Venezuela
				32	to elaborate an educative research project	cognitive	synthesis		models in approaching the study of educational problems
				33	to value investigation as an inherent activity in the teaching function	affective	valuing		research planning: the formulation of research problems and objectives; the theoretical framework, the role of theory, hypothesis systems; the selection of the design, types of designs; the selection of methods and techniques in collecting and analyzing data; the elaboration of a feasible research project for carrying out in the stage of professional practice
				TC	to value the importance of preserving the balance of the environmental system in order to guarantee the survival of humanity	affective	valuing		the concept of system
B	Human Population	II	Human Population	1	to differentiate the structure and function of the biospheric, atmospheric, hydrospheric and lithospheric subsystems	cognitive	comprehension		the biosphere: the atmosphere: layers, sunshine over terrestrial globe, air mass motions, the hydrosphere, the lithosphere: topography, weather, climate, biological activity
				2	to analyze the energetic dynamic and nutrient cycles at the biosphere level	cognitive	analysis		the energy dynamic: energy and atmosphere, transference of energy into ecosystems, cycles of nutrients, carbon, nitrogen and phosphorus cycles, terrestrial ecosystems: general considerations of world ecosystems: tundra, coniferous forests, temperate forests, temperate grasslands, deserts, tropical rainforests, tropical savanna, the ecosystems of Venezuela: macrothermic xerophilic forests, savannas, uplands, tropical forests, mesothermic hydrophilic forests, tropophile forests, hydrophilic forests
				3	to contrast characteristics of the earth's ecosystems at world and national levels	cognitive	analysis		productivity
				TC	to analyze the characteristics of different types of societies emphasizing the management of natural resources and their implications for the environment	cognitive	analysis		time scales: human, history and geology
B	Human Population	II	Human Population	4	to explain the ecological ages emphasizing the appearance of man on the earth	cognitive	comprehension		the appearance of humans on earth
				5	to compare attributes between developed and developing countries' population	cognitive	analysis		population attributes: density, birth rate, natural growth rate, distribution by sex and age, forms of population growth
				6	to explain trends human population growth	cognitive	comprehension		human population growth, demographic transition
				7	to analyze man's socio-cultural evolution emphasizing environmental relationships	cognitive	analysis		man's socio-cultural evolution, relationships between society and environment
B	Human Population	II	Human Population	8	to analyze the relationships between the dynamic of the Venezuelan population and its environmental impact	cognitive	analysis		the dynamic of the Venezuelan population: birth rate, mortality, growth rate, arrangement by age and sex, immigration, working population, unemployment, education

III	Environmental Problems: Origins, Effects and Technical Solutions	TC	to contrast solutions of technical alternatives to environmental problems once their causes and effects on the natural and social environment have been detected	cognitive	analysis	• air contamination: sources of contamination: carbon monoxide, sulphuric acid, nitrogen oxides, hydrocarbons, particles • climatic changes • ozone layer changes • technical control of air contaminations: chamber of gravitational precipitation, cyclone collector, humidity purifiers, electrostatic precipitation • air contamination in Caracas • sonic contamination: sound transmission, sound measurement scales, sound versus noise, noise sources: terrestrial and aerial transportation, domestic, commercial, industrial and construction activities, noise effects: on human and other living beings, natural resources and materials, measurements in decreasing noise. • water contamination: thermal, chemical, agricultural activities, domestic activities, water treatment: primary, secondary and tertiary treatments, treatment of water for consumption, aquatic contamination in Venezuela • soil contamination: contamination by solid waste, processes for recovering waste materials, biological diversity: benefits, source of problems, consequences of alterations, some technical solutions, biological diversity problems in Venezuela • energy alternatives: fossil fuel oil, natural gas, tar sands, bituminous shales, geothermal energy, wind energy, hydroenergy, nuclear energy, solar energy, bioenergy, social problems and quality of life: marginality and overcrowding
			9		knowledge	
			10		analysis	
			11		analysis	
			12		analysis	
IV	Solutions to Environmental Problems: Administrative, Legal and Educational Solutions	TC	to value interdependence among legal and administrative, legal and educational measurements in conserving, defending and improving the environment in order to guarantee a better quality of life	affective	valuing	• ecodevelopment • environmental legislation: environmental legislation in the United States, USSR, England, and France • environmental administrative and legal measures in Venezuela: territorial planning: national parks, natural monuments, wild fauna sanctuaries, forest reserves, protected areas • education awareness and conservation • community associations and quality of life
			13		knowledge	
			14		analysis	
			15		evaluation	
			16		analysis	

V	Action- Investigation Based Community Environmental Problems	TC	to communicate - through oral based and written reports, the results of an investigation based on the selection of a community environmental problem and performance of an action plan	cognitive	synthesis	• strategies in designing a project: phase I, diagnosis of community problems; phase II, design of an action plan; phase III, performance of an action plan; phase IV, elaboration of a report; phase V communications in elaborating a report, recommendations in presenting a report in written form, structural aspects of a report
		17	to identify each stage in the research - action process of community environmental problems	cognitive	knowledge	
		18	to fulfil a descriptive study of the student's community in order to collect the necessary information in selecting the problem of research - action	cognitive	synthesis	
		19	to design an action plan based on alternative solutions to a defined and delimited environmental problem	cognitive	synthesis	
		20	to carry out a project aimed at solving an environmental problem	cognitive	synthesis	
		21	to evaluate the procedure used in the research process in terms of objectives achieved, resources used, timetable fulfilled and results obtained	cognitive	evaluation	

APPENDIX H COMPARATIVE ANALYSIS OF THE UNESCO AND UPEL MODELS

UNESCO MODEL		COMPARISON WITH THE UPEL MODEL		
AREAS / COMPETENCIES		COMPETENCY AREA	SIMILARITIES	DIFFERENCES
Educational Philosophy	1 to apply a knowledge of educational philosophy to the selection and/or development of curricular programmes and strategies to achieve both general education and EE goals	Philosophy and Education	Both models refer to: the application of philosophical criteria to educational issues; as well as knowledge of the philosophical basis of teachers' education in their own society	The UPEL model does not include aspects relating to: experimentalism and reconstructionism theories; the need for EE; the holistic view of the environment; the goals of EE as endorsed by the world's first intergovernmental conference on EE; concepts of conservation education, outdoor education, outdoor recreation, ecology, and nature study; and the need for highly skilled teachers in EE
Theories of Moral Reasoning	2 To utilize current theories of moral reasoning in selecting, developing and/or implementing EE curricula which will effectively achieve accepted goals of EE with selected receiver groups	This is not Included in the UPEL Model		The UPEL model does not include competencies relating to utilization of theories of moral reasoning. In achieving EE goals, the UNESCO model proposes: theories of moral development such as Kohlberg's theory and valuing process theories; effective education; values clarification; moral education strategies; research relating to effective education and its implications for EE; teaching strategies appropriate for use in effective education. These issues are not considered in the UPEL model.
Theories of Knowledge, Attitude, Behaviour Relationships	3 to utilize current theories of knowledge, attitude, behaviour relationships in selecting, developing and/or implementing a balanced curriculum which maximizes the probability of desired behavioral changes in receivers	Evolutionary Psychology	The UPEL model refers to characteristics of cognitive knowledge and process; however, they are expressed at an analytical level which is contrary to the UNESCO model where it is expressed at an applied level and in terms of relationships	The UPEL model does not include the utilization of theories of knowledge, attitude, behaviour relationships in selecting, developing and implementing a balanced curriculum. This model does not refer to characteristics of attitudes and values, nor relationships between knowledge, skills, values and human behaviour
Theories of Learning	4 to utilize current theories of learning (e.g., Piaget, Bruner, Gagné) in selecting, developing, and/or implementing curricular materials and teaching strategies to effectively achieve EE goals with selected receiver groups	Educational Psychology	Both models refer to the application of learning theories	The UPEL model does not include implications for EE of special student populations such as: disadvantaged, gifted, disabled, etc., nor in the consideration of physical and intellectual development in planning education experiences.
Theory of Transfer of Learning	5 to apply the theory of transfer of learning in selecting, developing or implementing curricular materials and strategies to ensure that learned knowledge, attitudes, and cognitive skills will be transferred to life style decision-making by receivers	This is not Included in the UPEL Model		The UPEL model does not include competencies relating to the application of the theory of transfer of learning. The UNESCO model proposes to consider principles associated with the transfer of learning and their implications for EE

Instructional Methodologies 6 to select effective instructional methodologies which are appropriate for desired cognitive and affective outcomes, receiver characteristics, and available facilities (e.g. time, money, personnel) 7 to implement the following methodologies to achieve EE goals: (A) outdoor education methods (B) affective education methods (e.g. values clarification, Bank's inquiry model, moral dilemma model) (C) simulation games (including role playing) (D) case study methods (E) community resource use (ecological, issue related, human resources) (F) methods of autonomous student and/or group investigation, evaluation and action planning for resolving environmental issues (G) appropriate teacher behaviour while handling controversial environmental issues	Instructional Strategies and Resources (ISR)	Both models include the selection of instructional methodologies in order to guarantee an effective teaching-learning process	In selecting instructional methodologies, the UPEL model - contrary to the UNESCO model - does not make reference to the appropriate level that instructional methodologies should have with respect to cognitive and effective outcomes, receiver characteristics, and available facilities. The UPEL model does not refer to any particular instructional methodology. On the contrary, the UNESCO model proposes: methods of teaching awareness; methods of teaching investigation skills; methods of effective education; methods of teaching citizenship action skills. In particular, some of them refer to outdoor education, values clarification, Bank's inquiry model, moral dilemma model, simulation games (role playing), case study, methods of autonomous student and/or group investigation, evaluation and action planning for resolving environmental issues; rationale for using field experiences with receivers, panel discussions/formal debate, films and other audio-visual modes, appropriate teacher behaviour while handling controversial issues, community resource use.
Means of Planning for Instruction 8 to develop and use effective means of planning for instruction	Instructional Planning and ISR	Both models refer to instructional design, especially to aspects relating to objectives, goals, strategies and evaluation, and teaching models. However in the UPEL model, instructional design is expressed at synthesis level - elaboration, and in the UNESCO model it is expressed at an applied level	The UPEL model does not refer to specific case studies of monodisciplinary models. The UNESCO model also refers to key foundational components and goal levels to be considered for curriculum development in EE
Infusion of EE Curricula and Methods 9 to infuse appropriate EE curricula and methods into all disciplines to which the teacher is assigned	This is not included in the UPEL Model		The UPEL model does not include competencies relating to the infusion of environmental content and EE curricula and methods into existing disciplines and areas; advantages and disadvantages of EE as a monodisciplinary, infused, and interdisciplinary curriculum; problems and strategies associated with the implementation and evaluation of an infused environmental curriculum
Evaluation of EE Curricula and Methods 10 to evaluate EE curricula and methods achievement with receivers in both cognitive and effective domains	Educational Evaluation	Both models refer to evaluation of cognitive and effective learning. However, in the UPEL model evaluation is expressed in terms of elaboration of evaluation plans - synthesis, and in the UNESCO model in terms of evaluation of curricula and methods	The UPEL model does not refer to evaluation of curricula and methods. Neither does it include problems and strategies associated with the evaluation of an infused curriculum.

Ecological Foundations	Structure and Dynamic of the Natural Environment	The UPEL model includes only the system concept and the energy dynamic principle. However, they are expressed in terms of analysis skills whereas UNESCO expresses them in terms of application skills	Competencies of the application of major ecological concepts and principles to the analysis of environmental issues are not supported in the UPEL model. Most of these concepts and principles proposed by the UNESCO model are not included in the UPEL model (see Appendix F). Competencies of the application of ecological foundations in predicting ecological consequences of alternative solutions to environmental problems are not included in the UPEL model. Competencies relating to the identification, selection and interpretation of sources of scientific information for the process of investigation, evaluation and solution of environmental problems are not expressly stated in the UPEL model. Competencies relating to the communication and application, in an educational context, of the major concepts in ecology are not present in the UPEL model
Conceptual Awareness 11 to apply a knowledge of ecological foundations to the analysis of environmental issues and to identify the key ecological principles involved 12 to apply a knowledge of ecological foundations to predict the ecological consequences of alternative solutions to environmental problems 13 to be sufficiently literate in ecology to identify, select and interpret appropriate sources of scientific information in a continuing effort to investigate, evaluate and find solutions for environmental problems 14 to communicate and apply, in an educational context, the major concepts in ecology	Human Population; Environmental Problems; Alternative Solutions to Environmental Problems; and Investigation Based Action	The UPEL model makes reference to man's socio-cultural activities, emphasizing environmental relationships but at the analytical level Few examples of environmental issues at different levels - local, regional, national and international - are included in the EE instructional material; however, competencies relating to these issues are not included in the UPEL model Alternative solutions for environmental issues are established in the UPEL model. They relate to technical, legal, administrative and educational measurements. However their ecological and cultural implications are not clearly defined in the model. Competencies relating to investigation refer to an environmental project. However investigation is not expressed as a prerequisite to sound decision making.	The UPEL model does not include competencies relating to selection, development and implementation of specific EE curricular material associated with awareness. The influence of man's cultural activities on the environment from an ecological perspective is not stated in the UPEL model. How individual behaviour impacts on the environment is not established in the UPEL model. Competencies relating to local, regional, national and international issues and the ecological and cultural implications of these issues are not clearly established in the UPEL model. Ecological and cultural implications of alternative solutions for environmental issues are not defined in the UPEL model. The need for environmental issue evaluation as a prerequisite to sound decision making is not included in the UPEL model. The UPEL model does not consider aspects relating to the roles played by differing human values in environmental issues and the need for personal values clarification as an integral part of environmental decision making. The UPEL model does not include competencies relating to the need for responsible citizenship, such as: persuasion, consumerism, legal action, ecomanagement. Neither are teaching methods appropriate for use in awareness instruction mentioned in the UPEL model.

Investigation and Evaluation The effective EE teacher should be competent to investigate environmental issues and evaluate alternative solutions; to develop, select and/or implement curricular materials and strategies which will develop similar competencies in receivers, including: 22 the knowledge and skills needed to identify and investigate issues (using both primary and secondary sources of information and to synthesize the data gathered) 23 the ability to analyze environmental issues and associated value perspectives with respect to their ecological and cultural implications 24 the ability to identify alternative solutions for discrete issues and value perspectives associated with these solutions 25 the ability to autonomously evaluate alternative solutions and associated value perspectives for discrete environmental issues with respect to their cultural and ecological implications 26 the ability to identify and clarify their own value positions related to discrete environmental issues and their associated solutions 27 the ability to evaluate, clarify and change their own value positions in light of new information	Environmental Problems; Alternative Solutions to Environmental Problems; and Investigation Based Action Investigation activities in the UPEL model refer to the elaboration of an environmental project. The UPEL model includes the knowledge and skills needed for identification and investigation of an environmental project. The UPEL model includes issues relating to alternative solutions.	Competencies relating to the evaluation of alternative solutions are not included in the UPEL model. It does not focus on development, selection and implementation of curricular materials and strategies dealing with the issues stated below: Analysis of environmental issues and associated value perspectives with respect to their ecological and cultural implications. Identification of value perspectives associated with alternative solutions. Evaluation of alternative solutions and associated value perspectives with respect to their cultural and ecological implications. Identification and clarification of personal value positions related to environmental issues and their associated solutions. Evaluation, clarification and change of personal value positions in light of new information. The UPEL model fails to consider teaching methods appropriate for use in investigation and evaluation skill development.	The UPEL model does not include competencies relating to taking positive environmental positions. The UPEL model does not refer to the development, selection and implementation of curricular materials and strategies for the taking of individual and group environmental actions; development, selection and implementation of curricular material and strategies relating to individual and group environmental actions when appropriate, such as persuasion, consumerism, political action, legal action, economic action, etc. The UPEL model fails to consider aspects relating to citizen action training applications; research conducted in environmental action skills training and environmental action competencies of teachers; models of environmental action including modes of action, levels of action, and criteria for selecting specific actions; teaching strategies appropriate for the teaching of skills relating to persuasion, consumerism, political action, legal action, economic action or combination of them; application and evaluation of citizenship action strategies in environmental programmes.
Environmental Action Skills The effective EE teacher should be competent: 28 to take positive environmental action for the purpose of achieving and/or maintaining a dynamic equilibrium between quality of life and quality of the environment 29 to develop, select and/or implement curricular materials and strategies; to develop similar competencies in receivers; to take individual or group action when appropriate (e.g. persuasion, consumerism, political action, legal action, economic action or combinations of these action categories)	This is not included in the UPEL model		The UPEL model does not include competencies relating to taking positive environmental positions. The UPEL model does not refer to the development, selection and implementation of curricular materials and strategies for the taking of individual and group environmental actions; development, selection and implementation of curricular material and strategies relating to individual and group environmental actions when appropriate, such as persuasion, consumerism, political action, legal action, economic action, etc. The UPEL model fails to consider aspects relating to citizen action training applications; research conducted in environmental action skills training and environmental action competencies of teachers; models of environmental action including modes of action, levels of action, and criteria for selecting specific actions; teaching strategies appropriate for the teaching of skills relating to persuasion, consumerism, political action, legal action, economic action or combination of them; application and evaluation of citizenship action strategies in environmental programmes.

CONTENT ANALYSIS OF COMPARISON OF UNESCO AND UPEL MODELS			
SURVEY ACTIVITIES			CONTENT ANALYSIS OF COMPARISON OF UNESCO AND UPEL MODELS
Key Venezuelan Individuals	UPEL Environmental Education Professors	UPEL Teacher Candidates	
Insert environmental education across the teacher training curriculum Emphasize issues related to ethical and moral values, citizen participation, environmental issues in the oil industry, quality of life, sustainable development, national environmental education policy and regulation, territorial planning, natural resources management Improve issues relating to the causes and effects of environmental deterioration, and emphasize preventive measures Make more practical the area of projects with more focus on community needs including topics related to recycling of garbage and recovery of areas in degradation Make research activities more relevant to the community where the education process is happening Focus instructional methodologies on practical issues, study cases, local resources and open classrooms Make instructional methodologies more pertinent to students' concerns Apply instructional methodologies which develop positive attitudes for citizen participation and improvement of the quality of life of the community	Introduce a second environmental education course into the teacher training curriculum Complete the content of the course with the following impact topics: values, citizen responsibility, cultural foundations of the environmental crisis; political economic, social and cultural indicators in the history of Venezuela (Unit 2), ideological contamination (Unit 3); influence of mass media on the process of formation and distortion of values; present Venezuelan development style Improve issues relating to education, conscience and conservation Include content relating to man as a cultural dimension; include preventive solutions to environmental problems and resources management Insist on issues relating to ecodevelopment and analysis of several models and styles of development in order to determine the most appropriate for Venezuela Include the historical process of environmental education, especially that related to national and international environmental education events Consider more deeply the issues related to environmental degradation caused by marginality, lack of control of immigration and poor use of natural resources Balance the ecological component with the sociocultural component Reduce the number of topics in some areas Apply proper methodologies in order to achieve environmental education goals and objectives	Enlarge the time available to deliver the environmental education course Develop an approach more practical than theoretical Focus on activities relevant to students' local communities Emphasize issues relevant to the teacher's work such as instructional techniques and materials in environmental education Include issues dealing with values education and environmental awareness Encourage a love for nature and conservation and cleaning habits Train students in investigation techniques in order to deal with community environmental problems in an appropriate way Use more participative methodologies Use more variety of instructional resources Improve the quantity and quality of bibliographical resources Plan investigations and projects more related to student concerns Let students choose the topics of investigations and projects Relate community projects with students' work/home places Keep the continuity of community projects even though the course has finished Facilitate the culmination of community projects	Relate the environmental education competencies component to professional education competencies component Improve professional education competencies in terms of relevant topics to environmental education. These topics relate to experimentalism and reconstructionism theories; theories of knowledge/attitudes/behaviour relationships; attitudes and values characteristics; sound instructional design models for environmental education; environmental education programme evaluation Include professional competencies dealing with theories of moral development and values process; theories of transfer of learning; approaches for the inclusion of environmental education into the educational curriculum Stress specific instructional methodologies relevant to environmental education such as outdoor methods, simulation games and role playing, affective education methods dealing with values Improve knowledge of ecological foundations in terms of basic ecological concepts and principles associated with ecology of population and organizations and dynamics of ecological communities Associate human population concepts with environmental impact Infuse the model with competencies related to environmental awareness. Special attention must be paid to personal values and behaviour when analyzing, investigating and evaluating environmental problems

Make environmental knowledge less theoretical in order to help development of environmental awareness Apply controversial paradigms in analyzing environmental problems Propose research paradigms in order to promote participation of students in analyzing and solving environmental problems Analyze not only macrosocial but also microsocial problems Train students in participation techniques Use strategies in developing critical thought Establish a better link between community environmental problems and community environmental groups Establish links among ecology, geographical space, quality of life and environmental regulation, especially penal law Redefine methodological strategies in accordance with the content of the course Train professors in research techniques based on action Enlarge the number of professors teaching environmental education Improve the quality and quantity of the instruction material of the environmental education course Increase the number of field work activities Guarantee the necessary resources for doing field work Make the classroom suitable to environmental education Make environmental investigations much deeper and more serious	Eliminate the idea of elaboration of projects only as a requirement for a passing mark Fulfill extra-curricular activities relating to environmental activities in order to encourage and keep student participation Involve mass media in the process of environmental education teacher training Include special lectures and conferences relating to environmental issues Include activities which put students in direct contact with nature Include visits to parks and natural environments Include outdoor activities Establish more contact with local communities and natural environments Organize action groups against environmental contamination Keep UPEL institutes clean as a good example of environmental awareness Develop environmental education workshops for both professors and students	Stress environmental action skills; emphasis must be put on specific environmental action such as education, political, legal, administrative actions Balance the environmental education curriculum with competencies associated with the cognitive and affective domains Focus on application skills and avoid centring on theoretical analysis Focus competency statements in terms of goal levels instead of content units
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	Include a programme of extension activities relating to environmental education Organize presentation of projects carried out by students at national and international environmental education events Publish a periodical relating to environmental education issues Establish more contact between communities and the university		
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SOURCE: Adapted from survey of UPEL Environmental Education Professors, Teacher Candidates and Key Individuals

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PERSONAL COMMUNICATION

- Alarcón, Aníbal. 1992. Environmental Advisor of the industrial Sector
- Antillano, Sergio. 1992. Co-ordinator of Environmental Education Organizations. FUDENA
- Arias, Marlene. 1992. Coordinator of the Water, Soil and Vegetation Planning Office, Ministry of the Environment
- Barrios, Asdrúbal. 1992. Environmental Journalist of the "El Nacional"
- Blohn, Cecilia. 1992. Director of the Nature Defense Foundation
- Buroz, Eduardo. 1992. President of the AUDUBON Conservacionist Society of Venezuela. Member of the Interamerican Centre for the Integral Development of Land and Water. Professor of the Polytechnic Institute of the Arms Forces. Private consulting. Member of the Chamber of Venezuelan Petroleum
- Carrero, Omar. 1992. Director of the Venezuelan Forest Service, Ministry of the Environment
- Castellanos, Hercilio. 1992. Co-ordinator of the National Environmental Plan, Ministry of the Environment
- Castro, Ana. 1991. Co-ordinator of Environmental Education Activities of the Siso Martínez Teacher Training Institute (UPEL)
- Correa, Manuel. 1992. Head of the Ecological Impact Department of INTEVEP (Centre of Research and Technology)
- Corrie, Carlos. 1992. Head of the Protection Office of Venezuelan Petroleum Corporation
- Del Valle, Elba. 1991. Co-ordinator of Curriculum of UPEL
- Flores, Germán. 1992. National Coordinator of Environmental Education Activities, Ministry of Education
- Flores, Celestino. 1992. President and Founding Member of Conservationist Society of Sucre State. Researcher of the Oceanographic Institute, Universidad de Oriente. National Member of the Association of Environmental Organizations and Boards (FORJA). Member of the Latin American Association of Researchers in Sea Sciences.

- Gabaldón, Arnaldo. 1992. Ex-minister of the Environment. Member of the National Congress. Co-ordinator of the Environmental Commission. Professor of the Universidad Simón Bolívar
- García, Margarita. 1992. Curriculum Designer of the UPEL Environmental Education Course. Environmental Education Professor of the Caracas Teacher Training Institute (UPEL)
- González, Dolores. 1992. Co-ordinator of the Environmental Education Activities of the CENAMB
- Hall, Orlando. 1992. Programme Specialist of Environmental Education Section of UNESCO
- Hernández, María H. 1992. Co-ordinator of the Environmental Education Office of the Venezuelan Petroleum Corporation
- Hernández, Ricardo. 1992. Major Specialist of Environmental Regulations of INTEVEP. Environmental Protection Manager of MARAVEN
- Infante, Haidee. 1993. Co-ordinator of Register Office of the Siso Martínez Teacher Training Institute (UPEL)
- Lima, Eduardo. 1991. Environmental Education Professor of the Siso Martínez Teacher Training Institute (UPEL).
- Luzardo, Alexander. 1992. President of the Ecodevelopment Foundation of Venezuela. Adviser of the National Commission for the Elaboration of the Venezuelan Environmental Penalty Law. Professor and Researcher of the Universidad Central de Venezuela
- Marín, Matilde. 1991. Head of the Academic Office of the Siso Martínez Teacher Training Institute (UPEL).
- Medina, Antonio José. 1990, 1991. Environmental Education Adviser. MARNR-DEA
- Merola, Giovanna. 1992. President of the Association "Woman and Environment of Venezuela"
- Moya, José. 1992. National President of the Association of Environmental Organizations and Boards (FORJA)
- Moya, Pedro. 1990. Head of the Research Office of the Siso Martínez Teacher Training Institute (UPEL).
- Núñez, Ana. 1989. Technical Assistance Officer of the Environmental Education Office of the Ministry of Environment

- Ovalles, Omar. 1992. Environmental Education Professor of
Universidad Central de Venezuela. Environmental Adviser
- Parilli, Fanny. 1992. Director of the Environmental Education
Office of the Ministry of Environment
- Perrone, Pedro. 1992. Member of the School of Neighbours
- Piñero, Elizabeth. 1990. Technical Assistance Officer of the
Environmental Education Office of the Ministry of Environment
- Quero, Francisco. 1992. Member of the Club of Scientific
Journalism. Member of the Venezuelan Natural Science Society
- Quintana, Guillermo. 1992. Director of the Community Organization
Office, Ministry of the Environment
- Quiroja, Erik. 1992. Member of the Club "Friends of UNESCO"
- Romero, Aldemaro. 1992. President of the BIOMA Foundation of
Venezuela (Venezuelan Foundation for Conservation of
Biological Diversity)
- Salazar, Noris. 1989, 1990. Environmental Education Planner. Head
of the Office of Educational Support of the Ministry of
Environment
- Tobito, Augusto. 1992. President of the Centre for Environmental
Integral Studies
- Tovar, Braulio. 1990. Academic Vice-chancellor of UPEL.
- Zambrano, Angel. 1992. Co-ordinator of the Citizen Decision Office.
Mayor of the Municipality of Baruta