

CONTINUING EDUCATION NEEDS OF CERTIFIED  
SECONDARY SCHOOL SCIENCE TEACHERS  
OF LOS TEQUES, MIRANDA,  
VENEZUELA

By

DORIS MOSQUERA QUERALES  
Profesora de Educacion Media  
Instituto Universitario Pedagogico  
Caracas, Venezuela

1977

Submitted to the Faculty of the  
Graduate College of the  
Oklahoma State University  
in partial fulfillment of  
the requirements for  
the Degree of  
MASTER OF SCIENCE  
May, 1984

Thesis  
1984  
Q401c  
cop. 2



CONTINUING EDUCATION NEEDS OF CERTIFIED  
SECONDARY SCHOOL SCIENCE TEACHERS  
OF LOS TEQUES, MIRANDA,  
VENEZUELA

Thesis Approved:

*Hayanne B. James*  
\_\_\_\_\_  
Thesis Adviser

*John L. Beard*  
\_\_\_\_\_

*Wilbur L. Venable*  
\_\_\_\_\_

*Norman N. Durham*  
\_\_\_\_\_  
Dean of the Graduate College

## ACKNOWLEDGMENTS

The writer wishes to express gratitude to all who encouraged and assisted in this study. Sincere appreciation is expressed to Dr. Wayne B. James, major advisor, for her constant support, interest, and friendship. The assistance of my other committee members, Dr. John Baird and Dr. William Venable, is also appreciated.

The writer would like to give special recognition to the Venezuelan Government Foundation (Fundacion Gran Mariscal de Ayacucho) for its sponsorship which made her graduate program possible in the United States.

To my daughters, Nacarid and Astrid, I am also grateful for their patience and cooperation during the writing.

A special expression of thanks to my parents in Venezuela whose constant support and collaboration made possible this study.

My greatest thanks go to my husband, Edgar. Only through his continuous encouragement, total support, and understanding was this study possible.

## TABLE OF CONTENTS

Chapter	Page
I. INTRODUCTION . . . . .	1
Statement of the Problem . . . . .	3
Purpose of Study . . . . .	4
Research Questions . . . . .	4
Scope of Study . . . . .	5
Limitations of the Study . . . . .	5
Definition of Terms . . . . .	5
Organization of the Study . . . . .	6
II. REVIEW OF LITERATURE . . . . .	8
Characteristics of Venezuelan Educational System . . . . .	8
The sub-System of Adult Education . . . . .	12
Opportunities for Professional Continuing Education in Venezuela . . . . .	14
The National Open University . . . . .	17
The National Center for the Improvement of Science Teaching . . . . .	18
Continuing Education Needs of American Teachers . . . . .	23
Educational Needs of American Science Teachers . . . . .	27
Summary . . . . .	31
III. METHODOLOGY . . . . .	32
Population and Sample . . . . .	32
Development of the Instrument . . . . .	33
Collection of Data . . . . .	34
Analysis of Data . . . . .	34
IV. PRESENTATION OF FINDINGS . . . . .	36
Response Rate . . . . .	36
Characteristics of the Population . . . . .	38
Participation in Continuing Education Programs . . . . .	42
Reasons for Participation or Non-Participation in Continuing Education Programs . . . . .	49

Chapter	Page
Perceived Skills and Subject Areas . . . . .	49
Preferred Day/Time to Attend Continuing Education Programs . . . . .	56
V. SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS . . . . .	59
Summary . . . . .	59
Conclusions . . . . .	60
Recommendations . . . . .	61
Further Study . . . . .	61
A SELECTED BIBLIOGRAPHY . . . . .	63
APPENDIX A - CONTINUING EDUCATION NEEDS QUESTIONNAIRE . .	65
APPENDIX B - CUESTIONARIO SOBRE LAS NECESIDADES DE EDUCACION CONTINUA DE PROFESORES DE CIENCIA	69
APPENDIX C - LETTER SENT TO THE PRINCIPALS OF THE SELECTED SCHOOLS . . . . .	74
APPENDIX D - COVER LETTER . . . . .	76
APPENDIX E - COVER LETTER (ENGLISH) . . . . .	78

## LIST OF TABLES

Table	Page
I. Response Rate to the Questionnaire by Subject Specialty and Sex . . . . .	37
II. Number of Science Teachers in Study by Sex, Age, and Subject Specialty . . . . .	39
III. Educational Background of Science Teachers by Subject Specialty . . . . .	40
IV. Number of Years Science Teachers Have Been in Secondary School by Subject Specialty . . . . .	41
V. Number of Science Teachers Participating in Continuing Education Programs by Subject Specialty, Sex, and Age . . . . .	43
VI. Chi Square Results for the Relationship between Subject Specialty and Participation . . . . .	45
VII. Chi Square Results for the Relationship between Sex and Participation . . . . .	46
VIII. Chi Square Results for the Relationship between Age and Participation . . . . .	47
IX. Number of Teachers Participating in Continuing Education Programs During the Last Two Years by Subject Specialty, Sex, and Age . . . . .	48
X. Perceived Reasons Science Teachers Participate in Continuing Education Programs by Subject Specialty . . . . .	50
XI. Perceived Reasons Science Teachers Do Not Participate in Continuing Education Programs by Subject Specialty . . . . .	51
XII. Mean Perceived Importance of Science Teacher Skills by Subject Specialty . . . . .	52

Table	Page
XIII. Subject Areas of Interest to Science Teachers by Subject Specialty . . . . .	54
XIV. Days Science Teachers Preferred to Attend Continuing Education Programs by Subject Specialty . . . . .	57
XV. Time Science Teachers Preferred to Attend Continuing Education Programs by Subject Specialty . . . . .	58



## LIST OF FIGURES

Figure	Page
1. Structure of Venezuelan Educational System . . . . .	10
2. Organization Chart of Venezuelan Ministry of Education . . . . .	11
3. Graduate Study Programs Offered by Venezuelan Universities by 1978 . . . . .	16
4. Organization Chart of the Universidad Nacional Abierta . . . . .	19
5. Structure Organization of CENAMEC . . . . .	21
6. CENAMEC Projects from 1974 to 1978 . . . . .	22

## CHAPTER I

### INTRODUCTION

Education has always had a high value in Venezuelan society. Historically accepted as the privilege of the upper class minority and one of the attributes that distinguished that minority, it has become popularly accepted as the right of all (Allen, 1941; Burroughs, 1974). Venezuela, "the sixth largest country in South America" (Lowe, 1978, p. 18), has undergone many changes since democracy was adopted as the form of government (Sanchez, 1963; Tovar, 1982

After a relative slow start, the Venezuelan educational system began to expand rapidly in the late 1950's, and by 1970, 16.2 percent of the national budget was devoted to education (Lowe, 1978). Since 1950, when a modern educational system was installed, expenditures for education increased, and by 1976 8,000 teachers were instructing more than 3,550,000 students in over 12,000 schools at all levels (Lowe, 1978).

In order to meet the continuing demand, basic structural changes were planned in education. According to the Venezuelan Educational Law (Ley Orgánica de Educacion) (Venezuelan Congress, 1980) recently passed, primary school will offer nine years of basic education; rural school will be oriented towards the agricultural science; new courses at the secondary school

level will be offered to meet the scientific-technological needs of the country; adult education will start at age 16, and a system of continuing education will be available to all who wish to improve and/or upgrade their skills (Nemeth, 1976; Hoover, 1978).

Related to this point, the same law in the article 97 establishes that the ministry of education will provide permanent programs of self-development, specialization, and improvement for the teaching personnel (Venezuelan Congress, 1980). Those programs will attend to the priorities and needs of the Venezuelan educational system, and should be "according to the cultural progress" (p. 40).

Before this law was passed, the ministry of education and many other institutions were already offering continuing education programs for teachers. However, most of those programs were designed to prepare teachers who, due to national demands, had been employed without being graduated from any of the teacher's colleges of the country (Allen, 1941; Sanchez, 1963; Nemeth, 1976).

Today the national demand for teachers has been partly satisfied. By 1974 the national teacher-pupil ratios were 1:31 in primary schools; 1:15 in secondary schools, and 1:12 in post-secondary education (Kuriam, 1982). Although, in 1976 only 1,788 students graduated from Venezuelan universities and teacher's colleges in education (Kuriam, 1982), the number of certified teachers is increasing. As a result, continuing education for teachers is now mostly directed to those who had previously

graduated in education.

The ministry of education, universities, teacher's colleges and institutions such as the Venezuelan College of Professors (Colegio de Profesores de Venezuela), the Institute of Professional Improvement of Teachers (Instituto de Mejoramiento Profesional del Magisterio), and the National Center for the Improvement of the Teaching of Sciences (Centro Nacional para el Mejoramiento de la Enseñanza de la Ciencia, CENAMEC), are offering continuing education programs for the teaching personnel. However, the professional continuing education programs in Venezuela have been considered poorly planned and characterized by lack of coordination (Tovar, 1982). Moreover, because offering such courses generally grants academic status to the institutions, a competition has started among them in order to provide the greatest number of courses without taking into account the real demand for them and/or the educational priorities of the participants (Tovar, 1982).

The situation described above suggests an assessment of the continuing education needs of Venezuelan teachers. It will be useful to provide adequate continuing education programs that meet the educational priorities of the teachers. Taking into consideration the special attention that the Venezuelan educational system places in the teaching of science, a study of the continuing education needs of Venezuelan science teachers is needed. In addition, there is no report that such a study has been conducted to date.

### Statement of the Problem

In order to establish the priorities for continuing education programs to be conducted for certified secondary school science teachers of Los Teques, Miranda, Venezuela, the continuing education needs, as well as the perceived skills and subject areas that would meet those needs must be identified. However, there is no reported investigation of these perceived needs, skills, or subject areas.

### Purpose of Study

The major purpose of this study was to determine the extent of participation in continuing education programs, the continuing education needs, and the perceived skills and subject areas that would meet the needs of certified secondary school science teachers of Los Teques, Miranda, Venezuela.

### Research Questions

The present study sought to answer the following questions:

1. To what extent have certified secondary school science teachers of the city of Los Teques, Miranda, Venezuela, participated in continuing education programs?
2. Is there any difference in participation by subject specialty, age, and sex?
3. What are the perceived reasons for participation or non-participation in continuing education programs?
4. What are the perceived continuing education needs, and the skills and subject areas that would meet those needs?

### Scope of Study

The scope of this study was limited to:

1. The certified secondary school science teachers of the three largest high school of the city of Los Teques, Miranda, Venezuela.
2. Science teachers whose major was Biology, Chemistry, Mathematics, or Physics.

### Limitations of the Study

This study was conducted under the following limitations:

1. Since the study dealt only with certified science teachers of three secondary schools in Los Teques, Venezuela, its implications may not be applicable to other science teachers of other schools and localities.
2. Limitations that are inherent in the questionnaire technique. These include researcher bias and respondent opinion.

### Definition of Terms

The following definitions apply throughout the study:

Certified Science Teacher: any individual holding a title of Professor or Licenciante in Education, majored in any of the following areas: Biology, Chemistry, Mathematics, or Physics.

Continuing Education Needs: necessary knowledge or skill that may be obtained through educational programs or services designed to assist teachers who seek particular learning experiences on a part-time or short time basis for

professional development.

Graduate Study: "... any course of study taken after the first university level degree" (Hoover, 1978, p. 52).

Improvement Course: any graduate study that provides a pass or fail certificate, generally offered by an institution of higher education, but does not provide any credit towards a degree.

Natural Science Specialty: major of specialization that includes the areas of Biology and Chemistry.

Physical Science Specialty: major of specialization which includes the areas of Mathematics and Physics.

Professionalization Course: any graduate study aimed at obtaining a degree (bachelor's, master's, or doctor's).

Secondary School: "post elementary school education in Venezuela, offering five years of education beyond the elementary school" (Sanchez, 1963, p. 87).

Self-Development Course: any graduate study that provides an attendance certificate, and does not require any specific degree to participate in it.

Specialty: major area of study (or teaching).

#### Organization of the Study

Chapter I introduces the study and presents the problem, need and purpose of study, the research questions, the scope, and definition of terms. Chapter II includes a review of related literature including description of the most important characteristics of the Venezuelan educational system; history

of the adult education in Venezuela; current opportunities for professional continuing education, especially for teachers; and some studies conducted by American researchers assessing the continuing education needs of science teachers. Chapter III explains the methodology used by the researcher in this study, describing the population and sample; reviewing the instrument used to collect the data; and explaining how the instrument was administered, the data analyzed, and the results reported. Chapter IV is a description of the findings of the study. Chapter V concludes the study with a summary, conclusions, and recommendations.



## CHAPTER II

### REVIEW OF LITERATURE

This chapter is divided into three main sections. The first section describes the most important characteristics of the Venezuelan educational system, with emphasis in adult education. The next section includes a description of the different opportunities for the professional continuing education in Venezuela, and especially secondary school science teachers. The third section describes some studies concerning the continuing education needs of American science teachers.

#### Characteristics of Venezuelan Educational System

Venezuela in the last 20 years has been an example of commitment to education, facing a tremendous task of educational reconstruction (Sanchez, 1963; Nemeth, 1976). During the 1960's Venezuelan educational actions were oriented towards developing facilities and extending opportunities to outlying districts; in the last decade, the action has been on educational reform (Nemeth, 1976). This reform placed emphasis on administrative decentralization, diversification of secondary school and higher education, and a nationwide pre-school program (Tovar, 1982). This reform included as a very important

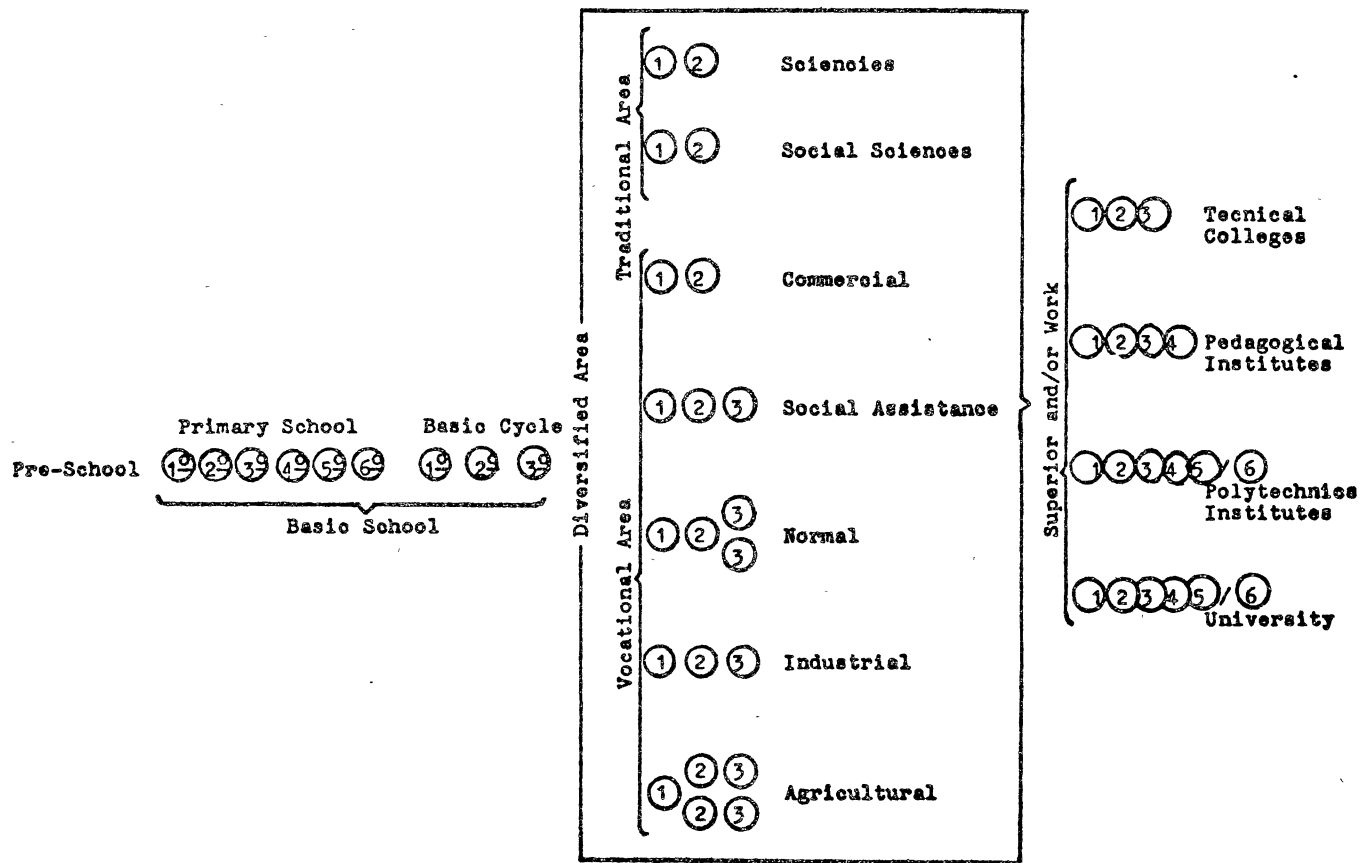
step, the declaration of a new educational law "Ley Organica de Educacion", passed on July 28, 1980 by the Venezuelan National Congress.

Venezuelan education is free and compulsory for 10 years between the ages of six and 15. Schooling last for 12 years divided into one year of pre-school, nine years of basic education, and two years of diversified or professional education (Educación Media Diversificada y Profesional) (Venezuelan Congress, 1980). The structure of the Venezuelan educational system is shown in Figure 1.

Educational administration is centralized in the Ministry of Education (Venezuelan Congress, 1980). Within the ministry are various directorates dealing with pre-school, primary, secondary, special, and adult education. The organization chart of Venezuelan Ministry of Education is presented in Figure 2.

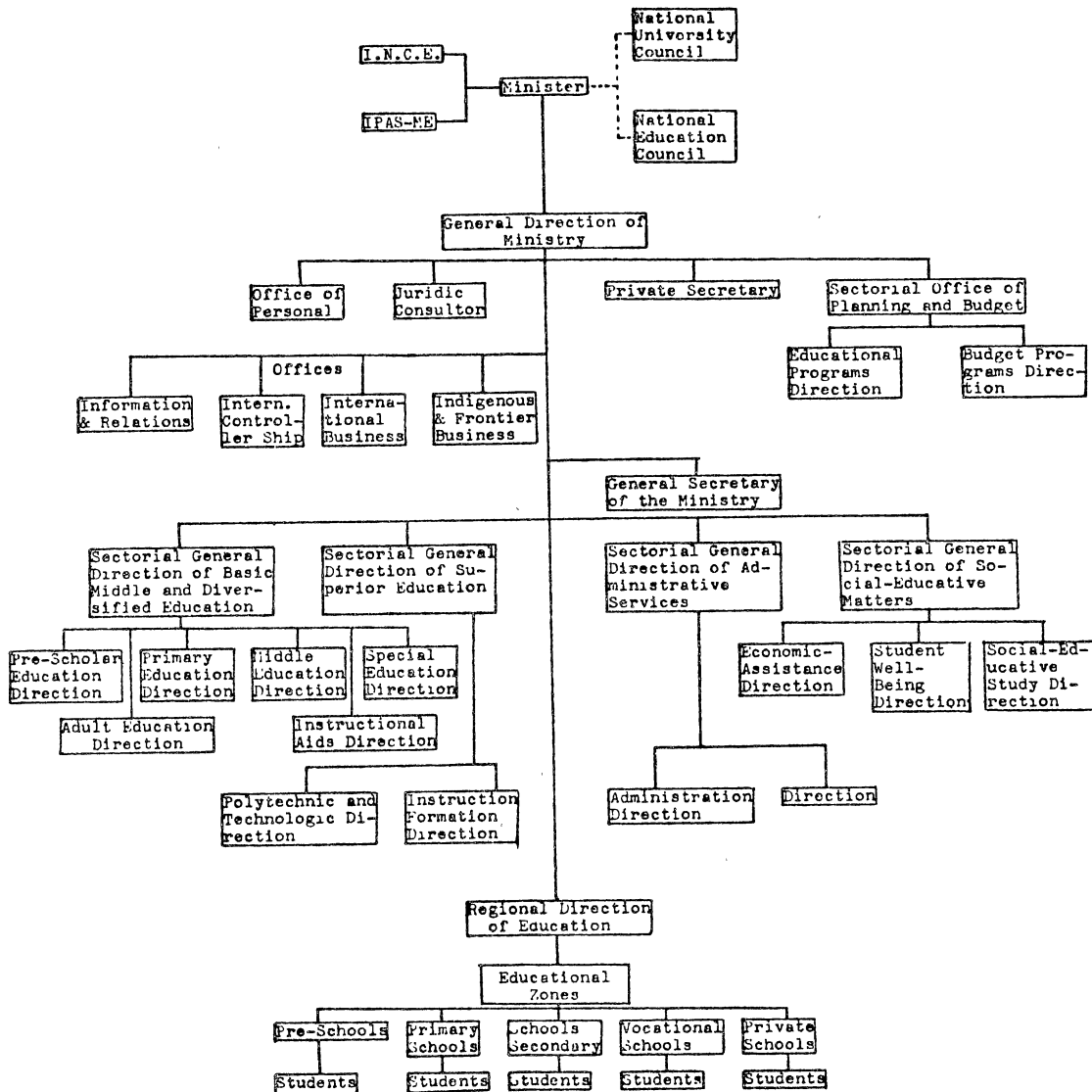
One of the most important characteristics of the Venezuelan educational system is the quantitative growth at all levels, due to rapid population and urbanization growth, industrialization and mobility (American University, 1971). Thus the total enrollment at all levels increased from 1,448,896 students in 1960-1961 to 2,653,114 students in 1970-1971 (Nemeth, 1976). The growth in the last decade has been increasing with the creation of 1,688,871 new places for students, and the educational system reached an enrollment of 4,341,985 students for the year 1970-1980 (Tovar, 1982).

This quantitative development has been oriented towards democratization, to reduce dropouts, to provide scholarships to



Source: Perez O. Enrique, Nuevos Aportes a la Reforma Educativa (Caracas, 1973), p. 21.

Figure 1. Structure of Venezuelan Educational System



Source: Memoria y Cuenta del Ministerio de Educación (1979), p. 21.

Figure 2. Organization Chart of Venezuelan Ministry of Education

students with few economic resources, to improve and bring about actualization of the educational programs, to improve evaluation system, to create more opportunities for studies, and to enhance the chance of examining, choosing, and searching strategies for better teaching and learning; to assist continuing education for teachers, and to develop adult education and literacy programs (Tovar, 1982).

Today, however, this fast expansion of the educational system has resulted in an increase of the teaching personnel; and sometimes, the administrative structure does not have the necessary resources to attend the educational demands of this personnel (Tovar, 1982).

#### The Sub-System of Adult Education

By 1936 there was no a true adult education structure in Venezuela, and it was the year when the first primary schools were created (Navarro, 1976). These night schools were primarily founded by welfare services of lotteries, and they were aimed at assisting those who could not attend the educational institutions at their corresponding ages, because they had to enter the job market (Navarro, 1976). In 1941 the service of literacy (Servicio de Alfabetización) was created within the ministry of education. From 1941 to 1948 this office launched big efforts for literacy programs; the first literacy campaigns were conducted during that period, and about 45,000 adults learned to read and write (Navarro, 1976).

Also this ministry created and founded the Centers of

Popular Culture (Centros de Cultura Popular) as schools for continuing the literacy process and where the participants could obtain their Primary Education Certificate (American University, 1971). During the same period the first night secondary school was created for adults workers, with a special regimen of study and programs adapted to the characteristics of the participants (Navarro, 1976).

Today, the "Dirección de Educación de Adultos" (DEA) of the ministry of education is a truly sub-system within the Venezuelan educational system, with a budget of \$ 266,036.5 in 1974-1975, and assisting a population of 308,996 adults during the same period (Navarro, 1976).

The rapid evolution of the adult education in Venezuela has been characterized by the support given by the national government, and that support was once again showed on November 29, 1969 when the president promulgated the "Decreto No 208" which represents the "Reglamento de la Educacion Permanente de Adultos" (Regulations of the Permanent Eeducation of Adults). The decree that contains eight chapters represents a triumph of the "Asociacion Nacional de Educadores de Adultos" (ANEA), in its efforts for keeping Venezuelan adult education within the tendencies of adult education around the world (Navarro, 1976).

Following the dispositions of the cited decree, the adult education system will serve any one who could not attend school at his/her corresponding age which is established by the "Ley Organica de Educacion", and those who wish to obtain new skills and/or improve their knowledge (Venezuelan Congress, 1980).

Within this framework, the DEA maintains primary and secondary night schools, a system of free schooling, correspondence studies, competency based programs for the rural population, audiovisual media programs, and literacy campaigns (Navarro, 1976).

However, the assistance of the adult population's educational demands is not an exclusive task of the DEA, other institutions such as the "Instituto de Cooperación Educativa, INCE" (Institute of Educational Cooperation), the "Instituto Nacional de Deportes, IND" (National Institute of Sports), the ministries of "Sanidad, Agricultura, Defensa", and other educational agencies organize activities that in one or another way meet the needs of the participants (Navarro, 1976). The educational demands of those who have completed their secondary and professional education is assisted by the institutions of higher education which offer day and evening programs to meet the demands of the adult population.

#### Opportunities for Professional Continuing Education in Venezuela

As stated early, in Venezuela the educational demands of those who have completed their college preparation is assisted by the institutions of higher education. In addition, some ministries and other institutions such as the "Instituto Venezolano de Investigaciones Científicas, IVIC" (Venezuelan Institute for Scientific Research), the "Consejo Nacional de Investigaciones Científicas y Tecnológicas, CONICIT" (National

Council for Scientific and Technological Research), and the Venezuelan Red Cross attend the needs of this population (Hoover, 1978; Tovar, 1982). The programs that are offered, often called "graduate study or course", include extension courses, refreshing courses taken by professional persons, week or day long seminars for business executives, training courses for teachers, and courses leading to advanced degrees (Hoover, 1978). The number of graduate study programs offered by Venezuelan universities by 1978 is shown in Figure 3.

However, today "most Venezuelan students go abroad, especially to Europe and the United States, to follow post-graduate studies" (Tovar, 1982, p. 17). Furthermore, this area of Venezuelan educational system which has been considered extremely important by Venezuelan planners, has also been judged as "unplanned and uncoordinated" (p. 18).

Taking into consideration the importance of the continuing education of the professionals, the Sixth Plan of the Nation (1981-1985) stated that a national policy on graduate education will be developed, and it will be closely related to the requirements and needs of national development, and related to the demands for teaching, research, technical, and scientific formation of the teaching personnel of the higher education system (Cordiplan, 1980).

Unfortunately, the system of graduate education in Venezuela is characterized by a proliferation of courses that in many cases do not meet the real demands, needs and/or educational priorities of the participants (Tovar, 1982). Moreover,



I N S T I T U T I O N	D E G R E E					
	U N I V E R S I T I E S	TOTAL	DOCTOR	MASTER	SPECIALIST	CERTIFICATE
Universidad Central de Venezuela	109	12	85	0	0	12
Universidad de Los Andes	11	0	11	0	0	0
Universidad del Zulia	19	0	7	12	0	0
Universidad de Carabobo	7	0	7	0	0	0
Universidad de Oriente	2	0	2	0	0	0
Universidad Centro Occidental	2	0	0	1	1	0
Universidad Simon Bolivar	7	0	7	0	0	0
Universidad Catolica Andres Bello	4	1	1	2	0	0
Universidad Santa Maria	1	1	0	0	0	0
M I N I S T R I E S						
Ministry of Education	7	0	5	0	0	2
Ministry of Health and Social Science	6	0	0	5	1	0
O T H E R I N S T I T U T I O N S						
Venezuelan Institute of Scientific Research	12	0	12	0	0	0
National School of Public Administration	3	0	0	0	3	0
Foundation for the Development of the Central Western Region	1	0	0	0	1	0
Venezuelan Red Cross	1	0	0	1	0	0
Institute of Higher Studies of Administration	1	0	1	0	0	0

Source: Tovar, Jose, "Faculty perception of Quality Criteria in Graduate Education in Venezuela" (unpub. Ph.D. dissertation, Oklahoma State University, 1982).

Figure 3. Graduate Study Programs Offered by Venezuelan Universities by 1978

there is no report of any study conducted in order to establish the needs and educational priorities of the teaching personnel of Venezuela.

### The National Open University

The "Universidad Nacional Abierta, UNA" (National Open University) was created in 1977 and it is an institution devoted to college and professional preparation for the Venezuelan adult population (Chacon, 1981). The participants are generally over 21, with previous higher education experiences completed or not, married, and who work during the day time.

UNA offers programs in the areas of Education, Engineering, Business and Administration, and Applied Mathematics (Consejo Nacional de Universidades, 1983). Participants enroll in a 18-week semester, and they do not need to attend lectures or scheduled meetings. Instead, they work in their homes with individualized textbooks, and attend to special television and radio broadcasts (Lopez, 1979). The students have voluntary meetings with academic adviser, and their evaluation is performed by means of the so called "presential exam" (Chacon, 1981, p. 1), and conventional course-work as research papers and practical assignments (Chacon, 1981).

This institution attended a population about 20,000 students by 1981, and its organization consist of a central headquarters in Caracas and 20 peripheral Learning Centers lacted in important cities of the country (Consejo Nacional de Universidades, 1983). The central headquarters is in charge

of the administration of the whole system, and of the design and reproduction of the curriculum material (Chacon, 1981). The learning centers are in charge of the student management, assessment, guidance and academic advisory, multimedia library, and other related functions (Lopez, 1979). In Figure 4 is presented the organization chart of the UNA. Unfortunately, the researcher was not able to find any data referring the number of professionals that has attended the UNA since its creation.

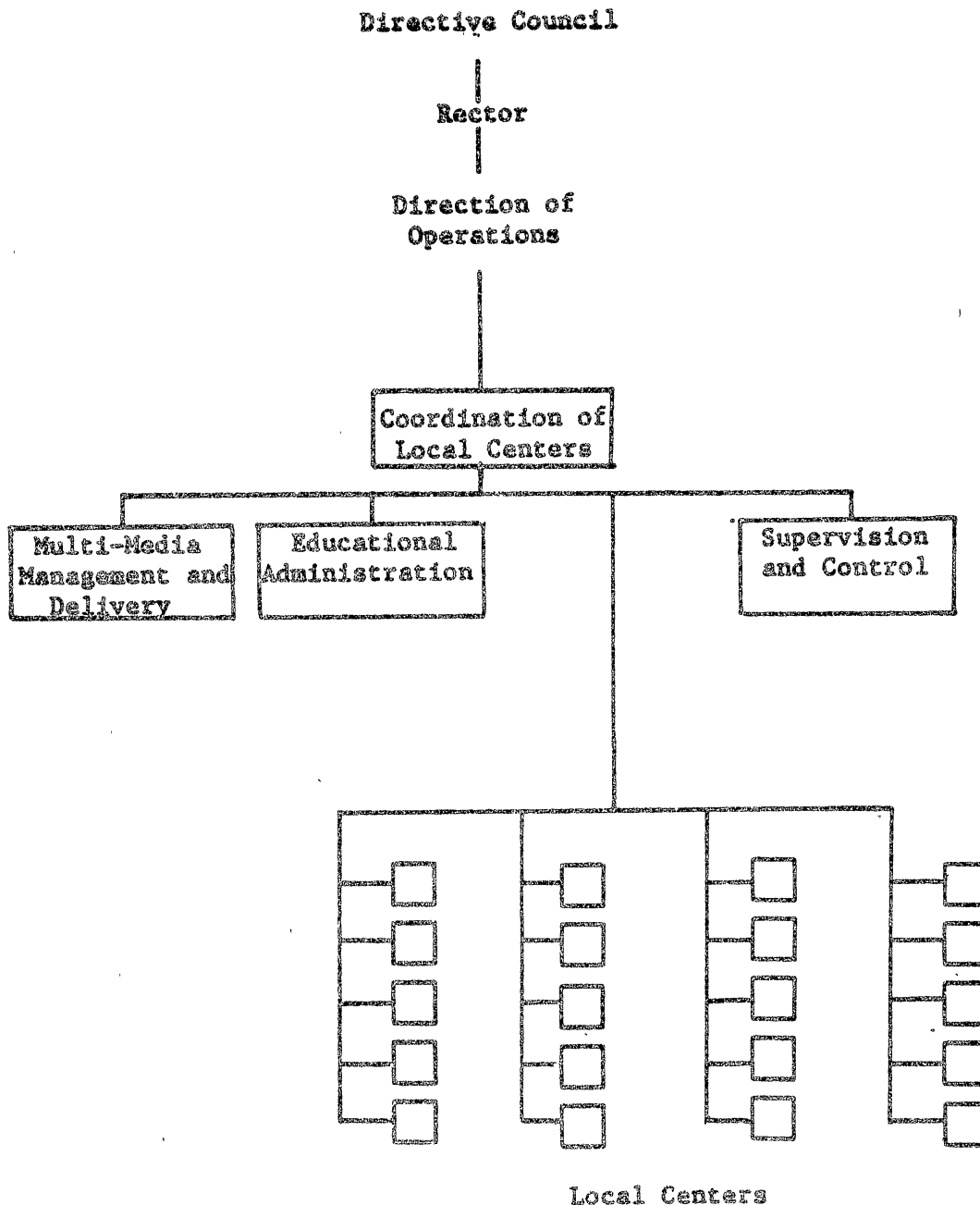
#### The National Center for the Improvement of Science Teaching

The "Centro Nacional para el Mejoramiento de la Enseñanza de la Ciencia, CENAMEC", is a Venezuelan institution devoted to the improvement of the teaching of sciences. This institution was created by a presidential decree on August 06, 1973. (Cenamec, 1978). The two main objectives of the center stated in the decree are as follow:

1. To attend in a continuous and systematic way the improvement and modernization of the teaching-learning science process (Cenamec, 1978).

2. To procure the improvement of the means and methods of instruction, and the formation and perfecting of the teaching personnel; and to stimulate teachers and students to develop an active, creative, and searching attitude (Cenamec, 1978).

The maximum authority of the CENAMEC is an Executive Committee which is helped in its functions by a Council of Advisers. In these group are representants of the Ministry of Education, the CONICIT, the "Consejo Nacional de Univeridades,



Source: Chacon, Fabio J, "The organization of the Distance Teaching Sub-System in an Open University" (1981). ED 207430

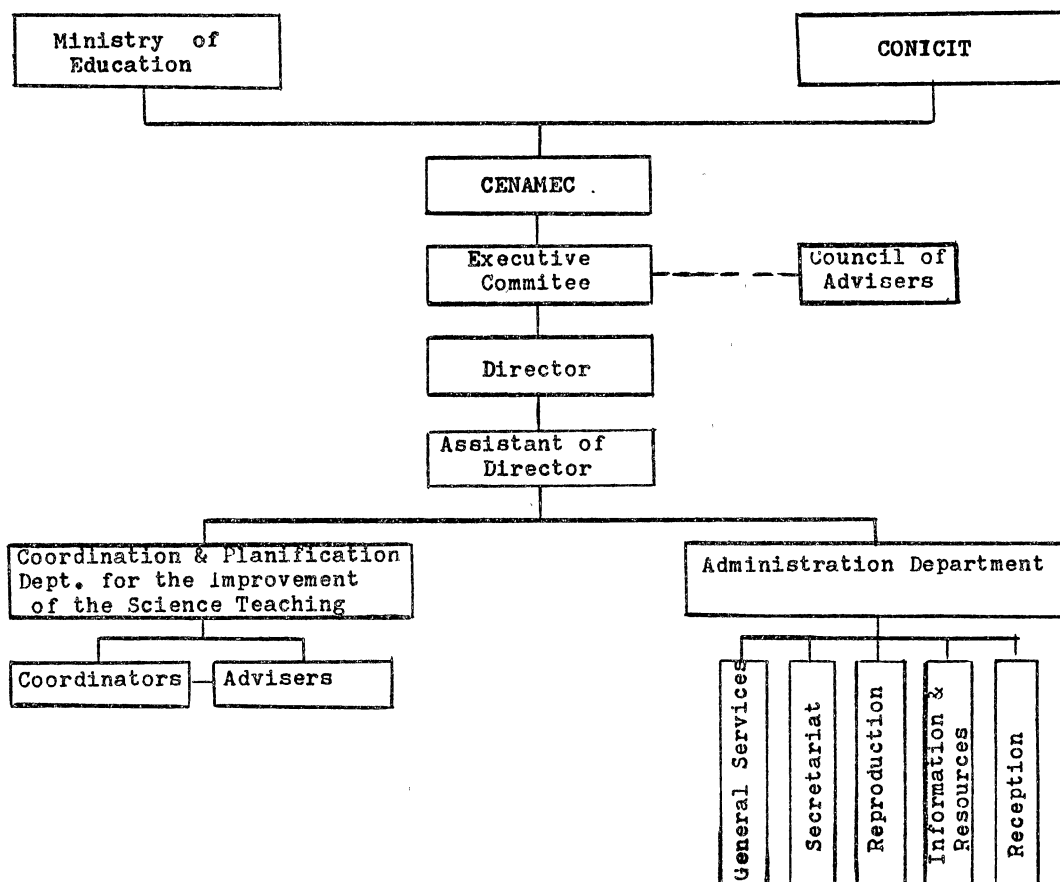
Figure 4. Organization Chart of the Universidad Nacional Abierta

CNU" (National Council of Universities), the "Academia de Ciencias Físicas, Matemáticas y Naturales" (Academy of Physical, Mathematical, and Natural Sciences), the "Asociación Venezolana para el Avance de la Ciencia, ASOVAC" (Venezuelan Association for the Science Advancement), the "Consejo Venezolano de la Industria" (Venezuelan Industrial Council), the "Institutos de Educación Militar" (Institutes of Military Education), and the IVIC (Cenamec, 1978). In Figure 5 is presented the structure organization of the CENAMEEC.

The projects that have been promoted by the center include activities aimed at perfecting science teachers in the areas of Biology, Chemistry, Earth Sciences, Mathematics, and Physics; and more than 2,600 science teachers participated in the experimental workshops conducted by CENAMEEC until 1978 (Cenamec, 1978). In Figure 6 is presented some of the projects conducted by the center during 1974 and 1978.

Some other activities conducted by this center and directed to foment interest in science and technology are the radio broadcasting program "Vida y Ciencia" (Science and Life), and the "Olimpiadas Matemáticas" (Mathematical Olympiad) which is a competition of mathematical abilities for the secondary school students (Cenamec, 1978).

Although, most of CENAMEEC activities are aimed at perfecting the Venezuelan science teachers, there is no report of any study conducted in order to assess the educational priorities of the population that the center assists.



Source: Cenamec, Centro Nacional para el Mejoramiento de la Enseñanza de la Ciencia (Caracas, 1978), p. 20.

Figure 5. Structure Organization of CENAMEC

PROJECT #	PROJECT NAME
PROMATEM - 01	"Olimpíada Matemática Venezolana" ( Vene-Mathematical Olympiad).
PROCIEN - 01	Radio broadcasting program "Vida y Ciencia" (Science and Life).
PROCIENEM - 01	Advisers and Promoters of Scientific Activities.
MATCB - 01	Improvement of the Teaching of Mathematics at the "Ciclo Básico Común" of Secondary School.
MATCB - 02	Perfecting of the Math Teacher at the "Ciclo Básico Común" of Secondary School.
MATCB - 01 CIENPRI - 01	Elaboration of Resources of the Learning of Math and Science at the Level of Primary Education.
FISEM - 01	Improvement of the Curriculum Area of Physics at Secondary School.
FISEM - 02	Perfecting of Teachers of Physics at Secondary School.
BIOLAB - 01	Perfecting of the Science Teacher.
CTCD - 02	Perfecting of the Earth Science Teachers at Secondary School.
QWIMLAB -02	Perfecting of the Teachers of Chemistry at Secondary School.
DIENCI - 01 EQUILAB - 01	Diagnosis of the Teaching of Science in Secondary School. Materials and Equipments.
MATPRI - 02 CIENPRI - 02	Advising the Ministry of Education in the Revision of the Mathematics and Science Programs of the first to sixth grades of Primary Education.

Figure 6. CENAMEC Projects from 1974 to 1978

## Continuing Education Needs of American Teachers

A number of factors have increased the needs for continuing education of school personnel. The declining image of public schooling, falling test scores, and the individual teacher autonomy can be named as some of those factors (Rubin, 1978). Consequently, inservice education and professional development, both synonyms of continuing education for professionals, are now considered a major force in school improvement (NSTA, 1978; Yager, 1981). Louis Rubin (1978) affirmed that,

... teachers are neither made nor born. Rather, as in other forms of human artistry, the best of the breed are a fortuitous combination of natural talent, commitment, and a knack for continuous maturation (p. 1).

The literature concerning continuing development of teaching personnel is comprised of studies and reports of specific programs. Few studies have involved an assessment of alternatives to traditional teaching training (Rubin, 1971; Ingersoll, 1976; Moore, 1977; NSTA, 1978; Rubba, 1981). Indeed, there is not yet a convenient and widely endorsed instrument to determine continuing education priorities (Hite and Howey, 1977; Moore, 1977). The studies that have been conducted are concentrated on what teachers want, both individual and as groups (Ingersoll, 1976). Some of the principles underlying these programs, as reported by Rubin (1978), are the following:

The acquisition of a needed skill or a new



knowledge and the ability to adopt a new approach to teaching are more rewarding than the accumulation of graduate credit or salary increments.

When a teacher or administrator; however, is able to improve the quality of his or her performance through in-service education, that improvement merits recognition.

In-service education is radically different from pre-service education. Participants bring with them experience and general knowledge often as great as that of their 'instructor'. In-service programs should not be conducted like college courses.

Participants in in-service programs are responsible for their own learning. They should be co-planners, co-leaders, and co-evaluators of programs (p. 16).

In 1973 Howell addressed the problem of assessing teacher inservice needs by determine possible categories of needs from school principal point of view (Ingersoll, 1976). He also asked teachers what their teaching interests were, and what mode of inservice training was most appropriated. Teachers ranked the areas of inservice instruction, techniques of discipline, motivation, and the use of media resources as most pressing.

Ingersoll (1976) developed an instrument with the intent of it could be used to gather data on inservice education needs. The instrument, called Teacher Needs Assessment Survey (TNAS), consisted of 43 teaching skills clustered into seven areas and was administered to 745 teachers (Ingersoll, 1976). The areas indentified as perceived training needs were (a) interpersonal communication and administration, (b) developing pupil self, (c) individualizing instruction, (d) assessment, (e) discipline, (f) development of personal self, and (g) classroom management (Ingersoll, 1976).

In the TNAS teachers were asked to respond to each item of

the questionnaire in two ways, indicating (a) "how they saw each training area as a personal need," and (b) "how they saw each training area as a need of teachers in general"

(Ingersoll, 1976, p. 170). Teachers' responses reflected that the areas with highest perceived need for training were (a) developing pupil self, and (b) individualized instruction.

Anothe study concerning with assessing teacher needs was conducted at Bowling Green State University (BGSU) (Pigge, 1978). This study was aimed at identifying competencies needed in teaching, and to evaluate the BGSU education graduates. The competency statements used in this study were developed by asking the educating faculty teaching the five education courses required at this university.

The faculty members were asked to prepare a list of teaching ability statements, based on "aims and objectives of the courses, or experiences that they were teaching and/or directing" (Pigge, 1978, p. 71). The questionnaire used as instrument consisted of 26 items, and the 1,651 teachers surveyed were asked to respond to the statements in four ways (a) "need for competency," (b) "use of competency," (c) "proficiency in the competency area," and (d) "where the competency was developed" (p. 71).

The results of this study indicated that the five most needed abilities were (1) ability to maintain order in .

classroom, (2) ability to motivate students, (3) ability to apply appropriate evaluative techniques, (4) ability to individualize instruction, and (5) ability to utilize audio-visual equipment (Pigge, 1978). This research also reported a tendency to give credit to "work experience" (p. 74) in developing the high needed competencies. In addition, there was a tendency to give few credit to "in service education" (p. 74) in developing the proficiency in the needed competency.

A study using the competencies developed at BGSU was conducted at Augusta College, Georgia (Bartos, 1979). This study examined the need and proficiency of a selected set of teacher competencies as viewed by practicing professionals. There were 15 selected competencies and the questionnaire was administered to "51 teachers with an average of 2.2 years of teaching experience" (p. 2).

The information presented in the investigation showed that the most needed competencies were (1) ability to maintain order in a classroom and to assist students in the development of self discipline, (2) ability to motivate students, (3) ability to individualize instruction, (4) ability to encourage and facilitate social skills, and (5) ability to apply evaluative techniques (Bartos, 1979).

Bartos (1979, p. 7) reported that there was an indication that "inservice has not proven worthwhile to gain proficiency," and that this might indicate that "teachers should be more involved in selecting topic for inservice education" to get the needed skills in the area they consider as high necessity.

## Educational Needs of American Science Teachers

It is generally acknowledged that the science teachers' role is changing due to changes in science curricula, materials, and media (Moore, 1977). In recent years, attention has been devoted to improvement of science teaching in schools (Anderson and Wood, 1975), and a reasonable proportion of the American science teachers has been involved in inservice and continuing education (NSTA, 1978). A 1971 survey reported that about one-fourth of all elementary school teachers were working towards a master's degree, whereas another one-fourth had already earned such a degree (NSTA, 1978). Fourteen percent of the elementary school science teachers had attended a National Science Foundation (NSF) sponsored workshop, and two-thirds reported involvement in some type of inservice education program or activity (NSTA, 1978).

Similarly, one-fourth of all junior and senior high school science teachers was working towards a higher degree. More than one-half of these teachers had participated in NSF funded institutions. Over 50 percent of the secondary school science teachers had participated in NSF Summer Institutes, whereas nine percent was involved in Academic Year Institutes. Many had attended both types as well as NSF COOP Inservice Programs and NSF Institute Programs (NSTA, 1978).

Journals in education and various disciplines in science have been important in continuing education of science teachers (NSTA, 1978; Yager, 1981). Many states affiliates of

National Science Teachers Association (NSTA) publish journals and/or newsletters which are "forums for science teachers to exchange ideas" (NSTA, 1978, p. 8). Journals and publications such as the Pennsylvania Clearinghouse on Methodology in Elementary Science, The Science Teacher, Journal of Research in Science Teaching, Science and Children, American Biology Teacher, Journal of Environmental Education, and many others are of special value to science teachers.

"Professional growth and development require continuous opportunities that have been planned around the needs of the participants" (NSTA, 1978, p. 27). Since 1950 several teacher needs assessment studies have been reported in the literature. These include investigations conducted by Clayton (1955), McKelvey (1979), Piltz (1954), Savage (1968), Schoonover et al (1950), Waite (1966), and White (1979). However, most of the instruments used in those researches cannot be applied to assess the educational needs of science teachers at all grade levels or of any science discipline (Moore, 1977).

In an attempt to assess the needs of science teachers at all grade levels and of any science discipline, Moore (1975) developed an instrument known as the Moore Assessment Profile (MAP). The MAP consisted of a list of 117 need statements categorized into six areas which included : (1) the development of a better understanding of students, (2) the improvement of diagnosis and evaluation practices, (3) the development of better classroom management practices, (4) the improvement of classroom instruction and planning, (5) the more effective use

of instructional material, and (6) the self-improvement of the classroom science teacher (Moore, 1977).

For the reliability and validity checking, the MAP was administered to a sample of 140 science teachers including "60 elementary school teachers, 40 junior high science teachers, and 40 senior high science teachers" (p. 147). In this study, were identified 13 factors which represented the "73.3 percent of the total variance" (p. 148) of the instrument. Those factors are the following:

1. Developing basis scientific reasoning skills,
2. Developing a greater understanding of students behavior,
3. Updating in science content and methodology,
4. Guiding and motivating students towards realistic goals,
5. Providing realistic science experiences,
6. Establishing and maintaining class control,
7. Procuring science material,
8. Understanding educational goals,
9. Developing confidence in working with experimental material,
10. Understanding the dialects of culturally different,
11. Utilizing library facilities to supplement science instruction,
12. Utilizing computer to facilitate classroom learning,
13. Preparing instructional material (Moore, 1977).

The Moore Assessment Profile has been used in other

studies to assess the educational needs of science teachers of specific disciplines such as Biology (Rubba, 1981) and Chemistry (Rubba, 1981a).

In these two studies the instrument was administered to 403 science teachers of which 93 were Biology teachers and 87 were Chemistry teachers. The top five educational needs for the Biology teachers that participated in that research were as follows: (1) making science meaningful to students, (2) developing in students an understanding of the interrelationships that exist between science and other school subjects, (3) motivating students to learn through a greater knowledge of students' needs, (4) developing better science reasoning skills in the students, and (5) motivating students to learn through a greater knowledge of students' interests (Rubba, 1981, p. 5).

For the Chemistry teachers the top five needed statements were as follows: (1) Updating of present knowledge of content in the areas of physics, (2) making science meaningful to students, (3) utilizing the library and its facilities so as to increase the students' abilities to develop reference skills, (4) developing in students an understanding of the interrelationships that exist between science and other disciplines, and (5) utilizing library and its facilities so as to increase the students' abilities to supplement classroom learning (Rubba, 1981a, p. 430).

### Summary

The review of literature began with a description of the Venezuelan educational system with emphasis in adult education, and continued with a description of some of the opportunities for professional continuing education in Venezuela, especially for science teachers. The last two segments of the literature review were descriptions of some American studies concerning with the assessment of the educational needs of teachers and science teachers.



## CHAPTER III

### METHODOLOGY

The purpose of this chapter is to describe the methodology used in this study in order to gather the data concerned with the perceived continuing education needs of science teachers of the city of Los Teques, Miranda, Venezuela.

The information will be used to determine the priorities for continuing education programs to be conducted for those teachers. This parte of the study has been organized under the following general headings:

1. Population and Sample,
2. Development of the instrument (Questionnaire),
3. Collection of Data,
4. Analysis of Data.

#### Population and Sample

The population used in this study consisted of the certified science teachers of the three largest secondary school of Los Teques, Miranda, Venezuela. The secondary schools selected for this study were the "Liceo Francisco de Miranda," the "Ciclo Diversificado Roque Pinto," and the "Ciclo Combinado Luis Eduardo Egui Arocha."

These schools were selected because they gather the

largest number of teaching personnel in that city, and because of the feasibility in collecting the data. Of the 250 teachers that represented the faculty of the three schools together, 63 were science teachers and only 47 were certified. Because of the small number of certified science teachers, the whole population was sample.

#### Development of the Instrument

The data gathering instrument for the study was a questionnaire . It was designed to obtain the perception of continuing education needs of Venezuelan science teachers. The instrument was developed locally and was based on expert opinions and ideas obtained from previous studies conducted in the United States.

The questionnaire consisted of 12 questions of which the first five were devoted to academic data. The questions six to 10 were dedicated to teacher perceptions of continuing education needs. Question six and seven dealt with reasons for participation or non-participation. Teachers were asked to identified of a given list their reasons for participation or not in continuing education programs. At the end of each question space was provided so the respondents could add any omitted reason (s).

Question eight consisted of a list of seven skills that the participants were asked to rank in order of importance given a Likert-type scale, where five was considered "very important" and one "not important". Space was provided so the

participants could add any omitted skill (s).

Question nine was related to the subjects or topics in which the teachers may be interested. Participants were asked to name the topic or subjects of interest. Questions 10, 11, 12 consisted of the demographic characteristics of the respondents.

The questionnaire was developed by the researcher in English (Appendix A) and in Spanish (Appendix B). The two versions were field tested by five Venezuelan teachers not participating in the study. All of them were Oklahoma State University (OSU) graduate students who had taught in Venezuelan secondary schools. They made recommendations for clarity of content, and for adaptation to Venezuelan characteristics. Minor working changes in the construction of the final instrument were made upon suggestions made by the group.

#### Collection of Data

The questionnaire and a letter to the principals (Appendix C) were sent to Venezuela in December 1983. The questionnaire and cover letter (Appendix D) (Appendix E, English) explaining the purpose of the study were distributed to the 47 secondary school science teachers during the first two weeks of January 1984.

#### Analysis of Data

The data gathered by the questionnaire were compiled using frequencies, means, and percentages. A two-way

classification chi square was used to determine if there was any difference in participation in continuing education programs by subject specialty, age, and sex. The analysis of the data was structured according to the research questions stated in Chapter I.

## CHAPTER IV

### PRESENTATION OF FINDINGS

The purpose of this study was to determine the extent of participation in continuing education programs, the continuing education needs, and the perceived subject areas and skills that would meet the needs of certified secondary school science teachers of Los Teques, Miranda, Venezuela. The findings of this study are presented in this order: (1) Response rate, (2) Characteristics of the population, (3) Reasons for participation or non-participation in continuing education programs, (4) Perceived skills and subject areas, and (5) Preferred day/time to attend continuing education programs.

The researcher divided the sample population into two categories. The categories chosen were (1) Natural Science Specialty, science teachers who majored in Biology and/or Chemistry; (2) Physical Science Specialty, science teachers who majored in Mathematics and/or Physics.

#### Response Rate

The response rate to the questionnaire is shown in Table I. Of the 47 distributed questionnaires, 32 or 68 percent were returned, 19 from the natural science specialty (40 %), and 13 (28 %) from the physical science specialty. Of the 47 science

TABLE I  
 RESPONSE RATE TO THE QUESTIONNAIRE  
 BY SUBJECT SPECIALTY AND SEX

	Questionnaire Distributed		Questionnaire Returned	
	n	%	n	%
<u>Specialty</u>				
Natural Science	30	64	19	40
Physical Science	17	36	13	28
<u>Sex</u>				
Male	28	60	21	45
Female	19	40	11	23
<u>Total*</u>	47	100	32	68

\* Numbers may not total 100% due to rounding.

teachers, 28 (60 %) were males and 19 (40 %) were females. There were 21 (45 %) questionnaires returned from males, and 11 (23 %) questionnaires returned from females.

#### Characteristics of the Population

The number of respondents by sex, and age is presented in Table II. The natural science specialty contained 19 (59 %) individuals, and the physical science specialty contained 13 (41 %) individuals. There were 11 (34 %) males and eight (25 %) females in the natural science group; and 10 (31 %) males and three (9 %) females in the physical science group, totaling 21 (66 %) males and 11 (34 %) females. Results indicated that 17, or 52 percent of the respondents were between 36 and 45 years of age.

The educational background of the science teachers in this study is illustrated in Table III. The results indicated that 41 percent of the respondents had a bachelor's degree, 28 percent in the natural science specialty, and 13 percent in the physical science specialty. A 47 percent had a bachelor's degree plus self-development and/or improvement courses, 19 percent were in natural science and 28 percent were in physical science. One individual (3 %) had a master's degree. There were three individuals, nine percent of the respondents with post master's studies. All of the respondents with master's or post master's work were natural science teachers.

The number of years that science teachers in this study had been teaching in secondary school is shown in Table IV.

TABLE II  
 NUMBER OF SCIENCE TEACHERS IN STUDY BY  
 SEX, AGE, AND, SUBJECT SPECIALTY

Characteristic	Natural Science		Physical Science		Total*	
	n	%	n	%	n	%
<u>Sex</u>						
Male	11	34	10	31	21	66
Female	8	25	3	9	11	34
<u>Age</u>						
26 - 30	4	13	1	3	5	16
31 - 35	1	3	3	9	4	13
36 - 40	5	16	6	19	11	34
41 - 45	4	13	2	6	6	18
46 - 50	3	9	0	0	3	9
over 50	2	6	1	3	3	9
<u>Total*</u>	19	59	13	41	32	100

\* Numbers may not total 100% due to rounding.



TABLE III  
 EDUCATIONAL BACKGROUND OF SCIENCE  
 TEACHERS BY SUBJECT SPECIALTY

Educational Level	Natural Science		Physical Science		Total*	
	n	%	n	%	n	%
Bachelor's only	9	28	4	13	13	41
Bachelor's plus self-development and/or improve- ment course	6	19	9	28	15	47
Master's	1	3	0	0	1	3
Post-master's	3	9	0	0	3	9
Doctor's	0	0	0	0	0	0

\* Numbers may not total 100% due to rounding.

TABLE IV  
 NUMBER OF YEARS SCIENCE TEACHERS HAVE BEEN IN  
 SECONDARY SCHOOL BY SUBJECT SPECIALTY

Years Teaching	Natural Science		Physical Science		Total*	
	n	%	n	%	n	%
1 - 4	1	3	1	3	2	6
5 - 8	2	6	1	3	3	9
9 - 12	5	16	4	13	9	28
13 - 16	3	9	4	13	7	21
17 - 20	5	16	1	3	6	19
21 - 24	1	3	3	9	4	13
25 - 28	1	3	1	3	2	6
29 - 32	1	3	0	0	1	3
Mean (in years)	14.9		13.6		14.3	

\* Numbers may not total 100% due to rounding.

The results indicated that the average number of years that teachers in natural science had taught in secondary school was 14.9 years. For teachers in the physical science specialty, the mean was 13.6 years. For the respondents, the mean number of years that science teachers in this study had been teaching in secondary school was 14.3 years.

#### Participation in Continuing Education Programs

The number of science teachers that had participated in continuing education programs by subject specialty, sex, and age is represented in Table V. In the natural science specialty, 10 (31 %) individuals had participated in continuing education programs, and nine (28 %) individuals had never participated in any program. In the physical science specialty, nine (28 %) individuals had participated and four (13 %) had never participated in any continuing education program. The results also indicated that of the individuals that participated, 15 (47 %) were males and four (13 %) were females.

For the non participating, six (19 %) were males and seven (22 %) were females. The results indicated that the largest number of participating (11, or 34 %) in continuing education programs was between 36 and 45 years of age. There were 19 (59 %) individuals that had participated in continuing education programs, and 13 (41 %) individuals that had never participated in any program.

TABLE V  
 NUMBER OF SCIENCE TEACHERS PARTICIPATING  
 IN CONTINUING EDUCATION PROGRAMS BY  
 SUBJECT SPECIALTY, SEX, AND AGE

Characteristic	Participation				Total*	
	<u>Yes</u>		<u>No</u>		n	%
	n	%	n	%		
<u>Specialty</u>						
Natural Science	10	31	9	28	19	59
Physical Science	9	28	4	13	13	41
<u>Sex</u>						
Male	15	47	6	19	21	66
Female	4	13	7	22	11	34
<u>Age</u>						
26 - 30	1	3	4	13	5	16
31 - 35	3	9	1	3	4	13
36 - 40	7	22	4	13	11	34
41 - 45	4	13	2	6	6	19
46 - 50	1	3	2	6	3	9
over 50	3	9	0	0	3	9
<u>Total*</u>	19	59	13	41	32	100

\* Numbers may not total 100% due to rounding.

A two-way classification chi square was used to determine whether significant difference existed between: (1) Subject specialty and participation, (2) Sex and participation, and (3) Age and participation. The chi square results for the relationship between subject specialty and participation in continuing education programs are presented in Table VI. A chi square result of 0.33 was not significant at 0.05 level of confidence for this association; therefore, there was no significant difference between specialty and participation in continuing education programs.

The chi square results for the relationship between sex and participation are shown in Table VII. A chi square value of 2.37 was not significant at 0.05 level of confidence which indicated that there was no significant difference between sex and participation in continuing education programs.

The chi square results for the relationship between age and participation are presented in Table VIII. A chi square value of 1.32 was not significant at 0.05 level of confidence, so, there was not significant difference between age and participation in continuing education programs.

The number of science teachers who had participated in continuing education programs during the last two years is shown in Table IX. The table is organized by specialty, sex, and age. Results indicated that eight (25 %) individuals had participated, and that the majority 24, or 75 percent had not participated in any continuing education program during the last two years.

TABLE VI  
 CHI SQUARE RESULTS FOR THE RELATIONSHIP  
 BETWEEN SUBJECT SPECIALTY  
 AND PARTICIPATION

Participation	Natural Science Fo	Physical Science Fo	Total
YES	10	9	19
NO	9	4	13
Total	19	13	32

Critical value  $\chi^2_{(0.05, 1)} = 3.84$

Calculated value  $\chi^2 = 0.32$

TABLE VII  
CHI SQUARE RESULTS FOR THE RELATIONSHIP  
BETWEEN SEX AND PARTICIPATION

Participation	Males Fo	Females Fo	Total
YES	15	4	19
NO	6	7	13
Total	21	11	32

Critical value  $\chi^2$  (0.05, 1) = 3.84

Calculated value  $\chi^2$  = 2.37

TABLE VIII  
 CHI SQUARE RESULTS FOR THE RELATIONSHIP  
 BETWEEN AGE AND PARTICIPATION

Participation	Age			Total
	26 - 35	36 - 45	Over 45	
	Fo	Fo	Fo	
YES	4	11	4	19
NO	5	6	2	13
Total	9	17	6	32

Critical value  $\chi^2_{(0.05, 2)} = 5.99$

Calculated value  $\chi^2 = 1.32$



TABLE IX  
 NUMBER OF SCIENCE TEACHERS PARTICIPATING IN  
 CONTINUING EDUCATION PROGRAMS DURING  
 THE LAST TWO YEARS BY SUBJECT  
 SPECIALTY, SEX, AND AGE

Characteristic	Participation				Total*	
	Yes		No		n	%
	n	%	n	%	n	%
<u>Specialty</u>						
Natural Science	3	9	16	50	19	59
Physical Science	5	16	8	25	13	41
<u>Sex</u>						
Male	8	25	13	41	21	66
Female	0	0	11	34	11	34
<u>Age</u>						
26 - 30	0	0	5	16	5	16
31 - 35	0	0	4	13	4	13
36 - 40	4	13	7	22	11	34
41 - 45	3	9	3	9	6	19
46 - 50	0	0	3	9	3	9
Over 50	1	3	2	6	3	9
<u>Total*</u>	8	25	24	75	32	100

\* Numbers may not total 100% due to rounding.

There were three (9 %) individuals from the natural science specialty, and five (16 %) individuals from physical science who had participated in the last two years. All of the participants were males and seven (22 %) of them were between 36 and 45 years of age. Due to the small number of participants during the last two years, no statistical test was applied to determine any significant difference.

#### Reasons for Participation or Non-Participation in Continuing Education Programs

Science teachers' reasons for participation in continuing education programs are presented in Table X. The most frequently selected reasons were subject matter (12, or 38%), better self for present job (7, or 22%), instructor (6, or 19%), prepare for a non-teaching job (6, or 19%), and time when the course was offered (6, or 19%).

Science teachers' reasons for not participating in continuing education programs are shown in Table XI. The most frequently selected reasons were inconvenient time when the course was offered (15, or 47%), place where the course was offered (12, or 38%), and no time to study (6, or 19%). There was one written response indicating that there were no graduate programs or studies available specifically for educators.

#### Perceived Skills and Subject Areas

The science teachers' perceived skills are presented in Table XII. In the table are shown the mean perceived importance

TABLE X  
 PERCEIVED REASONS SCIENCE TEACHERS PARTICIPATE  
 IN CONTINUING EDUCATION PROGRAMS  
 BY SUBJECT SPECIALTY

Reason	Natural Science		Physical Science		Total <sup>a</sup>	
	n*	%	n*	%	n*	%
Subject matter	7	22	5	16	12	38
Time when the course was offered	2	6	4	13	6	19
Place where the course was offered	1	3	3	9	4	13
Instructor	3	9	3	9	6	19
Degree Program	2	6	2	6	4	13
Cost	0	0	0	0	0	0
Prepare for a non-teachin job	1	3	5	16	6	19
Better self for present job	4	13	3	9	7	21
Self improvement	2	6	0	0	2	6
Promotion	5	16	0	0	5	16
Supervision encouragement	0	0	0	0	0	0
Friends were enrolled	0	0	0	0	0	0
Away from daily routine	0	0	0	0	0	0

\* Numbers may reflect more than one response per person.

<sup>a</sup> Numbers may not total 100% due to rounding.

TABLE XI  
 PERCEIVED REASONS SCIENCE TEACHERS DO NOT  
 PARTICIPATE IN CONTINUING EDUCATION  
 PROGRAMS BY SUBJECT SPECIALTY

Reason	Natural Science		Physical Science		Total <sup>a</sup>	
	n*	%	n*	%	n*	%
Subject matter	1	3	2	6	3	9
Inconvenient time when the course was offered	10	31	5	16	15	47
Place where the course was offered	6	19	6	19	12	38
Instructor	0	0	0	0	0	0
No interest in any further study	1	3	1	3	2	6
No time to study	4	13	2	6	6	19
Difficulty of the programs	0	0	0	0	0	0
Admission requirements	3	9	0	0	3	9
Cost	0	0	1	3	1	3

\* Numbers may reflect more than one response per person.

<sup>a</sup> Numbers may not total 100% due to rounding.

TABLE XII  
 MEAN PERCEIVED IMPORTANCE OF SCIENCE TEACHERS  
 SKILLS BY SUBJECT SPECIALTY

Skills	Natural Science $\bar{x}$	Physical Science $\bar{x}$	Total $\bar{x}$
New methods and techniques in teaching sciences.	3.79	4.69	4.33
Development of skills to advise students when they are working in research projects.	4.00	4.23	4.16
Elaboration of material such as study guides, lab guides, etc.	3.16	3.62	3.46
Design and elaboration of material for demonstration using school resources.	2.68	1.92	2.60
Elaboration and maintenance of resources such as aquariums, models, etc.	2.21	1.00	1.83
Safety and prevention techniques for common accidents in school labs.	1.63	1.54	1.76
Maintenance of lab instruments of frequent use.	1.47	1.62	1.53

N=32

of the skills by specialty. Respondents rated highest the skill new methods and techniques in teaching sciences, with a mean value of 4.33. The second highest rated skill was development of skills to advise students when they are working in their research projects, with a mean value of 4.16.

For the natural science teachers that statement was the highest rated with a mean value of 4.00; for the physical science teachers the highest rated was new methods and techniques in teaching science, with a mean of 4.69. The lowest rated skill was maintenance of laboratory instruments of frequent use, with a mean of 1.53. This skill was the lowest rated by teachers in the natural science specialty, with a mean of 1.47; but for the physical science teachers the lowest rated skill was elaboration and maintenance of resources such as aquariums, models, etc., with a mean value of 1.00.

A list of the subjects areas in which science teachers in this study indicated that they had an interest is presented in Table XIII. The subjects with the highest frequency were (1) Genetics with eight answers, (2) Ecology with five responses, (3) Cell Biology with five responses, (4) Audio-visual aids/design of material with four responses, and (5) Educational Evaluation with four responses.

Of the subject above mentioned, only the last two were of interest to both groups in study. The other subject areas with the highest frequency were of interest only to natural science teachers. For teachers in the physical science specialty, the subject with the highest frequency was Educational Evaluation.

TABLE XIII  
 SUBJECT AREAS OF INTEREST TO SCIENCE  
 TEACHERS BY SUBJECT SPECIALTY

Subject Area	Natural Science n*	Physical Science n*	Total n*
Genetics	8	0	8
Cell Biology	5	0	5
Ecology	5	0	5
Audio-visual aids/ design of material	2	2	4
Educational Evaluation	1	3	4
Chemical Cinetics/ Reaction Rate	3	0	3
Educational Research/ Scientific Method	1	2	3
Science Teaching	1	2	3
Zoology/Zootechnics	3	0	3
Applied Chemistry	2	0	2
Biochemistry	2	0	2
Computer Science	0	2	2
DNA	2	0	2
Electronics	0	0	2
Embryology	2	0	2
Linear Algebra/ Math Analysis	0	2	2
Logic	0	2	2
Mathematics	0	2	2
Petroleum Chemistry	2	0	2

TABLE XII (Continued)

Subject Area	Natural Science	Physical Science	Total
	n*	n*	n*
Physics	0	2	2
Quantum Theory	1	2	2
Administration	0	1	1
Benzene Reactions	1	0	1
Botany	1	0	1
Differential Equations	0	1	1
Dynamics	0	1	1
Electrochemistry	1	0	1
Electromagnetics	0	1	1
Electrostatics	0	1	1
Evolution	1	0	1
Hormones	1	0	1
Lab Training	0	1	1
Learning Psychology	0	1	1
Nuclear Energy	1	0	1
Probability	0	1	1
Spatial Geometry	0	1	1
Thermodynamics	1	0	1
Vectors	0	1	1

\* Numbers may reflect more than one response per person.



Preferred Day/Time to Attend Continuing  
Education Programs

The days of the week science teachers preferred to attend continuing education programs are shown in Table XIV. Saturday was the most preferred day with 56 percent response, followed by Wednesday with 44 percent, Thursday with 34 percent, and Tuesday with 31 percent. For teachers of natural science, Wednesday was the most preferred day with 25 percent response, followed by Saturday with 22 percent, and Vacation Time also with 22 percent response. For the physical science group, Saturday was the most preferred day with 34 percent response, followed by Thursday with 22 percent, and Wednesday with 19 percent response. Vacation Time was the least preferred day for this group with zero response.

The times of the day science teachers preferred to attend educational programs are presented in Table XV. Fifty-six percent indicated that they preferred morning or afternoon classes, and 34 percent indicated preference for evening classes. Natural science teachers indicated preference for afternoon programs (40 %), and physical science teachers showed preference for programs in the morning and evening hours, both had a 25 percent response.

TABLE XIV  
 DAYS SCIENCE TEACHERS PREFERRED TO ATTEND  
 CONTINUING EDUCATION PROGRAMS BY  
 SUBJECT SPECIALTY

Day	Natural Science		Physical Science		Total <sup>a</sup>	
	n*	%	n*	%	n*	%
Monday	5	16	4	13	9	28
Tuesday	5	16	5	16	10	32
Wednesday	8	25	6	19	14	44
Thursday	4	13	7	22	11	35
Friday	4	13	5	16	9	29
Saturday	7	22	11	34	18	56
Sunday	3	9	2	6	5	15
Vacations	7	22	0	0	7	22

\* Numbers may reflect more than one response per person.

<sup>a</sup> Numbers may not total 100% due to rounding.

TABLE XV  
 TIME SCIENCE TEACHERS PREFERRED TO ATTEND  
 CONTINUING EDUCATION PROGRAMS BY  
 SUBJECT SPECIALTY

Time	Natural Science		Physical Science		Total <sup>a</sup>	
	n*	%	n*	%	n*	%
Morning	10	31	8	25	18	56
Afternoon	13	41	5	16	18	56
Evening	3	9	8	25	11	34

\* Numbers may reflect more than one response per person.

<sup>a</sup> Numbers may not total 100% due to rounding.

## CHAPTER V

### SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

The results of the study are summarized and discussed in this chapter. A summary of the study is first presented, followed by the researcher's conclusions based on the findings of the study. Recommendations for research and practice are discussed in the final part of the chapter.

#### Summary

The problem of study was the need to establish the priorities for continuing education programs to be conducted for certified secondary school science teachers of Los Teques, Miranda, Venezuela. The purpose of this study was to determine the extent of participation in continuing education programs, the continuing education needs, and the perceived skills and subject areas that would meet the needs of the certified science teachers in study. This research would then be helpful to provide adequate continuing education programs that meet the educational priorities of these teachers.

The population for the study was the certified secondary school science teachers of the three largest secondary schools in Los Teques, Miranda, Venezuela. Sixty-eight percent of the population responded to the questionnaire designed by the

investigator to gather data. The sample population was divided into two categories: the natural science specialty, and the physical science specialty.

### Conclusions

The conclusions drawn from this study were as follow:

1. A moderate portion of the certified science teachers in this study had participated in continuing education programs with self-development and improvement courses the most common type of program attended by the teachers.

2. Physical science teachers showed a relatively lower participation rate, considering that all of the respondents with an advanced degree (e.g. master's) were natural science teachers.

3. Time and place where the program was offered were the main reasons why the teachers in this study did not participate in educational programs. Desired subject area was the main reason for participation in continuing education programs.

4. There was no significant difference in participation in continuing education programs by subject specialty, sex, and age.

5. The certified science teachers in this study showed a need for development in the cognitive doamain, represented by an interest in improving skills in teaching methods and in developing researching techniques. There was also a need for refreshing courses on use of audio-visual aids, and educational evaluation. Natural science teachers showed an interest in

improving their knowledge in specific subject areas related to their specialty (e.g. Genetics).

### Recommendations

The recommendations for practice based on the results of this study are the following:

1. Institutions of higher education in the region should consider offering programs in science teaching methods and techniques, educational evaluation, educational research, and audio-visual aids in order to satisfy the needs of the certified science teachers of these skills and subject areas.

2. Courses in the areas of Genetics, Cell Biology, and/or Ecology should be consider to be offered to natural science teachers in order to satisfy their interest in them.

3. Offering continuing education programs "on lacion" should be consider by agencies in charge. Saturday is suggested as the best day to offer the programs or courses.

4. The findings of this study should be shared with the educational authorities, teacher associations, and institutions of higher education in the region in order to coordinate programs that meet the educational priorities of the teachers.

### Further Study

Additional studies could be conducted to identify or collect the following information:

1. A similar study in a broader national basis in order to substantiate or refute this findings.

2. A study to compare the perceived continuing education needs of certified science teachers at different levels (elementary, secondary, and superior).

3. A study to compare the perceived continuing education needs of certified and non-certified science teachers.

4. A study to determine the best means for stimulating certified secondary school science teacher participation in continuing education programs.

## A SELECTED BIBLIOGRAPHY

- Allen, Henry. Venezuela A Democracy. New York: Doubleday Doran and Co., Inc., 1941.
- American University. Area Handbook of Venezuela. Washington, D. C.: U.S. Government Printing Office, 1971.
- Anderson, Wayne P., and Verne E. Wood. "The Del Mod Approach to Continuing Education for High School Teachers." Journal of Chemical Education, Vol. 52, (September 1975), pp. 604-605.
- Bartos, Robert B. "Development, Proficiency, and Needs of Teacher Competencies." Augusta College, Georgia: 1979. ED 175820
- Burroughs, G.E. Education in Venezuela. London: David and Charles, 1974.
- Cenamec. Centro Nacional para el Mejoramiento de la Enseñanza de la Ciencia, Venezuela. Caracas: 1978.
- Chacon, Fabio J. "The Organization of the Distance Teaching Sub-System in an Open University." 1981. ED 207430
- Clayton, A.D. "The Pre-Service and In-Service Science Education of Iowa Secondary School Science Teachers." (Unpub. Ph.D. dissertation, University of Colorado, 1955.)
- Consejo Nacional de Universidades. Oportunidades de Estudios en las Instituciones de Educación Superior de Venezuela: Año 1983-1984. Caracas: Unidad de Orientación, Distribución e Ingresos, 1982.
- Cordiplan. VI Plan de la Nación: 1980-1985, Sector Educativo, Versión Preliminar. Caracas: Oficina Sectorial de Planificación y Presupuesto, 1980.
- Hite, Herbert, and K. Howey. Planning Inservice Teacher Education Promising Alternatives. American Association of College for Teacher Education, 1977.
- Hoover, Gary. Venezuela. Washington, D.C.: American Association for Collegiate Registrars and Admissions Office, 1978.



- Ingersoll, Gary. "Assessing Inservice Training Needs through Teacher Responses." Journal of Teacher Education, Vol. XXVII (Summer 1976), pp. 169-173.
- Kuriam, George. "Venezuela." Encyclopedia of the Third World. Vol. III. New York: Facts of File, Inc., 1982.
- LaCruz, Pedro F. "Possible Adaptation in the Functions of Secondary Agricultural Education to Enhance Rural and Community Development in Venezuela." (Unpub. M.S. thesis, Oklahoma State University, 1981.)
- Lopez, Daisy C. de. "Design of an External Examination System for the Venezuelan Open University." (Unpub. Ph.D. dissertation, University of Nebraska, 1979.)
- Lowe, Arbor J. "Venezuela Pipeline to Prosperity." Americas, Vol. 30 (January 1978), pp. 17-40.
- McKelvey, Robert et al. "An Inquiry into Graduate Training Needs of Two-Year College Teachers of Mathematics." Washington, D.C.: National Science Foundation, 1979.
- Ministerio de Educacion. 1978 Memoria y Cuenta del Ministerio de Educacion. Caracas, Venezuela: 1979.
- Moore, Kenneth. "The Development and Use of an Instrument to Assess the Inservice Needs of Science Teachers." (Unpub. Ph.D. dissertation, University of Huston, 1975.)
- \_\_\_\_\_. "Development and Validation of a Science Teacher Needs Assessment Profile." Journal of Research in Science Teaching, Vol. 14 (March 1977), pp. 145-149.
- Navarro, Cesar. Educacion de Adultos en Venezuela. Caracas: Ministerio de Educacion, 1978.
- National Science Teacher Association. "Science Education: Accomplishments and Needs (A Working Paper)." Washington, D.C., 1978. ED 171571
- Nemeth, Edward J. The Educational System of Venezuela. Washington, D.C.: U.S. Government Printing Office, 1976. ED 134518
- Perez O., Enrique. Nuevos Aportes de la Reforma Educativa. Caracas: Ministerio de Educacion, 1973).
- Pigge, Fred. "Teacher Competencies: Need, Proficiency, and Where Proficiency Was Developed." Journal of Teacher Education. Vol. XXIX (July-August 1978), pp. 70-76.

- Piltz, Albert. "An Investigation of Teacher-Recognized Difficulties Encountered in the Teaching of Science in the Elementary Schools of Florida." (Unpub. Ed.D. dissertation, The University of Florida, 1954.)
- Rubba, Peter. "Teacher to Teacher. The Inservice Needs of Biology Teachers." The American Biology Teacher, Vol. 14 (January 1981), pp. 51-52.
- \_\_\_\_\_. "Chemistry Teachers' Inservice Needs. Are They Unique." Journal of Chemical Education, Vol. 58 (May 1981), pp. 430-431.
- Rubin, Louis. "Teacher Growth in Perspective," in Louis J. Rubbin, ed. Improving Inservice Education: Proposal and Procedures for Change. Boston: Allyn and Bacon, 1971.
- \_\_\_\_\_. "Perspective on Pre-Service and Inservice Education." Professional Development, Vol. 1, 1978.
- Sanchez, George. The Development of Education in Venezuela. Washington, D.C.: U.S. Government Printing Office, 1963. ED 044813
- Savage, Mary M. "The In-Service Needs of Experienced Elementary School Teachers in Fairfield County, Connecticut as Identified by Experienced Teachers and Their Principals." (Unpub. Ph.D. dissertation, Fordham University, 1968.)
- Schoonover, T. et al. "Description of a Self-Appraisal Questionnaire for Teacher In-Service." Educational Administration and Supervision, 36, (1950) 162-165.
- Tovar, Jose A. "Faculty Perception of Quality Criteria in Graduate Education in Venezuela." (Unpub. Ph.D. dissertation, Oklahoma State University, 1982.)
- Venezuelan Congress. Ley Organica de Educacion. Caracas: 1980.
- Waite, Willis D. "A Study of the Needs for Continuing Education of Staff-Members of the Public Schools of Illinois." (Unpub. Ph.D. dissertation, University of Illinois, 1966.)
- White, Edwin P. "South Carolina Middle School Science Survey." South Carolina University, Spartanburg: 1979. ED 174441
- Yager, Robert. "Science Education." ASCD Curriculum Update, (September 1981), pp. 1-4.

APPENDIX A

CONTINUING EDUCATION NEEDS QUESTIONNAIRE

## Continuing Education Needs Questionnaire

Directions

In order to clarify the questions, it will be appropriate to define some terms. The term "graduate study" is used to mean any course of study taken after the first university level degree. Those courses have been divided into: (a) Self-Development Courses, any graduate study that provides an attendance certificate; (b) Improvement Courses, any graduate study that provides a pass or fail certificate; and (c) Professionalization Courses, any graduate study aimed at obtaining a degree.

Complete the following questionnaire by filling in the blanks or following the directions given in the question.

1. What is your major? \_\_\_\_\_
2. What is (are) the course (s) that you teach?  
Course  
 (a) \_\_\_\_\_  
 (b) \_\_\_\_\_  
 (c) \_\_\_\_\_  
 (d) \_\_\_\_\_
3. How many years have you been teaching at secondary school?  
 \_\_\_\_\_ years.
4. What is your educational Background?  
 (a) \_\_\_ bachelor's degree only.      (d) \_\_\_ post-master's studies.  
 (b) \_\_\_ bachelor's degree plus      (e) \_\_\_ doctor's degree.  
 self-development and/or perfect-      (f) \_\_\_ other, specify \_\_\_\_\_  
 ing courses.  
 (c) \_\_\_ master's degree      \_\_\_\_\_  
 \_\_\_\_\_
5. Have you been enrolled in any graduate study during the last two years? Yes \_\_\_\_\_ ; No \_\_\_\_\_.  
 a. If "NO", when did you last take a course of this type? # of years \_\_\_\_\_; Never \_\_\_\_\_.
6. If you have enrolled in any graduate study, please check the reason (s) why you enrolled (Check all that apply).  
 a. \_\_\_ the subject matter was desired  
 b. \_\_\_ the course or program was offered at convenient time.  
 c. \_\_\_ the course or program was offered at convenient place.  
 d. \_\_\_ the instructor was outstanding.  
 e. \_\_\_ the course or program was a degree program.

- f. \_\_\_ it was inexpensive.
- g. \_\_\_ to prepare for a future job different from teaching.
- h. \_\_\_ to better myself for present job.
- i. \_\_\_ to get away from daily routine.
- j. \_\_\_ for self improvement.
- k. \_\_\_ it will help for promotion.
- l. \_\_\_ supervision encouragement.
- m. \_\_\_ friends were enrolled.
- n. \_\_\_ Other (specify) \_\_\_\_\_
7. If you have never enrolled, or have not enrolled during the last two years in any graduate study, please check the reason(s) why you have not (check all that apply).
- a. \_\_\_ subject matter of the courses or programs was not desired
- b. \_\_\_ inconvenient time when the courses were offered.
- c. \_\_\_ inconvenient place where the courses were offered.
- d. \_\_\_ instructor of the course.
- e. \_\_\_ no interested in any further study.
- f. \_\_\_ no time to study.
- g. \_\_\_ the courses or programs available were too difficult.
- h. \_\_\_ admissions requirements.
- i. \_\_\_ cost
- j. \_\_\_ other (specify) \_\_\_\_\_

8. Please give your opinion of the degree of importance for development that the listed skills have. Circle one of the numbers to the right of each skill, the numbers range from "5" VERY IMPORTANT (VI) to "1" NOT IMPORTANT (NI).

SKILL	DEGREE OF IMPORTANCE				
	VI 5	4	3	2	NI 1
(a) Safety and prevention techniques for common accidents in school labs.	5	4	3	2	1
(b) Design and elaboration of materials for demonstration using the school resources.	5	4	3	2	1
(c) Elaboration and maintenance of resources such as models, aquariums, etc.	5	4	3	2	1

SKILL	DEGREE OF IMPORTANCE				
	VI 5	4	3	2	NI 1
(d) Maintenance of lab instruments of frequent use	5	4	3	2	1
(e) Development of skills to advise students when they are working in research projects.	5	4	3	2	1
(f) New method and techniques in teaching science.	5	4	3	2	1
(g) Elaboration of materials such as study guides, lab guides, etc.	5	4	3	2	1
(h) Other (specify) _____ _____	5	4	3	2	1

9. Please list any subject areas in which you as a science teacher would be interested.

- a. \_\_\_\_\_ b. \_\_\_\_\_  
c. \_\_\_\_\_ d. \_\_\_\_\_

10. At what time, and on what day would be better for you to attend graduate courses or studies?

TIME AVAILABLE

DAY AVAILABLE

- |                      |                  |
|----------------------|------------------|
| a. ___ Morning       | a. ___ Monday    |
| b. ___ Afternoon     | b. ___ Tuesday   |
| c. ___ Evening       | c. ___ Wednesday |
| d. ___ Vacation time | d. ___ Thursday  |
|                      | e. ___ Friday    |
|                      | f. ___ Saturday  |
|                      | g. ___ Sunday    |

11. How old are you?

- \_\_\_ 20 to 25; \_\_\_ 26 to 30  
\_\_\_ 31 to 35; \_\_\_ 36 to 40  
\_\_\_ 41 to 45; \_\_\_ 46 to 50  
\_\_\_ 51 to 55; \_\_\_ over 55

12. Sex: Male \_\_\_ ; Female \_\_\_

APPENDIX B

CUESTIONARIO SOBRE LAS NECESIDADES  
DE EDUCACION CONTINUA DE  
PROFESORES DE CIENCIA

Cuestionario sobre las Necesidades de  
Educacion Continua de Profesores  
de Ciencia

Instrucciones:

Para mayor claridad de la pregunta es necesario definir algunos de los términos que se usan en el cuestionario. El término "curso de post-grado" se usa para definir cualquier estudio realizado despues de haber obtenido un título universitario. Estos estudios se han dividido en tres tipos de cursos: (a) Curso de Actualizacion, todo curso que no requiere título de educación superior para poder participar y en los que se obtiene, por lo general, un certificado de asistencia. (b) Curso de Perfeccionamiento, aquel que requiere título de educación superior para participar, y en los cuales generalmente se obtiene certificado de aprobación. No son válidos para obtener un grado. (c) Curso de Profesionalizacion, aquel destinado a la obtención de un grado (maestría o doctorado) u otra profesión.

Complete el siguiente cuestionario llenando los espacios en blanco o siguiendo las instrucciones especificadas en la pregunta.

1. Título y especialidad \_\_\_\_\_
- 2.Cuál es la asignatura (s) que Ud dicta?  
Asignatura  
a. \_\_\_\_\_ b. \_\_\_\_\_  
c. \_\_\_\_\_ d. \_\_\_\_\_
3. Cuántos años tiene trabajando en secundaria? \_\_\_\_\_ años.
- 4.Cuál es su formación profesional? Indique la alternativa apropiada.  
a. \_\_\_ Profesor o Licenciado solamente.  
b. \_\_\_ Profesor o Licenciado más cursos de post-grado.  
c. \_\_\_ Maestría.  
e. \_\_\_ Maestría más otros estudios  
f. \_\_\_ Doctorado  
g. \_\_\_ Otro (especifique) \_\_\_\_\_
5. Ha participado en algun curo de post-grado en los dos ultimos años? SI \_\_\_\_\_ ; NO \_\_\_\_\_  
a. Si su respuesta es "No", cuando fue la ultima vez que participó? # de años \_\_\_\_\_; Nunca \_\_\_\_\_.



6. Si alguna vez ha participado o se encuentra cursando algún estudio de post-grado, por favor, indique cuál o cuáles fueron sus razones.
- a. \_\_\_ Interés en el tema.
  - b. \_\_\_ Horario del curso.
  - c. \_\_\_ Lugar donde fue ofrecido.
  - d. \_\_\_ Credenciales del instructor.
  - e. \_\_\_ El curso fue o es parte de un programa para obtener un grado.
  - f. \_\_\_ Costo
  - g. \_\_\_ Prepararse para un trabajo diferente al de la enseñanza.
  - h. \_\_\_ Desenvolverse mejor en el presente cargo.
  - i. \_\_\_ Escapar de la rutina diaria.
  - j. \_\_\_ Propio perfeccionamiento
  - k. \_\_\_ Ascenso.
  - l. \_\_\_ Incentivo de supervisión
  - m. \_\_\_ Incentivo de amigos ya cursantes.
  - o. \_\_\_ Otro (especifique) \_\_\_\_\_
7. Si Ud nunca ha participado o no ha cursado ningun estudio de post-grado en los ultimos dos años, por favor, indique cual o cuales fueron sus razones.
- a. \_\_\_ No interés en el tema
  - b. \_\_\_ Horario del curso
  - c. \_\_\_ Lugar donde fue ofrecido.
  - d. \_\_\_ Credenciales del instructor.
  - e. \_\_\_ No está interesado en ningun otro estudio.
  - f. \_\_\_ Costo
  - g. \_\_\_ No tiene tiempo para estudiar
  - h. \_\_\_ Dificultad de los cursos.
  - i. \_\_\_ Requisitos de admisión.
  - j. \_\_\_ Otro (especifique) \_\_\_\_\_
8. Como profesor de ciencia, indique el grado de importancia que tienen para Ud las siguientes habilidades; encerrando en un círculo un numero a la derecha de cada una de las habilidades descritas. Los numeros varian del "5" MUY IMPORTANTE (M.I) al "1" NO IMPORTANTE (N.I).

HABILIDAD	GRADO DE IMPORTANCIA				
	(M.I)			(N.I)	
	5	4	3	2	1
(a) Medidas de seguridad y prevención de accidentes comunes en un laboratorio.	5	4	3	2	1
(b) Diseño y elaboración de material de demostración usando los recursos de la institución.	5	4	3	2	1
(c) Elaboración y mantenimiento de recursos tales como acuarios, terrarios, modelos, etc.	5	4	3	2	1
(d) Mantenimiento de instrumentos de uso frecuente.	5	4	3	2	1
(e) Desarrollo de habilidades en el asesoramiento de alumnos en sus proyectos de investigación.	5	4	3	2	1
(f) Uso de nuevos métodos y técnicas en la enseñanza de la ciencia.	5	4	3	2	1
(g) Elaboración de material de apoyo tales como guías de estudio, problemarios, guías de laboratorio, etc.	5	4	3	2	1
(h) Otro (especifique) _____	5	4	3	2	1

9. Liste los temas en los cuales Ud como profesor de ciencia estaría interesado.

a. \_\_\_\_\_ b. \_\_\_\_\_  
 c. \_\_\_\_\_ c. \_\_\_\_\_

10. Indique cual seria el mejor día y mejor hora en la cual Ud participaría en un curso de post-grado. (Indique todas las alternativas apropiadas).

Hora Disponible

a. Mañana \_\_\_\_\_

b. Tarde \_\_\_\_\_

Dia Disponible

a. Lunes \_\_\_\_\_

c. Martes \_\_\_\_\_

Hora Disponible

c. Noche \_\_\_\_\_

d. Vacaciones \_\_\_\_\_

Día Disponible

c. Miércoles \_\_\_\_\_

d. Jueves \_\_\_\_\_

e. Viernes \_\_\_\_\_

f. Sábado \_\_\_\_\_

g. Domingo \_\_\_\_\_

11. Marque el intervalo en el cual esta comprendida su edad.

a. \_\_\_\_\_ 20 a 25 años

b. \_\_\_\_\_ 26 a 30 años

c. \_\_\_\_\_ 31 a 35 años

d. \_\_\_\_\_ 36 a 40 años

e. \_\_\_\_\_ 41 a 45 años

f. \_\_\_\_\_ 46 a 50 años

g. \_\_\_\_\_ 51 a 55 años

h. \_\_\_\_\_ mas de 55 años

12. Sexo:

Masculino \_\_\_\_\_

Femenino \_\_\_\_\_

APPENDIX C

LETTER SENT TO THE PRINCIPALS  
OF THE SELECTED SCHOOLS

Stillwater 10 de Diciembre de 1983

Ciudadano Director

---

Los Teques, Edo Miranda  
Presente.-

Respetado Profesor:

Como estudiante de Oklahoma State University en EEUU, estoy desarrollando mi tesis de maestría sobre las necesidades de educación continua de los profesores de ciencia de la ciudad de Los Teques, y he seleccionada la institución a su digno cargo como una de las muestras para el estudio. Mucho sabría agradecer la colaboración que pueda prestarme en la aplicación del cuestionario que se esta utilizando como instrumento para recabar la información necesaria. Dicho cuestionario debe ser distribuido a los profesores egresados de institutos pedagógicos o universidades en las especialidades de Biología, Física, Matemáticas, y Química; independientemente del cargo que ocupe en la institución.

Una vez respondidos, por favor, devuelva los cuestionarios (si es posible en una sola entrega) a la persona encargada de su distribución. En este caso Señor Francisco Mosquera, Distribuidor de Pago de la Zona Educativa, Los Teques, Edo, Miranda.

Sin más quedo de Ud agradeciendo su valiosa colaboración,

Doris M. de Querales

Estudiante de Post-grado  
Oklahoma State University.

APPENDIX D

COVER LETTER

Stillwater 10 de Diciembre de 1983.

A: Profesores graduados en las especialidades de Biología,  
Física, Matemáticas, o Química.

Estimado Colega;

Como parte de mi programa de estudios estoy realizando una investigación con el propósito de determinar las necesidades de educación continua de los profesores de ciencia de la ciudad de Los Teques. Su respuesta al acompañante cuestionario es necesaria para la recolección de los requeridos datos. Responder el cuestionario le tomara aproximadamente 15 minutos, y sus respuestas serán de incalculable valor en el suministro de la información necesaria para este estudio. Su participación es altamente apreciada.

Una vez respondido, por favor, devuelva el cuestionario a la persona encargada de su distribución.

Muchas gracias por su participación.

Doris M. de Querales  
Estudiante de Post-grado  
Oklahoma State University

APPENDIX E

COVER LETTER (ENGLISH)



Stillwater December 10, 1983.

To: Certified Science Teachers of Biology, Chemistry, Mathematics, or Physics.

Dear Colleague,

An investigation is being conducted to determine the continuing education needs of science teachers of the city of Los Teques, Miranda, Venezuela. Your completion of the attached questionnaire is necessary to gather the required data. The answering of this questionnaire will take about 15 minutes, and your responses to the questions will be invaluable in providing the information for this study.

Please, turn in your complete questionnaire to the person in charge of its distribution.

Your participation is greatly appreciated,

Thanks,

Doris M. de Querales  
Graduate Student  
Oklahoma State University

VITA 2

Doris Mosquera Querales

Candidate for the Degree of

Master of Science

Thesis: CONTINUING EDUCATION NEEDS OF CERTIFIED SECONDARY SCHOOL SCIENCE TEACHERS OF LOS TEQUES, MIRANDA, VENEZUELA

Major Field: Occupational and Adult Education

Biographical:

Personal Data: Born in Caracas, Venezuela, August 16, 1953, the daughter of Francisco and Marcolina Mosquera. Married to Edgar J. Querales on April 04, 1974.

Education: Graduated from Liceo Francisco de Miranda, Los Teques, Miranda, Venezuela, in July 1970; received Profesora de Educacion Media Degree in Chemistry and General Science from Instituto Universitario Pedagogico, Caracas, Venezuela in March 1977; completed requirements for the Master of Science degree at Oklahoma State University in May, 1984.

Professional Experience: Secondary School Science Teacher from 1976 to 1981 at Ciclo Combinado Luis Eduardo Egui Arocha, Los Teques, Miranda, Venezuela.

Professional Organizations: Colegio de Profesores de Venezuela.