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**Chemistry teaching practices and the social construction of  
teachers' professionalism in Costa Rica**

**Alfaro-Varela, Gilberto, Ph.D.**

**The Florida State University, 1993**

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THE FLORIDA STATE UNIVERSITY  
COLLEGE OF EDUCATION

CHEMISTRY TEACHING PRACTICES AND THE SOCIAL CONSTRUCTION  
OF TEACHERS' PROFESSIONALISM IN COSTA RICA

By  
GILBERTO ALFARO-VARELA

A Dissertation submitted to the  
Department of Curriculum and Instruction  
in partial fulfillment of the  
requirements for the degree of  
Doctor of Philosophy

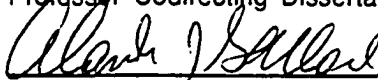
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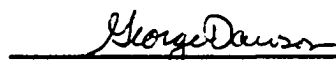


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**DEDICATION**

**to**

**My wife, my children, my father,  
my parents-in-law; and in memory of my  
mother and my elementary school teacher.**

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## ABSTRACT

Current concerns about school restructuring use the concept of teacher professionalism and the need for collaboration among teachers and administrators as the basis that will ensure a sustained change in the school culture. Therefore, in order for school restructuring to occur, a theoretical understanding of cultural issues of school is more necessary than the allocation of financial resources.

Undertaken as an interpretive research project, this study was an attempt to understand the cultural and theoretical frameworks which underline teachers' professionalism and the need for collaboration among chemistry teachers in Costa Rica. The participants in the study were a group of chemistry teachers who have been working together. They developed and implemented teaching strategies in their classrooms based on the knowledge constructed from their classroom experiences and their theoretical understandings of curriculum development. This study explored the following: How these chemistry teachers came to collaborate and the kinds of issues that were resolved in their collaborative efforts. This investigation was an opportunity to learn what happens when teachers decide on their own to get together, collaborate and make decisions that are based on the belief in professional autonomy as well as with the expectation that they can make a difference in their classrooms. Other issues addressed were as follows: The relationships of teachers with administrators, colleagues, students, and how teachers make sense of these relationships and construct alternative ways to overcome limitations in the school culture.

Through interviews two female chemistry teachers, who belong to the group,

explored their life histories (stories). They have different educational backgrounds, and work in the same town but in schools with different philosophical orientations. The purpose of using life histories was to explore the kinds of social interactions in which chemistry teachers see themselves learning and constructing self images of being chemistry teachers. Based on the descriptions of these teachers' life histories, interpretive explanations were generated under the theoretical framework that guided this research.

The benefit of using life histories to analyze personal experiences was that the participants were able to talk about their lives and move back and forth in time to add personally meaningful information that enriched the learning potential of the study. These life histories were not linear biographical descriptions. Rather, I was looking for contextually rich stories. It means that not only was it necessary to have the description of the facts and the environment in which those occurred, but also the meanings that participants assigned to them. In the process of constructing their personal stories, I found information about the way these teachers see themselves as professionals in relation to students, administrators, colleagues, professors at the university level and their own family environment. Moreover, the teachers' stories revealed roles that teachers play in school besides teaching and the way those roles make sense for them. Issues regarding autonomy and collaboration were elaborated on by the teachers' stories and considered central concepts when talking about professionalism.

This dissertation, "Chemistry Teaching Practices and the Social Construction of Teacher's Professionalism in Costa Rica," reflects what I learned about the process of constructing the professional identity of a teacher. Teachers, and professionals in general, are constantly changing their identities because of the influence of the context they create by interacting with others.

## CHAPTER 1

### COSTA RICAN SCHOOL SYSTEM

#### Introduction

In order to frame this dissertation within the proper context of the particular settings in which this research took place, I feel it necessary to describe part of my experience as a teacher as well as explain the historical development of the school system in Costa Rica. Thus, this chapter describes the historical basis of the school system in Costa Rica. Even when this study refers to a particular setting in Costa Rica, it needs to be understood within the larger cultural context that frames the entire Costa Rican school system. Costa Rica has a centralized system of education in which teachers and students work toward the achievement of the goals defined in the national curriculum.

I am a Costa Rican. Accordingly, the main purpose that guided the study was generated from my experience in the social context of Costa Rica. My experience working in Costa Rica includes 10 years as a chemistry teacher in public schools, teaching other areas of science in private schools as well as my university experience working with pre-service and in-service teacher programs in the area of science and mathematics education.

#### Purpose of the Study

The purpose of this research project was to learn how a group of chemistry



teachers in Costa Rica constructed the concept of professionalism and how chemistry teaching practices are influenced by teachers' conceptions of professionalism. The framing question of my study is as follows: How do teachers, struggling in the school culture, construct their identity as professionals? From my perspective, this is an important issue to be addressed, because the national interest to improve education has to be grounded in an understanding of teachers' construction of themselves as the implementators of educational views in the field. The study explored teachers' constructions of professional identities as related to the context from which they perceive their experiences in classrooms, schools, school districts, the school system at large, teacher unions, and society.

The need to probe and understand the constructions of professional identity is a prerequisite for teacher educators to build an understanding of what happens in schools and how those who interact in that social setting come to understand the roles that each of the participants has to play in the development and maintenance of the school culture: the glue that holds a system together and gives it meaning.

This research provided an opportunity to learn what happens when teachers decide to work together, collaborate, and make decisions based on their beliefs about professional autonomy and collegiality. They do so because they expect to make a difference in their classrooms. A study that tries to understand how a group of chemistry teachers construct themselves as professionals is helpful for those who have an interest in promoting professional teaching practices: Teacher educators, teachers and administrators.

### Background of the Study

My experiences as a chemistry teacher and a teacher educator have provided me

opportunities to reflect on what teachers go through in order to accomplish what they see as their professional responsibilities. As national policies and discourses addressing teaching have changed, many questions have been raised regarding the role of teachers in terms of the discipline that they teach and the schools' expectations about their contribution to education in the country. It seems to me that are expected to play roles that are associated with the subject matter they teach. For example, science teachers are associated with scientists in the same way that music teachers are associated with musicians. In the communities, science teachers are expected to function as consultants on projects that require knowledge of natural science. Projects related to environmental education, use of agrochemicals for example, are coordinated by science teachers because the community assumes that teachers know how to deal with those issues.

From my perspective, science teachers choose their roles in order to further their understanding of their discipline. This vision creates a conflict when teachers see the roles school programs assign to them. The suggestions given for developing the content area and the way students are assessed lead to an expectation that teachers will follow the content sequence and the methodology. However, teachers expect to cover as much content as possible in order to place this new content on the exams they are required to give. Rather than promoting understanding, they promote the idea of covering the content of the discipline, an option that generates disinterest on the part of the students as well as the false idea that students are learning science in an appropriate form and manner. Thus, there is a contradiction between the teachers' visions and the actions they perform in school settings.

My experience as a graduate student in the program of science education at Florida State University has given me opportunities to undertake field research on teaching, learning, and teacher change. It was through my research and course work

where I came to understand the sociological aspects of school culture. It was during my field research, observing classrooms and reviewing literature, where the problem of conflicting expectations resurfaced; teachers were doing things they never envisioned doing as teachers. Questions began to emerge as part of my research interest: How do teachers construct their identities as professionals? How do others influence the development of teachers' professional identities? How do teachers' professional identities influence their teaching practices? Based on my previous experiences, I understood that a professional is one who is able to deal with the knowledge (information, skills, abilities, beliefs) related to the field. Moreover, a professional is one who has a deep understanding of the ethical implications of the professional actions in such a field that requires autonomy to deal with the uncertainties that emerge in the working place.

Current teaching practices and goals. Memorization has been traditionally the most common practice promoted by chemistry teachers in secondary schools (Gabel, 1983). Rather than understanding natural phenomena, teaching and learning chemistry have been associated with the memorization of symbols for elements and formulae for compounds as a base for writing chemical equations. Traditional chemistry teachers have been concerned with the reproduction of information in the way of symbols, formulae and chemical equations to fulfill the requirements that students "need" when they go to other chemistry courses. With the practice of memorization and the intention of teachers to prepare students for future courses, the idea that chemistry is valuable only for those who will take more chemistry courses, but not for those who will join the work force or continue in academic areas different from the natural sciences, is implicit.

It is within this conception that traditional chemistry teaching practices are framed in Costa Rica. But what happens when a group of teachers take a different view and intend to teach in different ways? What kind of preparation do they need in order to do that? What is the vision of teaching professionalism on which they make decisions and assume responsibilities? Is the school system supportive of teacher professionalism? What kinds of characteristics do teachers have as professionals? How do they come to develop their identity as professionals? These are the types of questions that shaped my study.

#### A Vignette about my own Experience and the Profession of Teaching

The first time I taught chemistry to 10th graders, I was introduced by the principal to the students and faculty of the institution. In his introduction, the principal introduced me as a specialist in teaching chemistry. I understood that he meant his introduction as something positive for the secondary school institution in general and for the students in particular because that was the first time that a certified chemistry teacher had come to work at this school. The school was relatively new when I went to work there. I arrived six years after the school was founded. This period of time did not seem to be long enough for the development of an institutional culture, and all participants felt new. Thus, my nine years experience in that institution was to participate in the creation of a new school culture.

Before I received that position, general science teachers were often required to teach chemistry, as is the case in the majority of secondary schools in Costa Rica. The students' first reactions toward me was negative. They did not want to come into my class or even talk with me as their chemistry teacher. According to students, as they told me much later in the process of interaction as part of the chemistry course, their

resistance was based on the experiences regarding chemistry that former 10th graders had. For those students chemistry was stressful because of the amount memorization required. My students assumed that if the previous chemistry teacher, who was not certified to teach chemistry, made it so hard, something worse would happen with a new teacher whose major interest was chemistry.

After giving students opportunities to express their negative impressions about chemistry and explaining my vision about chemistry teaching, they agreed to come into my class. Students were surprised when the course started because I did not bring with me a periodic table and books that they assumed contained the concepts they had to memorize. As suggested earlier, they had an image of chemistry and the way it should be taught, and my practice did not fit this image.

I think that many of my beliefs about teaching as sharing and collaborating are grounded in those experiences with my family and former teachers. In my formal education I was influenced by teachers who wanted to show students that learning was good, something to enjoy, even when it was difficult. Likewise, my family informally influenced my ideas about teaching chemistry. I am the second son in a family of 13, plus a member of an extended family (grandparents, uncles, aunts, cousins) who lived on the same farm. As a member of a large family, I found that they were a source of learning experiences in which I had the opportunity to share with others. In constructing my ideas about how to teach chemistry, I was particularly influenced by some of the philosophical foundations that oriented "Chem Study", a curriculum resource for high school chemistry that was developed in the U.S.A. during the time of science curriculum reform in the 1960s.

As a prospective chemistry teacher, I had the opportunity to learn from my experiences with other prospective teachers. When I started my internship,

prospective chemistry teachers were encouraged to collaborate with each other. From those experiences I came into the field, as Pimentel and Ridgway (1972) would argue, without an “authoritarian pedagogy for teaching, descriptive chemical facts for content, memorization for study, and regurgitation for evaluation” (p. 40).

Additionally, once in the field, I had the opportunity to share with other chemistry teachers as part of a program that was promoted by the national coordinator of chemistry teaching from the Ministry of Education. This program started when a group of chemistry teachers in the country were using the Chem Study project. In order to analyze their experiences, they decided to work together in different regions with the support of a professor who was interested in the adoption of Chem Study as a curriculum resource for secondary school chemistry in the country. It was difficult to use Chem Study as a program because of the conception of science, the lack of equipment required for the laboratories, the high cost of books for students, and the lack availability of audiovisual materials. Nevertheless, the basic principles that oriented that program were useful for teachers in the organization of new pedagogical strategies as well as the collaborative practices that were developed within the community of chemistry teachers.

Collaboration as a base for learning with others was common practice at the high school where I worked as a chemistry teacher for nine years, and since then, collaboration has been a key element for me in professional development efforts. This is one of the main reasons for my interest in learning from a group of chemistry teachers, a group of which I was once a part, who believe that collaboration makes a difference. In order to understand science teaching, one needs to understand that the science classroom is, to a large degree, influenced and shaped by the larger context of the school as well as the entire school system in which it resides. What follows is a brief description of this context.

## Educational Context in Costa Rica

### A Brief History of Educational Development in Costa Rica

The roots of the Costa Rican school system are historically deep. Since the beginning of the colonial period, Costa Rica was not considered important by the explorers. It was sparsely populated, and there were not many metal resources. According to Ordoñez (1992), when the colonizers came, the native groups of Costa Rica had a social organization that valued education. The form of education and the way it was integrated within the society was thoroughly described by the conquerors.

According to the mentality of the era, since there were no metals or other valued resources, those who came to live in Costa Rica were people who wanted to own a small piece of land. They did not have the resources to pay others to work for them nor the resources to live in an intensive social interactive life. According to Bosch (1984) and Pacheco (1972), the first settlers of the Costa Rica were basically impoverished nobles and some educated plebeians. Bosch states that these people lived in small villages to avoid the compromises that social life required. Costa Rica was part of the "Capitanía General de Guatemala", but because of distance, communication with Costa Rica was not good. Thus, the people who settled in Costa Rica developed their own style of life. The Catholic Church played an important role in the organization of social life, and priests were in charge of education that was based on what Spain determined to be good for the colonies.

By the time of independence from Spain (1821), Costa Rica had an educational system controlled by the church, with a main school called the "Casa de Enseñanza de Santo Tomás". That was a school in charge of the general education. Some people had the opportunity to participate in schools outside of the country such as at the University of Leon in Nicaragua and the University of San Carlos in Guatemala. A few years after

independence, Costa Rica's unusual philosophy of education set it apart from the other republics of Central America. In 1823, just two years after independence, education was proclaimed as "the base and fundamental principle of human happiness and common prosperity" (Pacheco, 1972, p. 12).

Around the 1830s, a unionist movement was promoted by the other republics of Central America. These republics wanted to unify the area once again, but Costa Ricans did not see any benefit in a unification. During this time Costa Rican families who could afford a better education for their children started sending them to schools in England and France. This was when of the economic system began influencing the educational system; the ones who could pay became the educated people, and thus the ones with the potential to influence the development of more education in the country. At the same time, these people were the ones who promoted a conflict that by the 1870s separated the church from the school system (Cordero, 1984).

The history of the educational reform in Costa Rica. The Costa Rican school system has gone through a series of reforms, all intended to produce the citizens that the country needs. As stated previously, education provided by the church was based on Spain's educational system. The main purpose of education at that time was to read and learn church doctrine. At this stage, during the construction of the basis to define our nationality, education was provided for those in the main cities, although primarily for those who had the financial means to support the education of their children. The first major educational reform occurred in 1889 was when the state began taking control of the educational system that had been dominated by the higher economic class. The state took control over the Casa de Enseñanza de Santo Tomás in 1824, created the Instituto Nacional, and created the University of Santo Tomás in the 1840s. Likewise, the state



declared that education was obligatory and would be supported by the state (Churnside, 1985; Fischel, 1987). As part of attempts to develop the political, economical and social aspects of the nation, the educational system was restructured in a way that emphasized preparing people to conduct business. It was during that time that Costa Rica began to export coffee to Europe, and in addition, banana companies began to settle in the country. The educational system was used to generate the necessary work force for the coffee industry and to prepare employees for government work. Pacheco (1972) describes this as the origin of the middle class in Costa Rica. However, despite these reforms, education was not open to all citizens. There were not enough schools for everybody to attend, and the poor families, who needed the entire family to work, could not afford to send their children to school.

During the first two decades of the 20th century, there was an educational movement in Costa Rica that promoted a more integral education. This movement was concentrated in the Escuela Normal with leaders such as Omar Dengo, Joaquín García Monge, Roberto Brenes Mesén, Anastasio Alfaro and others, all in charge of the preparation of teachers for the school system. These intellectuals were influenced by the historical movements that were taking place in the world at that time: World War I, the Mexican Revolution, and the Russian Revolution (Gutiérrez, 1979; Carazo, 1992; Gamboa, 1976; Ministerio de Educación Pública, no date).

Many reforms had been implemented following the big reform of 1889. This reform is known as the reform of Mauro Fernández, who was the Minister of Education at that time. The decade of the 1940s marks a time of many conflicts and realizations in Costa Rica. However, Costa Ricans refer to the 1940s as the decade when the second republic was created. This meant that a new vision was created and new reforms were required, not only in education but in the social system as a whole.

In summary, Costa Rica's school system has been influenced by many sources. Spain influences in the beginning by the education provided basically by the church. England and France were the main sources of influence in education after independence through those who were educated in those countries. Latin American movements at the beginning of this century generated a need to recover or define a culture that responded to our own social conditions and natural environment. The United States after World War II has influenced education sending educators there or bringing educators to the United States what provides the basis for the generation of new views. From a historical perspective, I see this process of influence and generation of change as part of the world wide movements of industrialization, colonialism and neo-colonialism.

Internally, there have been movements that support the external influences as well as others that have resisted foreign influences and promoted a more indigenous approach to education.

#### Secondary Schools in the National School Cultural Context

The school system in Costa Rica is organized by Cycles (Ministerio de Educación Pública, 1971; Gámez, 1974; Gallard, 1990). General education (nine years) is divided in three Cycles. Cycles one and two correspond to elementary school and Cycle three is the beginning of secondary school. General education is obligatory, nevertheless, not all students continue after sixth grade, especially in rural areas.

Cycle four is called diversified education. There are two tracks in this cycle (academic and technical education). Academic education includes 10th and 11th grades and its basic orientation is to prepare students for tertiary education. Until 1972, students were required to take baccalaureate exams at the end of the 11th grade. With a reform of the National Plan of Education, baccalaureate exams were considered

unnecessary and eliminated because of the problems they generated. Under pressure to improve the quality of education, in 1986 national exams were established at the end of each cycle, and with them the baccalaureate exams were reinstated. Passing these exams became a condition for acceptance in the university. Technical education includes 10th, 11th, and 12th grades and has different orientations (agronomy, craftsmanship, technology). The main purpose of this track is to prepare technicians who can be integrated into the labor force just after 12th grade. However, generally the main aspiration of students who attend cycle four is to continue tertiary education. This is the reason why at the end of 11th grade students in the technical track take the baccalaureate exams and many of them do not finish the program they started.

Elementary and secondary public schools have as their counterparts private schools. Private schools have to be approved by the Ministry of Education and must abide by the same rules as all public schools (Fischel, 1987; Gallard, 1990). Private schools enrich their curricula with other subjects or activities that are not mandated by the Ministry of Education for the school system in Costa Rica. Private schools usually include a second language from the first year a child enters school. In addition, private schools have plus resources than are available in public schools.

There is a parallel system after cycle three. This system is not coordinated by the Ministry of Education. The National Institute for Learning (Instituto Nacional de Aprendizaje, INA) is an institution supported by private industry. Its main interest is to prepare those who drop out of the school system after cycle three to be technicians. The program is organized specifically to meet the technical needs of private industry who employ students after they complete the program. Preparation is very specific and of high quality, but students cannot continue tertiary education.

Tertiary education is coordinated at the national level by CONARE (National

Commission of Rectores). This system includes four public universities (Universidad de Costa Rica, Universidad Nacional, Universidad Estatal a Distancia, and Instituto Tecnológico de Costa Rica). Each university has a particular emphasis in the preparation of professionals for the country (OPES<sup>1</sup>, 1990). According to the constitution, public universities in Costa Rica are economically supported by the state. Degrees awarded by these universities are recognized in all public and private institutions in the country.

There is another system that is similar to community colleges in the United States that aspires to be recognized as tertiary education. It is supported by the government but is not well received by the university system (Vincenzi-Gang, 1992). Community Colleges (Colegios Universitarios) are basically in charge of the preparation of technicians in different fields.

A private university system that has very competitive and intensive programs as well as specific orientations also exists. As regulated by law, the programs in this system have to be approved by the Ministry of Education and the degrees have to be recognized by the public university system. Competition between public universities comes from the fact that public universities try to provide a broader educational background for their students, while private universities do not consider more than the specific purpose that each program attempts to serve. The preparation of professionals in private universities is based on what Grundy (1987) calls a technical approach to education.

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<sup>1</sup> Oficina de Planificación de la Educación Superior (Superior Education Planning Office).

### Current Reforms

The importance given to science literacy as a means to promote scientific and technological development in the country (Fundación Omar Dengo, 1991; Ministerio de Ciencia y Tecnología, 1992; Murillo, 1988; Zeledón, 1988) has led teachers and policy makers during the last 40 years to look for the creation of different visions of what science teaching in general and chemistry teaching in particular could be as well as the need for different approaches in the schooling process. This has been the base for the development of multi-disciplinary projects coordinated by universities and the Ministry of Education for the purpose of working with science teachers in the field. The projects developed thus far by different institutions have been looking for different orientations to develop curriculum. Likewise, some projects have been developed to promote interest in science, mathematics and technological areas as a way to contribute to the creation of a culture that understands and values science as a base for the scientific and technological development of the country. Other projects have been created to look for possibilities to compete in the international community of nations (Ruiz, 1984). It is important to clarify that the projects in these areas have been developed more for personal interests rather than for institutional commitments.

During the last 20 years, changes have been promoted in Costa Rican schools using a concept of curriculum that encourages teachers to adapt the curriculum to the region in which they work (Gámez, 1974; Herrera, Rojas & Pérez, 1990).

### Reassessment of the Problems with Science Education

Efforts to promote changes in science teaching have been part of the educational culture in Costa Rica since the beginning of this century (Carazo, 1992; Gamboa, 1976). Efforts have been promoted by the Ministry of Education through departments

created for this purpose, or by the universities, especially by the colleges of science to assist in-service programs for teachers as well as by colleges of education to prepare new teachers. Efforts in science education have been made for the improvement of the quality of knowledge that teachers have as well as for the pedagogical strategies teachers use in their classrooms. One of the problems teachers face with the implementation of innovations is that the evaluation system is not in accordance with the teaching strategies required for such innovation.

With the creation of the Ministry of Science and Technology, new approaches for science education have been generated. The system of Colegios Científicos (Science High Schools) is coordinated by the Ministry of Science and Technology, Ministry of Education and universities (Ministerio de Ciencia y Tecnología, 1990). In this system, after 9th grade students are selected from among the best secondary school students in the country. If students want to participate, they have to send their applications and letters of recommendation from their teachers as well as the consent of their parents. There is an exam on the content, specifically science and mathematics, that is used as a basis for selection. Grades from the last three years (Cycle three) in science and mathematics courses are used as a criterion for accepting and rejecting students' applications. In this system, students have to cover the official programs of the Ministry of Education all subjects. Universities provide special programs in science, mathematics and computers as a complement to the curriculum. The *colegios científicos* are located in or close to university campuses for students to use the facilities such as laboratories and libraries that universities have. Each university gives a particular orientation to the special programs they organize. According to my conversations with teachers and assessors, there is not much information about the contribution of this experience to science education in the country.

As a counterpart to the *colegios científicos*, there is an experience in the area of science and mathematics that is coordinated by the universities and the Ministry of Education with the economical support of the National Council for Research in Science and Technology (CONICIT). This is an experience in which elementary, secondary and university teachers participate in the reconceptualization of the role of science and mathematics in the education of citizens (Madrigal & Peralta, 1993). Their intention is to develop research on teaching and learning in these areas as a base to justify the need for reforms in science and mathematics education.

Another project that supports and contributes to science education is the project of National Science and Technology Fairs. This project is coordinated by the University of Costa Rica with the collaboration of other education institutions, and the Ministry of Science and Technology supports it financially. The idea is that teachers engage students in research projects throughout the school year as extra-curricular activities in such a way that, by the end of the year, students will have a product that can be shared at the institutional, regional and national levels (Díaz & García, 1992). Science and Technology projects are assessed by scientists and science educators according to an evaluative guide developed for that purpose (Alfaro, 1989).

Labeling teachers as professionals. Alternative approaches in science education are not related only to how to teach science but how to categorize teachers. According to the Regulations of the Teaching Career (República de Costa Rica, 1972) teaching is considered a profession when those who are teaching in any of the school levels use the official programs of the Ministry of Education. The considerations of teachers as professionals in the school system in Costa Rica has taken different forms. According to Fischel (1987), at the end of the last century teachers were supposed to pass exams to

determine whether or not they knew the content they were supposed to teach. That was a sign of professionalism.

In the first quarter of this century Omar Dengo wrote,

The teacher is a professional who needs, besides a rigorous technical preparation, to study ancient and modern authors that let him to elaborate on the necessary general and human vision, without which a teacher is no more than a half teacher. (Ministerio de Educación Pública, no date, p. 34)

Dengo had a vision of a teacher that is similar to what Giroux (1988) describes as the need to develop a historical possibility. The expectation was that teachers needed to develop their own visions.

The recognition assigned to teachers during the 1920s to the 1970s was more a matter of affective recognition of the work teachers did. For many years, the teacher was the one who had something to say about anything that happened in the community. With social changes, other professionals started to take part in the social life of the towns and small villages (physicians, lawyers, engineers, etc.), and the role of teachers, as community leaders, started to fade. This change in status for teachers can be associated with the change in the occupational structure as well as with the mass production of teachers that conduce to the following:

- 1 - External certification.
- 2 - Prospective teachers are supervised by non-teachers.
- 3 - Development of educational models based on backgrounds that are not understood by teachers.
- 4 - Teachers work in bureaucratic settings.
- 5 - The growth of other types of jobs.

It is in the last 20 years that teacher associations have been claiming the right to be called professionals. The Colegio de Licenciados y Profesores en Letras, Filosofía,



*Ciencias y Artes (CLPLFCA)* was created as a way to group together all the secondary school teachers with degrees awarded by universities. This is an institution with the same characteristics as those that certify physicians, lawyers, scientists and other professionals, but, in terms of salary, secondary school teachers are still in the category of technicians.

Teacher associations petitioned for salary increases every year until 1989, when all teacher associations, including the CLPLFCA, joined efforts to petition the government to consider teaching as a profession, not only by law, but in terms of the salary teachers receive. Consequently, teachers at all levels of the school system who have a bachelors or higher degree are considered to be and are paid as professionals. For example, a teacher with a bachelor's degree has the same salary as a chemist with a bachelor's degree who works for the government. Changing the label has had implications for the reward structure according to what associations describe as the professional teaching career (Colegio de Licenciados y Profesores en Letras, Filosofía, Ciencias y Artes, 1992). In order for the Ministry of Education to assess the professional qualifications of teachers, teacher associations and the Ministry of Education have agreed to consider the following: Academic degrees, participation in short courses, professional experience at national and international levels, publications, and awards received for contributions to the school system. These considerations have challenged teachers to reconsider the possibilities of continuing other programs in the university as well as maintaining a record of their academic production. At this stage there are programs in the universities (private and public) attempting to recruit these potential students who are seeking higher degrees in order to better qualify themselves as professionals.

### Responsibilities for Implementing the Curriculum/School Connections

Other changes have occurred that parallel the change in the labeling of teachers. In 1990 a new government administration came and with that a new Minister of Education was appointed, as it is commonly done every four years. The new minister and the team with whom he worked wanted to implement a new curricular vision (Herrera, et al., 1990). In their general vision it was expected that teachers would adapt the curriculum to the region where they work. At the same time new programs were developed for this period; however, there was a change in the format in which programs were presented. In the 1970s up until 1986, teachers used programs that stated in columns the objectives, content, activities and evaluation procedures. After 1986 teachers used what was called the "minimum content list". This was a list of the content to be learned for each discipline. Teachers had to cover the required content because students needed this content as a basis to pass the national exams, the exams given at the end of each cycle that were implemented in 1986.. The programs developed after 1990 were organized in two columns: Objectives are written in terms of the process that students have to follow and suggested learning activities are descriptions of what teachers are supposed to do. These learning activities tend to constrain the possibilities for teachers to generate something new. There is nothing specified regarding the content. Teachers and students had to generate the content from their own experiences. Parallel to the new programs, there was an effort to develop and implement a methodology that responded to the characteristics of the new curricular vision (Pérez, Molina, Hernández, Rojas, & Murillo, 1991).

Besides the new curricular vision, programs and methodology, teachers received new evaluative regulations in this administrative term. According to the general presentation of the regulations that came from the Educational Superior Council,

teachers had the option to adjust the evaluation to the school and the kinds of activities used to engage students in learning. According to policy mediators, teachers have had to follow the implementation rules that they developed in order to objectively evaluate students' learning. Teachers have had to perform many small details in order to fulfill the requirements of the office in charge of evaluation as well as to avoid problems with parents and students. On the other hand, for teachers who work in cycle four, their students have had to take the baccalaureate exams that are based more on the minimum content list that was developed in the previous administration.

Remove teachers from the testing process. Teachers in schools talk about the disparities in criteria regarding curricular concepts. There is no agreement as to what are the general terms around which teachers have had to organize their teaching. However, the expectation that professional teachers should make decisions based on what is the best for the students in their region seems to be gone.

Teachers are accountable for the way they teach, as is implicit in the documents emanating from the Ministry of Education, yet they are not trusted to administer national exams. As many chemistry teachers discussed, part of the dissatisfaction stems from the fact that in 1992 they could not stay in their own school at the time national exams were administered. The reason given by the Ministry of Education through the national testing service office was that in previous years they discovered that "some" teachers were not honest when they had to apply and grade exams. With a change in the policy of the administration of national exams, teachers are sent to other schools the day that the national exams are administered, and exams are graded by a computer. In an attempt to be objective, teachers' accountability has diminished. They are still held accountable, but they are not allowed to "control" testing.

### Current Science Education Reform Efforts

According to my observations in schools as well as from my conversations with teachers, principals and assessors, the reform efforts of the school system are oriented toward a reconceptualization of the curriculum in general. There is not a particular emphasis in any subject matter. Teachers participate together in discussions about pedagogy, but there is not an investment in science specifically on the part of the Ministry of Education. Even the programs that universities coordinate on with the Ministry of Education to help in-service teachers improve what they did in classrooms are in a state of decline or have disappeared.

An effort has been made to prepare new science teachers as well as teachers in other areas. The Ministry of Education and CONARE along with the support of the International Bank for Development (IBID) have developed a project to prepare science teachers (Noguera, 1992). It is expected that this project will prepare teachers to work in the region from which they come. The program has to be coordinated among different institutions, and students are under a contract with the Ministry of Education. Because of the shortage in the number of science teachers, these students are expected to start working after two years of university study. Student-teachers are expected to continue in two tracks--profesorado and Bachelor's degree--until graduation. According to the law that applies to teachers as professionals, those who get a profesorado are not considered professionals. Rather, this seems to be an attempt to prepare technicians in education again.

### The Costa Rican Classroom and the Role of the Teacher: Professionalism or Technicism

*Teacher preparation and the conditions in which teaching takes place in schools* are aspects that school reform movements take into consideration while explaining part

of the problems in schools. School restructuring is a process that seeks to address national, regional or local educational problems. Elmore (1990) describes three different models for school restructuring: 1- Reforming the core technology of the school, 2- reforming the occupational conditions of teaching, and 3- reforming the relationship between schools and their clients. Papagiannis, Easton, and Owens (1992) discuss different orientations that have been adopted in the process of restructuring school systems, and they state that the socio-technology, curriculum, budget and personnel are the objects of change. They discuss the political, economical and social implications of the school restructuring process.

The school restructuring process in Costa Rica, with a long history of changes since the time the school system was established in the 1880s, seems to have incorporated different methods for restructuring. Reforming the occupational conditions of teachers, looking at them in terms of their academic preparation and practical performance as a basis for categorizing them as professionals, was the approach used at the end of the 19th century (Fischel, 1987; Gamboa, 1976; and Gutiérrez, 1979). These reformers' stance is ironic when one considers that authors like Goodlad (1990), Goodlad, Soder, and Sirotnik (1990), Leavitt (1991) argue about the meaning of teacher professionalism as a social construction, something social scientists are still not clear about today.

If we examine the expectations that administrators have about teachers' performance in the class today, we would find that they see a need for teacher control. Teachers are supposed to control attendance, rules regarding uniforms, discipline and curriculum content. These are aspects of teaching that the majority of administrators will look for when they come to observe a class.

Teachers get adjusted to administrators' expectations because they do not have the

resources, nor the support to implement innovations in their classrooms. This makes teaching to become a set of routines. With a curriculum intended to prepare students for exams, a lack of resources to implement innovative strategies in the class, and the concept of knowledge as something that can be transferred from the teachers's book or notebook to students' notebooks to exams, control is something that functions well in the system. Science teachers complain about time, lack of laboratory equipment and materials, the number of students in class, physical conditions of the room, form of the tables as well as the extensive programs that they have to cover. From this perspective I am able to assert that teachers are in schools to cover or deliver something that does not make sense to them nor their students.

It is from here that questions emerge about the professionalism or technicism of teaching. This is because those who are outside of classrooms have been deciding what to do in the classrooms. As Sarason (1982) and Lieberman and Miller (1984) point out, changes to the classroom culture have been promoted from outside. Traditionally, teachers in Costa Rica have not taken a leadership role in deciding what to do, when to do it, how to do it, and why to do it in accordance with the students with whom they interact. This is a challenge that few teachers are taking in the country because they are concerned about their students' success on exams which is an area with which teachers have little control.

#### Intended Curriculum Versus Implemented Curriculum: The Gap

In my discussions with teachers, I have learned that when teachers reflect on what they are supposed to do and what they actually do, they see a discrepancy. During my visit to Costa Rica in October 1992, I attended a general meeting of teachers in one of the secondary schools. The purpose of this teachers' meeting was to discuss the

programs that they were supposed to implement. Interestingly enough, in my previous visit to Costa Rica I had an opportunity to work in a session with the top level assessors who were in charge of the preparation of the agenda and format for the general meeting with teachers. The teachers' meeting took place in many regions at the same time. This was a top down approach using what they call multiplier agents<sup>2</sup>.

When those in the top level participated in the session that I presided over, my intention was to make them aware that teachers in the field have experiences, knowledge and ideas that have to be used if we want to implement a new idea. I gave them pieces of paper on which they were to write what they understood about teaching and learning. I assumed that if they were planning to work with teachers, these were relevant concepts for them to talk about. In order to facilitate social interactions in those sessions, I asked participants to use their concepts in the way they were written and try to figure out the type of school they would envision if those concepts drove the school's curriculum. It was an exercise to create visions of schools that would emerge from the use of different perspectives. The challenge was to describe the role of teachers, students, administrators, parents, community, materials, evaluation, discipline, etc. These assessors were surprised when they realized, that in the group, there were discrepancies in the way they understood these concepts--concepts that for a long time had been taken for granted. After a period of confusion and discussion, one of the participants, who was previously a principal in a secondary school, said, "Ahora entiendo por qué los educadores no hacen lo que nosotros les pedimos que hagan diciendo que no entienden. Esto es porque nosotros tampoco entendemos lo que estamos haciendo."

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<sup>2</sup> The idea, as it is used in the Ministry of Education in Costa Rica, is that a small group at the top of the school system can start a process to prepare others at the lower level. The process will continue until they reach all the members of the school system.

*Now I understand why teachers are not doing what we ask them to do and say they do not understand. It is because we do not understand what we are doing either.*

Secondary school teachers who participated in the general meeting that I attended were received by the principal with a welcome that sounded like, "This will not work." In his introduction he mentioned that he did not expect anything from that meeting. He saw this opportunity as a political game that the Ministry of Education officers were playing because of a discussion that the Ministry personnel were having with teacher associations. But he said that since we are mandated to do this, we should go ahead and do it.

In order to provide opportunities for teachers to talk and become engaged in the discussion, the group was divided in three subgroups. The group that I attended was coordinated by one of the teachers who participated in this study. It was interesting to see the resistance of some teachers, particularly one coming from science, because he did not see any benefit in questioning or suggesting things. He said, "Después de 20 años uno sabe que funciona y que no." *After 20 years in this, you know what works and what doesn't.* He was encouraged to read some documents, but he refused because those papers were "like philosophy". Because philosophy is not an area of interest to him, he assumed the documents would be difficult for him to understand. The documents came from reflections that other teachers had made about the role of education in the preparation of future generations, and the idea was to reflect on those ideas and generate ideas that applied to this particular school. Other teachers were open and enthusiastic about their ideas, and they were willing to challenge themselves as members of the generation of new visions of what the school could do.

It seems that all participants in the school system were dealing with the dichotomy of what was intended and what was actually implemented. There had been a tendency for almost everyone to blame someone else for the problems, but there had not



been questioning of the teaching approaches they had been following, nor to the way current questions had been approached.

The need to reframe the questions. I think that at this stage it is important for policy makers, policy mediators, and teachers to start reframing the questions regarding curriculum development and the role of school participants in the construction of the school culture. Teachers are constantly under the pressure of constraints and control framed by the way they see knowledge in their disciplines. Teachers find justifications for everything that happens in the school in terms of ways of teaching, evaluating, controlling, etc., that make it difficult for them to envision something different.

The new procedure for curriculum development (Herrera, et al., 1990) and the documents that intend to address issues regarding methodology (Pérez, et al., 1991) do not question concepts commonly used in the school culture such as knowledge, control and constraints, and the relationships that can be established among them. They are not questioning the purposes of education in general terms. It seems to me that these are vital aspects that are taken for granted, under the assumption that teachers and students understand what they are talking about.

If there are not new questions, then why bother looking for new answers? At the point that I interacted with teachers and students in schools it was not clear to them why change was needed, nor was the rationale for change clear as it was perceived by policy makers. Teachers see the need for change in terms of what they find as their own constraints (more time, shorter programs, less students, more materials). And, they see a need for change in order to achieve higher student achievement. If school culture is seen as natural, then teachers do not see the need for change (Grundy, 1987). If changes are suggested from outsiders, teachers do not see the need to question their implicit

theories about teaching and learning (Sarason, 1982).

The impact of the current reform at school level. At this point, teachers are in the third year using new programs. They are still struggling with how to integrate the curriculum within the community and how to use alternative ways of evaluating students and the curriculum. Because teachers do not relate their subject matter beyond what they can do in the classrooms due to all the limitations they have there, they do not see the value of a curricular committee, at least not the reason for its creation as part of the school committees.

There is much discussion in schools about the new policies, and teachers go to their classrooms and try to follow the new procedures that are suggested for the application of the new programs (Molina & Pérez, 1991). When they cannot make sense of something, they still have the option to close the door and teach the way they want. The only problem for the teacher, but benefit for the system, is that in the implementation of the new reform, publicity is playing an important role. At this stage students and parents are very knowledgeable about the methodology that teachers are supposed to use in the classroom and the way teachers have to assess students. This has become a source of pressure against professional actions. When things are regulated, teachers cannot make their own decisions. An example can help to clarify this point.

A teacher, who is very responsible in the school and who has a lot of respect from administrators and colleagues, had a problem with a student who did not want to do anything that she suggested in the class as learning activities. When she had to grade him, he did not pass the term. The student's aunt, who is in a position at the Ministry of Education, came and requested all the documents that the teacher used for assigning that grade. According to the evaluative regulations, teachers are supposed to keep a log for each one of the students that they use as a base to assign a grade at the end of the term. This teacher was taking care of those aspects in the way that she understood; nevertheless it was not in accordance with

what the student's aunt had in mind. This teacher had to change the grade of the student to what the good aunt wanted her nephew to have, a 100 in that particular subject matter. The teacher had to give up according to the regulations that parents and protective aunts know very well. But what about this teacher's professional perspective? In this sense teachers are not well protected and usually they are the losers in these kind of problems.

This, then, is the background context in which this study takes place. Teachers work in complex social and cultural realities, interpose with reforms that often operates at cross-purposes. Even the role of the teacher itself is contradictory. How to teach, what is needed to teach, who controls and who executes are all issues and problems that simultaneously penetrate the science classroom. To understand teachers teaching science, one must understand not only the teachers but also the context within which she or he works.

#### The Field Setting of this Study

This study was conducted with a group of chemistry teachers who work in the central area of the country of Costa Rica. This is a region that economically depends on agriculture. The group of teachers work in seven secondary schools separated from one another by no more than 30 minutes driving. In the 1970s, I was part of the original group of chemistry teachers. This study is an exploration of what has become part of the culture of chemistry teachers in that region. The setting for this research is unique since the group is established, and my relationship with them facilitates my participation as a member of the group.

The towns where these teachers work are well connected by a highway to the main cities of the country. In each town there is an elementary school, a secondary school, and a public library. The main municipal offices, the Catholic Church, the market,

supermarkets, stores (drugstore, bookstores, and others) are distributed around a central park that originally was a plaza, according to the tradition of the colonial organization. The town where this study was conducted is different from the surrounding towns because in this town there are public and semi-official elementary and secondary schools.

The group of chemistry teachers of the region functions on the basis of friendship, and the main purpose in meeting is to facilitate collaboration among them. These teachers have developed and implemented strategies in their classrooms based on the knowledge constructed from their teaching experiences and their theoretical understandings of curriculum. The group meets regularly to discuss their experiences in school settings and to make decisions that directly affect the development of curriculum in their classrooms regarding exams, laboratory experiences and content organization. The majority of participants have a long history of teaching in that region, or are from the region, thus making them feel attached to the institutions at which they teach. In general terms, these teachers are highly qualified to work in secondary schools and to participate in school committees that make some school decisions. I was in contact with some of these chemistry teachers who facilitated the process of getting the group collaboration for this study.

Two female teachers participated in the analysis of personal stories regarding their lives as professionals. Both teachers work in the same pueblo (small town), but in different schools: Marta works in a public school, and Elissa works in a semi-official school. They are both certified chemistry teachers. Marta has a bachelor's degree in biology, a bachelor's degree in chemistry teaching as well as the course work in

chemistry teaching at the Licenciatura level<sup>3</sup>. Elissa has a bachelor's degree in education with an emphasis in chemistry teaching. She is also certified to teach general sciences.

As a group of chemistry teachers, they bring to the group a lot of the problems they live in their own institutions. As friends, they know each other enough to participate and help to understand their personal stories about their careers as professional chemistry teachers. These are some of the reasons why this group was chosen as well as the facility to enter into schools where their principals were willing to collaborate.

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<sup>3</sup> Licenciatura is a degree awarded by the university system in Costa Rica after a bachelor's degree. The main orientation of a Licenciatura is on research in the specific area of expertise.

## CHAPTER 2

### THEORETICAL FRAMEWORK

#### Introduction

Doing research is not a neutral matter. Whenever a human being takes a position as a researcher there is an agenda underlying that interest. Researchers frame questions and decide on research methodologies based on their purposes of research in action. Within a particular culture, human actions are guided by people's cultural beliefs.

As a researcher I have to be aware of the beliefs that support my actions. Honesty in conducting research is a matter of recognizing the beliefs on which my research is grounded. This is why I see the need to clarify my beliefs, or at least try to be sensitive to their appearance in the process of my research.

In order to clarify my extant beliefs regarding research, learning, teaching, human interactions, culture and human actions, I need to review my experiences as a researcher, a learner, a teacher, a human being and, in general terms, as a cultural being. My theoretical framework and my research methodology are interrelated and are consistent with my belief that research is a learning process. It is from this perspective that I make sense of my interactions with research participants. That is, my understanding comes from my interpretations of the social interactions that have occurred in this research project. I was able to participate in those social events because my extant knowledge from which I came to construct myself as a learner in the

school culture, and that permitted others to construct me as part of that culture. That is, I regarded myself as part of a culture in which I could share experiences with colleagues who accepted me as one of them.

This chapter is devoted to re-present the evolutionary process through which I have gone from learner to researcher always, learning and giving shape to a personal framework from which I make sense of reality. From my way of understanding a theoretical framework, I see my personal beliefs influencing the research process. Explanations coming from this project will be viable explanations that can be used as a base for discussion. Generalizable explanations are not the goal, since I do not see any possibility for humans to have a general comprehension of the social situations under analysis.

#### On the Construction of a Theoretical Framework

In order to reflect on the role of a researcher as part of his integral being, the definition of a personal theoretical framework has to take into consideration all of one's life experiences. As researchers and learners, we are exposed to ideas coming from different sources during our life history. Accordingly, since I cannot separate myself as a researcher in a particular line of research from my daily life, it has been difficult for me to bound theoretical framework under which my research is framed. All the ideas and experiences with which I have had the opportunity to interact have influenced my way of thinking, and they all have contributed to my understanding of reality. My relationships with family, professional colleagues and friends have resulted in experiences in which ideas of sharing, learning together and questioning each other, as a way of constructing a better understanding of our interactions, have shaped my ways of thinking.

Even though others' ideas such as constructivism, radical constructivism, social constructivism, action theory, critical theory, etc., when they were used as a basis for explaining teaching, learning and research, all sounded interesting as pure theories, they are framed in different contexts than mine. I believe that it is not possible to transplant those as theoretical frameworks to my way of thinking. Rather, I must make sense of them according to my own personal experiences before I can embrace the meanings associated with them.

#### Learning: A Culturally Mediated Process

I do not see myself, nor my theoretical framework, as pulling theories from different sources, but rather, they have been constructed through all my social interactions.

If individuals construct themselves in interaction with others through a culturally mediated process, I think that I am, as a researcher, a product of my cultural interaction. I believe that, in order to understand the theoretical framework that guides my actions as a researcher, I need to disclose the roots of myself as a learner. This means that I have to see my theoretical framework as an integral part of myself and all that I have learned from my social interactions in all the ways that social interactions are culturally understood. An autobiographical approach will give me an opportunity to look at some of the experiences in which I have been involved and the ways in which I have made sense of them. A review of the literature will account for the influence of others, to whom I know by their work, in my understanding of issues related to research and school culture.



### Where I am Coming from: Prior Intellectual Influences

A chemistry teacher. When development is understood as improving the quality of life in a society, chemistry teachers, and perhaps other teachers, carry the responsibility that people assign to science as the potential for development. Since the beginning of my career as a chemistry teacher, I assumed the challenge of providing students with the kinds of activities that generated interest for learning science. Perhaps this was an idealistic way of getting my students engaged in a search for a better understanding of the reality that each one of them was living. At that time, during my first year working as a chemistry teacher, I was teaching in a secondary night school and two other secondary schools with diverse populations.

Chemistry, as subject matter, is taught only to tenth and eleventh graders in the secondary school system in Costa Rica. Since I was certified only to teach chemistry, it was not possible for me to complete my time in one institution. In this case, the Ministry of Education filled out a teacher's schedule by sending him to other institutions. The third institution in which I was employed was at the invitation of the principal. For two years I had worked in the institution as an assistant librarian. My first year teaching was the first year that chemistry was taught in that school. The principal offered me the opportunity of being the first chemistry teacher in the school. Teaching chemistry in three schools was a challenging start to my teaching career.

After getting a degree that certified me to teach chemistry at the secondary school level, I was employed in what could be a lifetime position; this system of hiring was in accordance with the way teachers are hired in the Costa Rican educational system. In Costa Rica, once a teacher gets a position through open competition, the teacher is the owner of that position, and unless there is an ethical problem, he can remain there for 30 years which is the amount of time required for a pension.

I started teaching with those visions and materials that I developed during my internship program. The visions and materials seemed to be solutions to all the problems related to chemistry teaching that we had discussed in the teacher education program. Based on theories developed by Tyler (1949), Taba (1962) and Bloom (1956), curriculum orientations that were integrated with materials developed in the curricular reform movement of the 1960s and 1970s in the United States constituted the course work in my university teacher education program.

As an intern in school where I worked for one year with one group of students, everything appeared straightforward and worked as I intended. I had a good relationship with students, and they performed according to my expectations. They were what now I regard as regular secondary school students who received significant parental support to succeed in school. Attendance is not compulsory in the Costa Rican School System after ninth grade. For this reason, those who chose to remain at school after ninth grade usually had a high level of commitment to learn. Parents encouraged students to perform well in the school, or at least they did not interfere with what they had to do. Secondary school duties were basically what those students had to do. I say those were their duties because I realized later that there were secondary school students in the country I who had to work to remain in the school system. The students that I had in my internship did not think that a chemistry course was a big deal to them. As an intern I received the highest grade that the university gives, and I think I performed as was expected. It was not difficult for me to make adjustments to the university's grades system. Looking back on that experience, I can say that I was part of a technically oriented program where everything had to be defined in advance for students to learn (myself and those to whom I was teaching).

As a chemistry teacher at the beginning of my career, I had a difficult time

interacting with students at the night secondary school. These students were older than me and were trying to take advantage of formal education opportunities after many hours of working in the fields (basically coffee plantations). At the same time, I was working with students in two regular secondary schools. At that point the challenge was to understand the kinds of expectations students had as well as understand my responsibility to make sense of the chemistry I was supposed to teach. I did not have solutions to most problems then, and I am still trying to find solutions to such problematic situations. However, my initial years of teaching provided opportunities learning and innovation.

Classrooms as islands. When I first became a teacher, schools appeared to me to be groups of islands; each room represented an island, and the teacher and students were the inhabitants of each island. The subject matter was the frame that guided the creation of an isolated culture for the society in each section of the school. Since there was an assumption that communication was not necessary, nor possible, among teachers of different subjects, communication among island inhabitants was not a major concern. We (a group of teachers in one of the schools) came to understand later that subject matter divisions reduced our opportunities to learn from one another.

As a faculty member of three institutions, I was not able to deal with school situations in isolation. School programs, evaluation strategies, curricular visions and student problems, together, were too many things for me to deal with at the same time. Even though the school as an institution was so complex for me, in my second year I had an opportunity to participate with a group in the implementation of an experience called "Total language" in the secondary night school. That school was part of a pilot project for the implementation of pedagogical ideas that was developed by a multidisciplinary

group based in part on the ideas of Paulo Freire (Gutiérrez, 1971, 1976). Still, as a group, it was hard at the beginning to realize that we could learn from each other. In the majority of cases, the subject matter for which each one was responsible was a barrier that made it difficult for us to see other issues. I remember the struggle I had trying to figure out what others were doing. I also recall how difficult it was to make others understand and try what, from my perspective, was a good idea. Our goals related to finding ways that helped us engage our students in making sense of the subjects for which each one of us was responsible. The experiences with that group gave me alternative ways to look at school problems and challenged me to try alternative pedagogical actions.

I think that I enjoyed that experience because my idealistic visions of what to do as a professional encouraged me to see school as a social institution and to view the curriculum as more than a book, even though the formal theories to which I had been exposed were very technical. As a professional, I saw myself assuming the responsibility of better understanding the subject of chemistry, my students and colleagues as a way of dealing with the situation as a whole. Many times it was frustrating to see other teachers arriving late to school, leaving early, complaining about students rather than trying to see their points of view, viewing their participation in school as a job and not as the vocation, which was my idealistic vision.

During my first few years of teaching, there was a point when I categorized faculty in the school in two groups: Those with whom to talk and those to avoid. The categorization was based on my perception of their visions. If they had a positive attitude toward teaching and were willing to talk about that, I was happy to join them. Those who complained or spoke in ways that underestimated teaching were not my colleagues. I saw myself struggling to conform to patterns that were not in accord with those of the culture of schooling. At the same time, I was responding to what my teaching

supervisor advised me to do:

Nunca se dejen llevar por la corriente donde ella quiera. Cuando ustedes sientan que su forma de trabajo hace a los demás sentirse cómodos, es porque ustedes están haciendo lo que ellos hacen.

*Do not permit the stream to take you where it will. When you feel that you are performing in a way that seems very comfortable to everybody, perhaps it is because you are doing what they do.*

That advice was very powerful, and it supported my idealistic way of looking at school as well as my roles as a teacher. As one of the reasons Giroux (1983) describes for resistance to change, I was not satisfied with the traditional explanations for schooling. Therefore, I “resisted” conforming to the roles that persons played and to the expectations teachers gave by trying different ways of interacting in school. That resistance was grounded in a different understanding of the roles of teachers and students in school as well as an awareness of the different perspectives from which we were looking at teaching and learning. Because of the specific orientation that was required in my teacher preparation program, I now see that the problems that I had as a chemistry teacher can be attributed to a lack of understanding of the school culture.

Teacher preparation programs for secondary school teachers are usually organized on the assumption that these teachers will be specialists in how to teach a subject matter. My experience contrasted with the schools’ expectations. In Costa Rica, not only are teachers supposed to deal with teaching a subject, but also they must be able to deal with students as integral human beings. This is a situation for which teachers are not well prepared.

Part of the construction of my idea of profession--or rather, vocation--was my ideal of being a teacher. At that time, teacher educators and educators in general did not refer to teaching as a profession; rather, they referred to it as a vocation. As I now understand it, the meaning of vocation is the idea that those who chose to be teachers

should identify with those with whom they worked. To be a teacher was not only to teach but also to assist and counsel. Since that was my experience with former teachers and my family, I felt comfortable with that vision. All of my schooling before college took place in rural schools. Since my teachers were full time teachers who had close relationships with their students, I gained the impression that teachers were supposed to devote all their time to teaching and related activities. My family life helped me see a need to assume personal responsibilities as well as to make commitments to serve others. Belonging to a group not only implies membership in that group, but it also suggests actions that are appropriate for the culture of that group. That was the experience I had with my family.

According to my vision, a professional was a learner, and learning was a permanent process in life. My experience indicated that if all that I wanted was to learn, then I needed first to become aware of the culture of which I was a part. Once I started to understand--not necessarily to accept others' points of view--then, I was able to listen, confront, elaborate on and think about my teaching experiences.

Continuing my education. Pursuing formal studies was a means for me to build a base to facilitate interaction with others who were interested in similar topics. A common complaint in the teaching community was the shortage of time as well as the idea that schools do not need over educated teachers in order to do their jobs. Five years of university studies seemed to be more than enough education to do the job. Yet, according to my idea of a professional, that was not enough education. I could not see an end to my career because every time that I interacted with students and colleagues I learned something, even when I taught or discussed the same topic.

As a chemistry teacher, I had the opportunity to interact with two groups of

teachers. One was a group of chemistry teachers with whom I met once a month to discuss issues related to concepts, approaches and problems in teaching chemistry. The other was an interdisciplinary group comprised of secondary night school teachers who taught general sciences, languages, social studies and mathematics. These groups gave me an opportunity to see myself, not only as a chemistry teacher, but also as an educator in general. Moreover, they helped me to define teaching roles that were commensurable with the goals of the school.

The call of progressive education. Three years after starting my teaching career, the ideas proposed by Paulo Freire, Jean Piaget and John Dewey resounded in my mind. Although I had read works by these authors prior to this, I had not made any sense of them. I started reading the works of these educational writers, and I began discussing and connecting them to my experiences in the school. Concepts such as culture, communication, creativity, curriculum integration and the political implications of education started to underscore certain aspects of my teaching experience. At that point I was searching to understand, not only my viewpoints, but also what others had to say. My ideas of teaching chemistry were interlaced with language, mathematics, social studies, art and daily life. My interest was not only that students understand chemical concepts but also that they relate chemistry to their own lives and other subjects in the school. My experiences as a teacher, together with extensive reading, led to an alternative conceptualization of teaching chemistry. I see this as the social reconstruction of myself as a chemistry teacher and as a science educator.

Becoming a science educator. Continuing in my career, I had other learning opportunities such as being part of a group of chemistry teachers and researchers who

were looking to develop new approaches to teaching chemistry. We were trying to develop learning opportunities based on alternative understandings of the role of teachers, students and subject matter. During that time I was working with psychologists, philosophers, sociologists, mathematicians, physicists, biologists, chemists and science educators. During this experience I had an opportunity to expand my understanding of the natural sciences and social sciences, and how these apparently unconnected areas could be interrelated in the construction of a theoretical framework that guided us to approach our actions in school in different ways (Ruiz, 1983).

A need to clarify the purpose of teaching chemistry at the secondary school level emerged as a consequence of trying to understand the problems that students faced after graduating from the secondary schools that they attended. After long discussions with other chemistry teachers and researchers from different areas, we questioned the idea that teaching chemistry was a way to prepare the future generation of chemists of Costa Rica. We realized that the role of chemistry teaching at the secondary school level was not to give the content that students are supposed to receive in their first university chemistry course. We realized a new vision that included providing opportunities for students to interact in order to become aware of their potential as well as to learn about the importance of being well prepared agents of social development in Costa Rica.

Confronting students as active agents in learning. As part of our discussions, we realized there was also a need to understand the characteristics of students and teachers. Accordingly, the school became for me a social institution and not simply a building where students came to take classes. Thus, understanding the participants in the educative process became relevant. Since my purpose in teaching chemistry had changed, the conception of chemistry as a subject also had to change. I was now looking at



chemistry as a means to generate learning opportunities, not as an end in itself. Along with a change in vision, my methodology or how to operate in the class changed to how to operate as a learner, not only in the class, but also in the school and in all other social activities (Madrigal & Alfaro, 1992). As part of the process of trying to understand teaching and learning from a different perspective, the limitations of using a theoretical framework as a recipe became clear to me. As Duckworth (1987) suggests, teachers make sense of their experiences in their particular ways that are based on their understandings and the connections that they make in their minds.

Curricular implications of all these experiences were discussed in depth and applied in the classrooms. The use of educational materials took different dimensions in the classrooms. As a teacher, I was trying to make sense of students' questions generated from their personal experiences. My students were dealing with chemical products every day, and they were not aware of this before coming to my class. I started using written materials as resources that helped us figure out possible solutions, but they were not used as part of curricular devices that we used as resources to generate questions. Administrative implications of using different approaches had to be faced bravely. These included the concept of a national science curriculum, something we highly criticized. As teachers, we needed to have a clear view because, as professionals, we were responsible for defending our perceptions.

A graduate student. With those experiences and perceptions of myself as a professional, I had an opportunity to participate in a masters degree program at Harvard University from 1986-1987. During that time I saw myself contrasting my experiences with those of the others who were doing research in different contexts. I learned that what I was doing was not a solution for everybody; rather, it was my

solution and the one that made sense for me at that point in time in that specific context. I was given opportunities to discuss what I saw as alternative theoretical approaches to understanding curriculum (Bruner, 1986; Duckworth, 1973, 1975, 1979; Dewey, 1916; Eisner, 1985; Freire, 1970; Giroux, 1981; Giroux & Purpel, 1982; Hawkins, 1974; Papert, 1980; Sarason, 1982; Schubert, 1986), supervision (Achenson & Gall, 1980; Blumberg, 1980; Cogan, 1973; Goldhammer, 1969; Mosher & Purpel, 1972) educational research (Armstrong, 1980; Bogdan & Biklen, 1982; Hopkins, 1985; Paley, 1986; Patton, 1980; Schön, 1983; Watts, 1985; Westbrook, 1985), multicultural education (Banks, 1986; Bennett, 1986; Ovando & Collier, 1985), and moral development (Gilligan, 1982; Kohlberg, 1984; Lyons, 1983; Piaget, 1965; Perry, 1970).

All the courses and research projects in which I participated as well as my experiences in informal discussion groups emphasized the need to recognize that individuals (teachers, students, parents, and human beings in general) within a group are uniquely different from one another. Moreover, they are constantly struggling in their search for being. The condition of being human does not only have biological constituents. Humanness is a construction that evolves constantly and is part of the nature of humankind. Those experiences gave me an opportunity to learn with others and also to realize that there were not ultimate solutions. The conclusion of the speech given by the dean of the School of Education at the graduation ceremony became very meaningful to me. She said the following:

Go out, return to your place, find a job and do your best, but never say that what you do is what you learned in the Graduate School of Education in Harvard University, because wherever you go, and whatever you do will require different approaches than those that were discussed here. Then, that will be your opportunity to be yourself.

Returning to work in the university. Working as a faculty member of a university, again provided opportunities to experience the possibilities that result from people deciding to work together. I use the word deciding because at the beginning it seemed that there was a reluctance to share, perhaps because of a lack of confidence in others. The school culture has divided people according to their areas of expertise, a practice that seems to hinder, rather than promote, the ways people interact with each other.

The Universidad Nacional views its role as catering to the needs of the country. In order to meet this vision of being a necessary university, faculty members are required to look at their actions in ways that create opportunities to interact, learn and re-create knowledge as the growing base of a social institution. The concept of necessary university rests on the assumption that this is the institution in charge of doing research and developing strategies to resolve problems that affect the population. The Universidad Nacional, of which I have been a part for 10 years, requires that faculty members develop activities in an integrated manner including research, teaching and extension. The idea is that a necessary institution has to organize actions in accordance with the needs of society to which it provides services. The rationale is that in order to know society, the university has to interact as a single institution with that society. Thus, everything that is done in the university has to be related to society. Research, teaching and extension are three interrelated areas that integrate the academic model of the Universidad Nacional (Núñez, 1973). I viewed these as opportunities to learn with others and in the process evolve as a science educator.

#### Current Influences

Learning and opportunities to learn are endless. Accordingly, life took me again

to a graduate school. From 1990-1993, I studied science education at Florida State University. Searching to learn about constructivism and its relationship to teaching and learning, especially in science education, once more I found myself struggling with ideas related to curriculum (Grundy, 1987; Tobin, 1991a; Kincheloe & Pinar, 1991; Beyer & Apple, 1988), language and metaphors (Bruner, 1986; Lakoff, 1987; Lakoff & Johnson, 1980; Johnson, 1987; Lemke, 1989; McCrone, 1991), semiotics (Sless, 1986; Solomon, 1988), culture and school culture (Erickson, 1987; Corbett, Firestone, & Rossman, 1987; Ogbu, 1981; Magendzo, 1991), science, knowledge and knowing (Kuhn, 1970; Habermas, 1971; von Glasserfeld, 1987, 1989), actions (Gusfield, 1989; Meacham, 1984; Eckensberg & Meacham, 1984; Mischel, 1984; Wertsch, 1991; Moll, 1990; Munch, 1987; Vygotsky, 1978, 1985; Young, 1992), sociology, sociology of education, sociology of professions, sociology of social change (Parsons, 1982; Carnoy, 1988; Welch, 1985; Shapiro, 1988; Weiler, 1989; Larson, 1977; Bledstein, 1976), among others.

All of these resources and many others come from required course materials, articles or books suggested by professors and colleagues, or materials that I found interesting in my review of literature. The ideas about learning, teaching, knowledge, provided or generated from these sources have been the basis for me to understand alternative ways of doing educational research as suggested by Eisner (1991), Gallagher & Tobin (1991), Patton (1990), Bogdan & Biklen (1982), Wax (1971) as well as alternative ways of looking at school organization and governance in order to understand concepts related to the profession of teaching (Cerdeira, Núñez, & Silva, 1991; Larson, 1977; Goodlad, 1990; Elmore, 1990; Schön, 1983).

### The Role of Literature Review

A review of literature in a particular field is a way of becoming acquainted with the sources that one commonly uses as well as a means of keeping track of the way a particular academic field evolves through critical engagement with the literature. What I used at this point as my resources is what I read that is related to my research topic and what, in one way or another, influenced the way I conducted my research.

After understanding the elements that are used to frame research as a cultural action and from my experiences as a learner, a teacher and a participant in different groups, I came to construct myself as a researcher

### Culture and Education

Since research is a cultural action and actions occur within culture, then, culture is a concept that needs to be addressed first. Using Parson's perspective, Geertz (1973) describes culture as follows:

[Culture is] a system of symbols by which man [sic] confers significance upon his own experiences. Symbol systems, man-created, shared, conventional, ordered, and indeed learned, provide human beings with a meaningful framework for orienting themselves to one another, to the world around them, and to themselves. (p. 250)

Lotman (1979) states that "culture never represents a universal unit, but a subunit with a determined organization" (p. 68). The implicit vision is that the *culture* that is created by a group provides a basis for the kinds of relationships that can be established in that particular group. Individuals can participate in different groups if they are able to manage themselves within those different cultures.

Malinowski (1960) explains the relationship between culture and how a group functions as follows:

Culture is essentially an instrumental apparatus by which man [sic] is

put in a position the better to cope with the concrete specific problems that face him in his environment in the course of the satisfaction of his needs (p. 150).

Referring to Malinowski, Chilcott (1987) states that "culture is made up of customs and institutions, each of which provides a specific function in satisfying human needs" (p. 203).

Malinowski (1960) lists some axioms that characterize his theoretical approach for understanding individuals' interactions in a group.

- a - Culture is a system of objects, activities, and attitudes in which every part exists as a means to an end,
- b - Culture is an integral in which the various elements are interdependent,
- c - Activities, attitudes and objects are organized around important and vital tasks into institutions such as the family, the clan, the local community, the tribe, and the organized teams of economic cooperation, political, legal, and educational activity,
- d- From the dynamic point of view, that is, as regards the type of activity, culture can be analyzed into a number of aspects such as education, social control, economics, systems of knowledge, beliefs and morality, and also modes of creative and artistic expression. (p. 150)

In order to make sense of cultural experiences, individuals construct contexts out of their personal experiences that occur within a social group. Therefore, in order to understand personal participation in a particular culture, it is important to understand the context from which participants make sense of their interactions. As Scharfstein (1989) states that "Context is that which environs the object of our interest and helps by its relevance to explain it." (p. 1) The ways in which participants use and interpret the cultural elements that facilitate personal interaction in a setting constitutes the context for each one of the participants. The fact that context is a personal construction in interaction with others provides the basis for constant cultural negotiations. Bruner

(1986) states this as follows:

The most general implication is that a culture is constantly in process of being recreated as it is interpreted and renegotiated by its members. In this view, a culture is as much a *forum* for negotiating and renegotiating meaning and for explicating action as it is a set of rules or specifications for action. (p. 123)

Context is a key element in understanding the way participants give meaning to the symbols they use in their interactions (Bogdan & Biklen, 1982; Woods, 1988; Scharfstein, 1989; Atkinson, 1990; Patton, 1990).

In a society individuals constitute groups that are interrelated. This means that social groups are not isolated entities, but rather, groups of individuals related by the commonalities that their cultures provide. Social groups are influenced by other social groups, and culture is always evolving in a dialectical process (Van Den Bergue, 1974). From this perspective, it is not possible to understand the culture of a group unless the cultures of associated groups are understood as interdependence on one another. If we try to understand schools as social institutions as well as understand the actions of participants, it is necessary to explore the culture that has been generated there.

Different conceptions of schools can be found according to the ways participants describe culture. Some of these conceptions are culture as knowledge bits, culture as conceptual structure and culture as political struggle (Erickson, 1987). Students, teachers, administrators, policy makers and parents traditionally have been involved in the school culture. Their roles have been defined in terms of the potential each one has to participate in that society or the expectations that society ( i.e., other institutions, social class, etc.) has created for each school to give them.

Exploring school culture has required researchers to uncover social rules, myths, taboos, language and relationships that usually are taken for granted in schools or are assumed to be part of the nature of the institutions (Sarason, 1982; Lieberman &

Miller, 1984; Corbett, et al., 1987; Noblit & Pink, 1987).

### Social Actions and the Construction of Self

According to Wertsch (1991), social interactions are culturally mediated in the sense that for an individual to interact in a particular group, s/he needs to know the cultural elements that the group has negotiated as acceptable ways for interacting in that society. As described by Parsons (1982), society is a collection of individuals who conceptualize and institutionalize values and norms in order to define roles for individuals as a basis for membership. The cultural elements, to which I refer, are those components of the culture that are chosen to be negotiated among group participants to facilitate interactions among them. These elements include ways of thinking, values, and social and political organizations. Thus, the cultural elements also include language in all the different ways that we encounter it: Oral (formal and informal), written (stories, poetry, novels, journals, newspapers, letters, etc.), all forms of art, symbols, taboos, myths, customs, feelings that are generated or situational expectations that individuals face. According to Lotman (1979), culture is the general framework that provides the necessary structure to establish social relationships.

Even though social interactions are culturally mediated, individuals have particular experiences that help them to make sense of and or interpret their ways of interacting with others. Social interactions are based on the idea that individuals are able to communicate. However, as Sless (1986) discusses, the only thing related to communication that we can be sure of is that we believe that others understand what we are trying to communicate. It is through this process of interaction (communication) that culture continually evolves and the self constructs and reconstructs itself.

The way I construct myself as a researcher, as a learner, or perhaps still better,



as a human being is influenced by my interactions with others. It is through interaction with others that I come to realize the uniqueness of myself. By recognizing the self and knowing the similarities and differences between others, one sees the need to be a social individual in order to grow as an individual. From this perspective I agree with Bateson (1987), Bruner (1990), Carvalho (1985), Gilligan (1982), May (1980), Belenky, Clinchy, Goldberger, and Tarule (1986), in that the construction of self is socially and contextually dependent. However, as Carvalho (1985) states, "The being is essentially a search." (p. 5) Therefore, I assert that the self is a product of social interactions and personal sense-making in a way in which neither one direction influences more than the other. Rather, together both maintain a balance. The way a person constructs himself/herself, as a participant in a group, helps him/her to make sense of the social interactions in which he/she engages.

In order to understand the role of individuals in a particular group, we have to examine them within the context in which they are struggling in their search for being. Human beings by nature are different, but at the same time, they "have developed their own inner driver" (McCrone, 1991, p. 132) that makes them associate with others. In the permanent search for being as related to others, individuals construct themselves in ways that help them operate better in the system in which they are living. In this process of constructing and reconstructing the self, I see individuals evolving through stages, perhaps what Erikson (1968) calls cycles, in which they come to stabilize their interactions within the system. At some point they are able to feel comfortable with the approaches they are following, and then some routines are established as part of the culture.

Social interactions are based on the various possibilities that individuals create for themselves in order to interact. In order to be able to interact in the culture, I need

to know myself (personal construction of my being). Knowing myself implies knowing my potentialities and my limitations in such a way that I am able to make decisions that give me, as a human being, the possibility to keep growing. That is, it allows me to continue the process of developing myself.

Actions, the ways individuals socially interact, are constantly assessed by the individuals. It is in this process that individuals come to discover alternative ways of acting. Once these alternative methods of acting are discovered, historical possibilities (Freire, 1988) are framed and applied in the process. Historical possibilities are ways that individuals develop to succeed in their permanent search for something better in their social interactions. The search for historical possibilities is a search for alternative ways of interaction that provide opportunities for cultural evolution,

As discussed above, human actions are guided by what Eckensberger and Meacham (1984) call the essentials of action:

- 1 - Actions are goal oriented;
- 2 - There are alternative ways for doing an action;
- 3 - Consciousness is involved in acting; and
- 4 - The actor is able to foresee the consequences of action and accept the responsibility of his/her action.

### Professionalism as a Socially Constructed Concept

In order to understand and learn from teachers' experiences as professionals, we have to look at their actions as well as their routines as ways to see how they socially construct themselves in the culture in which they interact.

According to Larson (1977), professions as traditionally conceptualized, by social scientists, take into consideration specific attributes of which there is substantial

agreement in society related to the responsibilities that are supposed to apply to those who work in a particular area. From this point of view, there are three basic dimensions used to characterize a profession:

- 1- The cognitive dimension, related to the body of knowledge and techniques that participants in a profession need to master;
- 2- The normative dimension, related to the service orientation of professionals and their distinctive ethics;
- 3- The evaluative dimension that compares professions to other occupations.

Cogan (1953) argues that the traditional conception of professionalism has its antecedents in the 11th century when those who wanted to be considered professionals had to be involved in an association, which in turn implied certain kinds of social acceptance of an individual's credentials. The idea of an association related to a profession is still used as a basis for recognition in society as well as a claim to rights for the groups to which professionals belong (unions, associations, societies).

Bledstein (1976) characterizes a profession as follows:

[A profession is] a full-time occupation in which a person earned the principal source of an income. During a fairly difficult and time consuming process, a person mastered an esoteric but useful body of systematic knowledge, completed theoretical training before entering a practice or apprenticeship, and received a degree or license from a recognized institution. A professional person in the role of a practitioner insisted upon technical competence, superior skill, and high quality of performance. Moreover, a professional embraced an ethic of service which taught that dedication to a client's interest took precedence over personal profit, when the two happened to come into conflict. (pp. 86-87)

Larson (1977) describes this interest of the occupations, such as teaching, that are looking for professionalization. Based on the point of view of different authors and what has been the historical development of professional organizations, Larson describes this as follows:

The main instrument of professional advancement, much more than the profession of altruism, is the capacity to claim esoteric and identifiable skills--that is, to create and control a cognitive and technical basis. The claim of expertise aims at gaining social recognition and collective prestige which, in turn, are implicitly used by the individual to assert his authority and demand respect in the context of every day transactions within specific role-sets. (p. 180)

These ideas fit with the traditional conception of professionalism, as they relate to social organizations that control knowledge, establish the normative and ethical dimensions and define the parameters to evaluate the profession. Some of these principles of professionalism have been used to support the bureaucratic systems that modern societies have created, including schools (Larson 1977, p. 182).

In contrast to the traditional conception of professionalism, there are different aspects that are considered relevant features which characterize a profession, particularly as they apply to teachers. Schön (1983), for example, says, "The reflective practitioner [he means the professional] tries to discover the limits of his expertise through reflective conversation with the client" (p. 296). In his book, *The Reflective Practitioner*, Schön states that the traditional idea of a professional as social controller of knowledge is not desirable: "Whereas he is ordinarily expected to play the role of expert, he is now expected from time to time to reveal his uncertainties" (p. 299). Others (Lyons, 1990; Stenhouse, 1985; Larson, 1977) regard teachers as professionals because they have to develop their own strategies and learn constantly with others. Based on the idea "that all teaching ought to be seen as experimental" (p. 97), Stenhouse (1985) sees teaching as "a professional skill in performance" (p. 101). Lyons (1990) views teachers as professionals because what they do is influenced by "the way [they] see themselves and the epistemological dimension of their practice" (p. 161). Her point is that teachers are not devoid of theory on which to ground their actions. This means that teachers are making decisions based on their personal

theoretical frameworks. Larson (1977) argues against the traditional conception of professionalism and the ideology behind it. Taking examples of what has been happening in learning and work places where different approaches in the production and sharing of knowledge have been developed, Larson suggests that professional teachers must take the risk, even when it is known that "breaking with ideology, finding new norms for the social production of knowledge and the social uses of competence demands passion, vision, and hard work" (p. 243).

The school reform movement has made professionalism the base to claim rights for teachers and simultaneously assign new responsibilities to them. This means that teachers will have to reconceptualize their roles in the school if they are to be held accountable under the basis of professionalism. This requires that teachers have a better understanding of themselves, their potentials and their limitations in order to make decisions that provide them opportunities to succeed in the cultural environment of the school. If teachers are accountable for their professionalism, then they have to be aware of the roles they are playing and the possibilities for success. From my understanding of the action theory point of view (Wertsch, 1991; Mischel, 1984), teachers have to be able to assess their approaches based on a clear understanding of the purposes they have. As human beings, teachers have to construct themselves as seekers of the professional they envision. This has to be both a personal construction as well as a negotiated one in the social context in which teachers act. Autonomy is generated on the base of a clear understanding of the culture. Cerda, et al., (1991) describe the situations that teachers face in schools as products of the institutional context in which they have to develop their actions. The status and quality of their jobs depend on the degree of autonomy that they associate with their actions. According to Cerda, et al., (1991) teachers can be considered professionals, technicians or workers, depending on

the degree of autonomy or dependency associated with their roles in schools.

As I have described thus far, there are different conceptions of professionalism, but the idea of profession is neither static nor permanent. Professionals are continuously looking to be professionals. McGaghie (1991) states that "with few exceptions, professions are not forever. . . most professions evolve" (p. 3).

As it is inferred from the previous discussion, I will argue that professionalism as an entity is a social construction. As von Glasersfeld (1987) states, each construction has a personal interpretation, even when it is socially constructed. Teachers, as other social groups, organize themselves in ways that facilitate members of the group fulfilling their needs.

#### Fairness in Conducting Educational Research

The study of school culture relates to the way school participants interact in a social institution. The traditional methods of conducting research in schools are based on the application of methodologies adopted from the natural sciences that are grounded in positivism. From that perspective, educational researchers are required to define their research problems, taking small parts of the school reality, in order to be able to control as much as possible what happens there in their search for an explanation or model that reflects what they regard as a truth. There is an expectation that in the research process it is possible to control, report and generate explanations in an objective way. Objectivity in this approach is associated with the possibility of understanding reality as it is. This is based on observations that supposedly are not influenced by personal theories but are influenced by theories nonetheless. The notion of objectivity here is associated with the idea that "there is a singular material reality, and therefore, propositions are ultimately true or false" (Patton, 1990, p. 483). The

assumption is that "correctness is independent of the state of peoples' minds" (Lakoff, 1987, p. 164)

From this perspective, the role of researchers is to find what is true. The problem with objectivity, as it is understood in this way, is that in the social interactions inherent to research, researchers learn, then explanations evolve. This idea of objectivity as a guiding force for conducting educational research has been questioned since alternative perspectives to understanding reality have been developed (Peshkin, 1982; Lakoff, 1987; Johnson, 1987; Patton, 1990; Phillips, 1990; Eisner, 1991; Tobin, 1991b).

Regarding research in social sciences, Ebel (1964) states the following:

Controlled experiments on human behavior are difficult not only because of the great variety of factors that must be controlled, but also because human beings are involved. (p. 18)

When Barrit reflects on the traditional methods of conducting educational research (Barrit, Beekman, Bleeker, & Mulderij, 1985), his major concern is that researchers devote too much time talking about methods to convince the audience that their accounts are objective; therefore, they forget the focus of their research.

If we consider alternative views to studying human experiences as a whole, then the traditional notion of objectivity is not useful. The same is true of the methodological approaches coming from natural sciences. Other methods of conducting research are mentioned as approaches that better fit with the notion of research as a learning process. Phenomenology, qualitative, ethnography, interpretive, case studies are names associated with the notion that researchers interact with participants on the basis of previous experiences in order for them to learn. Eisner (1991) states the following:

Perception of the world is influenced by skill, point of view, focus, language, and framework. The eye is not only a part of the brain, it is a part of tradition. (p. 46)

Eisner's idea makes it evident that research as a process is not void of personal influences. Concepts such as subjectivity and intersubjectivity (Masschelein, 1991) recognize and value the potential for participants to influence explanations generated from learning experiences. A researcher becomes part of a group, understands the culture and, with participants, transforms the culture by the interactions. Regarding subjectivity, Patton (1990) quotes Denzin to emphasize the following:

All researchers take sides, or are partisans for one point of view or another. Value-free interpretive research is impossible. This is the case because every researcher brings preconceptions and interpretations to the problem being studied. (p. 476)

It seems that the dichotomy of objectivity and subjectivity has taken the world of researchers apart. The possibility of being objective in the traditional way, this is, to know reality as it is, seems to be impossible. The potential for participants to influence explanations supports the notions of subjectivity and intersubjectivity. Tobin (1991b) describes the notion of critical subjectivity as a way to clarify the standpoint from which an explanation can be understood as a viable explanation for a situation:

The purpose of conducting research can no longer be to ascertain truths about our universe, but to construct viable models for our experiences-- that is, to construct models that have coherence with extant knowledge of the members of a research team. (p. 204)

A notion, suggested by Guba and discussed by Patton (1990), seems to be a useful way to bring parts of the educational researchers' worlds together. This is the notion of fairness. Given the fact that pure objectivity is not possible and subjectivity is culturally mediated, we need to have a "balanced, fair and conscientious in taking account of multiple perspectives, multiple interests, and multiple realities" (Patton, 1990, p. 481). From this, we will have the potential to report and accurately contribute what we learn in our research projects. Construction of data from this



perspective will be based on fair descriptions that recover the points that seem more relevant for the participants, and, to the extent that these data contribute to the clarification of relationships, more relevant for the purpose of the study.

From the perspective of Phillips (1990), the problem with the dichotomy of objectivity-subjectivity is based on the understanding of objectivity. For some, objectivity is to look for something that is true. This seems to be the point that makes educational researchers uncomfortable with the notion of objectivity. An alternative view of objectivity is to see it as an approach that views research as an open inquiry. Phillips (1990) explains this as follows:

A view that is objective is one that has been opened up to scrutiny, to vigorous examination, to challenge. It is a view that has been teased out, analyzed, criticized, debated--in general, it is a view that has been forced to face the demands of reason and of evidence. (p. 30)

An important point to take into consideration is that in either case authenticity has to be a part of all research projects. Authenticity is supported by the standards that are defined for each kind of approach. Guba and Lincoln (1989) discuss the criteria that are used from two different perspectives: Positivistic and constructivistic approaches of doing research.

To assure authenticity, a positivistic approach to research will take into consideration the following concepts:

1. Internal validity, how close we are of the truth regarding the problem under study;
2. External validity, how useful a particular explanation is to an extended group;
3. Reliability, how much support of replication based on consistency, predictability, dependency, stability, and accuracy;
4. Objectivity, implies neutrality or intersubjective agreement.

A constructivist approach (associated to phenomenological, qualitative, interpretive research), which implies a different concept of reality, will take into consideration concepts such as the following:

1. Credibility, supported by prolonged engagement, persistent observation, peer debriefing, negative case analysis, progressive subjectivity, member checks;
2. Transferability, grounded on thick description;
3. Dependability, decisions and interpretations based on the salient factors of the context;
4. Confirmability, the integrity of the findings rooted in the data.

#### The Analytic Framework of this Study

At this point in time, I see human life as being conducted as a sequence of routines and actions. Routines and actions interweave in the process of interaction with others or with the self in the context in which interactions take place. Routines are those patterns of interaction taken for granted that, with time, have lost the characteristics of actions. Routines are patterns for which people have lost the notion of purpose; therefore, routines are unconscious ways of doing things for which there are no attempts to assess the approaches followed, nor are there attempts to assume the responsibility. The tendency to routinize patterns in social interaction seems to limit what Giroux (1988) calls the search for historical possibilities of being.

On the other hand, if an action corresponds to a pattern of interaction that has a purpose of which the actor is aware, it means that the actor is conscious of his/her actions. This provides the possibility for self-assessment as a base to readdress the approach followed in doing (a possibility for improvement), and as such an opportunity for growing as a human being.

Routines and actions have to be understood within the culture in which they take place. If schools are social institutions with particular cultures, those who participate there may operate under routines and actions to keep the system stable in some way, yet evolving in other ways. Since routines and actions can change over time, culture has to be understood as an evolutionary process. What at some point is an action can become a routine, and routines can recover the status of actions, but all of these depend on human motives for action. As described by Young (1992), motives for actions can take the forms of what Habermas calls interests: Technical, practical, and emancipatory (Grundy, 1987). These interests are not exclusively one or the other as part of the whole, but parts that can be well integrated. In terms of categorizing routines and actions, we can understand the particular motives with which we are dealing in particular situations.

From this perspective, the operation of the culture of those chemistry teachers who participated in this study and the personal contributions of individual teachers to the construction of such a culture will be analyzed. It is through the use of stories that teachers are able to uncover patterns of relationships among the members of the group of participants as well as relationships with others. Others are teacher educators, assessors, students, supervisors, principals, friends or relatives. Accordingly, this study is not only a study of a group of chemistry teachers but also of different interrelated groups. The teachers' stories provide the basis to explore the development and the conception of professionalism as part of the construction of self, looking at how interactions take place as routines or actions. Self, as a construction, has to be understood from the context in which it is supposed to act, that is, in relation to others, as human or not human.

Teacher actions can be understood as mediated by the concept of knowledge that

pervades schooling. Actions are revealed as ways of controlling the schooling process within the school's constraints or within the constraints that teachers construct. School change implies not only removing constraints or changing patterns of control, but it also implies promoting a different understanding of the whole situation by changing the notion of knowledge that is used.

In this study I do not intend to criticize the concept of professionalism that each teacher has. Rather, I intend to make sense of the way s/he came to construct her/himself and the context in which this social construction has taken place and how this concept is the main source or referent in defining teaching professional actions. Unpacking how one constructs oneself is to examine not only one's personal interpretations but also to examine the social construction process that includes the self and others. Context institutionalized values and organizational structures are in constant interplay with the teacher, and how s/he comes to define the self should be understood as a joint, socially constructed practice or set up of ongoing practices.

## CHAPTER 3

### RESEARCH METHODOLOGY

#### Introduction

This chapter describes the rationale I followed in my research as well as the connections between my beliefs about learning, knowledge, culture and the way I see research as a learning process. This is an attempt to contrast my position with the common belief, that in order to do research from a social science perspective, researchers need to have a particular way of approaching their prior and current experiences. I will argue that the difference is that researchers think about their learning, while others just learn.

Based on my construction of the concept of research, this chapter describes the research approach that I followed and the way I became comfortable with it. A brief description of the group with whom I interacted, the way I negotiated entry into the group and the schools, and how I interacted with participants in different settings is provided.

The process of constructing data and developing interpretations is fully described as the means that helped me write my personal story as a researcher.

#### Rationale for the Research Project

This study started with an endeavor to understand why a group of chemistry teachers decided to work together over a long time period. This group of chemistry

teachers came from different secondary schools located in a central region of the country. According to the participants, it had been a tradition for chemistry teachers to work together in this region. It was in the mid-1970s when a regional supervisor suggested that teachers form groups by their subject matter to discuss issues related to teaching and learning. By the time this idea was implemented, I was a chemistry teacher in that region. There was a meeting for all teachers in the region to discuss the possibility of getting together for support and for developing a better understanding of the problems that we faced in the region. According to the teachers and one supervisor, the only group that continued to work together since that time was the chemistry group. In the beginning, this group was interested in visiting each others' schools to observe the conditions in which each worked. However, over time, the composition of the group has changed, and so have the goals and visions (interest in meetings, visiting each others' classrooms and exchanging experiences). Today, the new group wants to share information about teaching, evaluation and the subject of chemistry, and they wish to discuss the need to support each other. They talk about coordination and collaboration as important outcomes of participation in this group. They see many changes in educational policies, but they do not feel supported in the implementation of the changes proposed by the new policies set by schools. This lack of coordination has been addressed by Gallard (1990, 1991) and Gallard and Gallagher (in press) in their research on the implementation of a national science curriculum in Costa Rica.

This study was an attempt to explore teachers' beliefs, benefits, conflicts and fears about working together, as described by the group of chemistry teachers. How did they come to view this group as an opportunity for them to learn and to improve what they did as professionals? *A group's story has been constructed and interpreted to be used as a means to illustrate the elements that members use to justify the creation of*

such a group. Some of the relationships, that teachers have or have created among themselves and with their colleagues who support to group, became evident in the process of my research. In the process of telling the story of the group, teachers came to realize the importance of the relationships that they established at certain points in time as well as the importance of being a group in order to respond to certain kinds of societal questioning of their professional actions. What a former group participant remembered about the group is stated as follows:

En una ocasión, un diputado escribió una carta en uno de los periódicos nacionales refiriéndose a la calidad de la educación y a la falta de disposición de los docentes para buscar soluciones a los problemas educativos. En aquella carta el diputado difamaba a los educadores. Como grupo nosotros respondimos a la carta indicando lo que nosotros estábamos haciendo y el beneficio que nosotros encontramos de la colaboración a nivel de la región. Pocos días después el diputado dió respuesta a nuestra carta y un día vino a visitarnos durante una de nuestras reuniones. Nosotros aprendimos que como grupo, la gente nos escucha, y demostramos que lo que se dice de los educadores no se puede generalizar.

*On one occasion, a national congressman wrote a letter in one of the national newspapers referring to the quality of education and the lack of disposition on the part of teachers to look for solutions to educational problems. In that letter the national congressman defamed teachers. As a group, we responded to the letter, pointing out what we were doing and the benefits that we found in collaboration at the regional level. A few days later, the deputy responded to our letter, and one day he came to visit us during one of our meetings. We learned that, as a group, people listened to us, and we demonstrated that what people say about teachers cannot be generalized.*

The group's main focus at that stage was to learn about the processes that teachers go through in the development and maintenance of collaborative efforts. I gathered information on administrative issues that teachers have to deal with, as well as how they make sense of them and construct alternative ways to overcome limitations.

More specifically, this study concentrated on the stories of two teachers. These two teachers had been involved in an in-depth analysis of their personal stories

regarding the way they saw themselves as they constructed their professional identities. The benefit of using life histories (stories) to analyze personal experiences was that the participants were able to talk about their lives and move back and forth in time to add personally meaningful information that enriched the learning potential of the study. They could move in time without the concern of losing information because the story was reconstructed in the way the events became relevant for the person telling the story (Elbaz, 1991). These were not linear biographical descriptions but what Van Manen (1990) calls contextually rich stories. This means that it was not only necessary to have a description of what was going on but also to have what Geertz (1973) calls thick descriptions. These thick descriptions took into account the meanings that participants attached to the events in the context in which such events occurred.

Although the focus of the study was on two teachers, other group participants were encouraged to think about their personal stories and use them as a basis for learning. In the process of constructing personal stories, I expected to gather information about how teachers see themselves as professionals in relation to students, administrators, colleagues, teacher educators and their relatives. What kinds of roles do teachers adopt in schools besides teaching? And, how do teachers make sense of their roles? How do teachers make sense of autonomy and collegiality, central concepts of professionalism? My intention was to explore the history of how they developed ideas about their job.

In telling their life histories, teachers were encouraged to include formal and informal educational experiences as well as personal and family experiences that influenced their decisions to elect teaching as their career. Teachers were encouraged to explore their interpersonal relationships within the school culture in order to understand the following: How teachers see these relationships; how their perceptions



relate to those of administrators, colleagues and students; how teachers conduct professional practices; how teachers are perceived by others; the beliefs, images and metaphors that orient teachers' actions in the field; and how these beliefs, images and metaphors accord with teachers' concepts of being professionals.

I also explored what others within the school culture believed about teachers and how their beliefs, images and metaphors influenced the actions that they took in relation to teachers. Participants included administrators at the regional and national levels and science teacher educators who were perceived by teachers as influencing their ideas of professionalism. Data constructed from all these sources (Zaharlick & Green, 1991) were compared with teachers' views, and similarities and differences were observed.

#### Research as a Learning Process

Learning is a process through which, in interaction with others, individuals make sense of the experiences they live (Bauersfeld, 1992; Bruner, 1986; Tobin, 1993; von Glasersfeld, 1989; Young, 1992). It is by being part of a group that individuals come to develop ways of learning through the interactions and the means that can be used for these interactions. According to Wertsch (1991), the social interactions from which one learns are culturally mediated. This means that in order for individuals to interact with one another, they have to be acquainted with the meanings given to language, symbols, rituals, rules, and in general, with the cultural institutions that have been developed to facilitate social interactions.

By making sense of participatory experiences, individuals become knowers; that is, they construct knowledge. New knowledge is constantly integrated as part of the whole culture by individuals. In this sense, learning is a social process, and knowledge consists of personal constructions or interpretations, and culture is the framework

within which individuals interact.

Given the diverse possibilities for individuals to know--that is, to make sense of their interactions and to generate interpretations of their experiences--knowledge and culture are constantly re-created as individuals interact. Knowledge then consists of more than an individuals' experiences and includes the personal interpretations that emanate from the social interactions framed by the cultural context.

In my opinion, human beings learn through all types of interactions. As a human action, research cannot be something different than what human beings do. Accordingly, I have no reservation in saying that the purpose of research is to understand the common ways we learn in our daily lives. That is, in daily life, research is the way in which we, as human beings, analyze our actions in order to learn from our experiences. As I discussed in the previous paragraph, learning occurs as part of the social interactions in which individuals participate. When we take the time to analyze the experiences in which we participate, our role then becomes that of learners learning about our own experiences. If we are able to reflect on our experiences, all situations from which we learn can be the basis for research. It seems to me that what I do in this research project is re-present and discuss my interactions with the participants as well as learn from my own experiences.

### Research Paradigms

Research methods, techniques, strategies and procedures that have helped me deal with questions that I proposed in my research project came from many sources. Researchers seem to place qualitative and quantitative approaches, as extreme methods of knowing, under different paradigms. My interest has not been to deal with a discussion of research paradigms, but rather to learn as a researcher by interacting

with others. The most important aspect of doing research is to learn from the experiences in which we have been engaged (Wax, 1971; Barrit, et al., 1985; Patton, 1990; Gallagher, 1991; Eisner, 1991).

This study is an account of my ways of interacting with others and how I came to learn much of what goes on when teachers get together, talk and think about their own experiences. In order to do this, I had to be willing to learn from whatever artifacts or interactions were provided during the progress of my research.

The general tendency to categorize research seems to me to be based on different ways of describing situations rather than analyzing the concepts of learning that are implicit in them. In most of these categories, I see an intention to get an objective approximation of the reality that others are living. According to my understanding of experience and learning, the reality of others is a subjective experience. Accordingly, if the main purpose of research is to learn, then I have problems with the notion of objectivity as part of the research process, since, as a learner, I can deal only with my own subjective way of looking at reality, reality that I have constructed.

If learning for an individual is the process of making sense of personal experiences within a cultural context, I, as a researcher, had to use approaches that gave me opportunities to look inside the situations from which I wanted to learn. Since I view research as a learning process, and learning occurs as part of a social process, then I had to organize my study in a way that provided me with possibilities to be involved with participants of the study in social events. My being a part of the social situation gave me insight into the ways participants made sense of their experiences. Nevertheless, the account that I report is my interpretation of these situations. It is not their interpretations, but rather a description of what I understood.

In doing my research I was looking for ways that provided me with as much

information as possible that related to the issues in which I was interested. Interpretive research as a broader category seemed to better fit my interest, but my primary purpose was learning from the interpretation of experiences, rather than the descriptions of the experiences themselves. As described by Erickson (1986), Gallagher (1991), and Tobin (1991b), interpretive research is an approach in which information sources are diverse. It is from these sources of information that data were created as personal interpretations. Interpretations provided a basis for possible explanations for what emerged from the process of interacting with others. Erickson (1986) states the following:

Humans, the interpretive perspective asserts, create meaningful interpretations of the physical and behavioral objects that surround them in the environment. We take action toward the objects that surround us in the light of our interpretations of meaningfulness. Those interpretations, once made, we take as real--actual qualities of the objects we perceive. ( p. 126)

My interest in learning about the personal construction of professional identities proved to be difficult. It took time to organize my mind regarding the way I conducted my research. I explored the literature, trying to find research strategies that best fit my research questions and, at the same time, concurred with my theoretical framework. Dobbert's (1982) suggestion, matching the type of educational problem with the type of theory, characteristics of the theory, and the appropriate method, was helpful in framing the research strategy. By the time I read Elbaz's (1991) article, "Research on teacher's knowledge: The evolution of a discourse," the idea of using stories sounded interesting. Yet, the concept of "stories" was not used much in the cultural context in which I was dealing with my research. It took time for me to feel comfortable using such a term. Later on, the suggestions provided by Wolcott (1990), Gallagher and Tobin (1991), Bogdan and Biklen (1982) on how to organize information and write

qualitative or interpretive research reports were helpful in making sense of stories, notes, documents and memos as a means of putting my story together. Moreover, members of my committee were helpful in listening to my ideas and assisting me frame what seemed to be a mess at the beginning.

I tested my idea of using life histories one day, while in line in the American Embassy in Costa Rica, where I met a retired teacher with whom I had an opportunity to talk for a long time about different issues. After realizing how proud he was of what he did as a teacher, I gathered the courage to test my idea of using stories as a way of gathering information for my study. This teacher was happy that I took the time to listen. This situation provided me a setting to explore my idea of using stories as the means for constructing data for my research. I asked the retired teacher: If you had to tell your story as a teacher, what would you say? Teaching for him was connected to his childhood experiences, his happy and unhappy experiences in school and the community, enriched by those with whom he interacted in the process, and with periods of depression and excitement with students with whom he had to deal. During the conversation he realized how powerful were the skills that he learned in his years as a scout for his teaching career.

Stories are a useful way to get people engaged in rich conversations. As described by Nespore and Barylske (1991); Carter (1993); Connelly and Clandinin (1990); Cochran-Smith and Lytle (1990), the use of stories makes it possible to see people in a non-threatening way. In reading the stories of others, I became part of the group, and at the same time, I started thinking of my own story and analyzing it from my own theoretical referents.

Different types of artifacts were used in this study: Class observations, group conversations, interviews, documents, transcriptions and memos. Spanish is the official

language of Costa Rica, the country where this study took place. Thus, the majority of artifacts are in Spanish. For the purpose of this dissertation, the stories have been translated into English.

### Negotiating Entry

This study was conducted in three stages corresponding to my three visits to Costa Rica. The duration of each visit was approximately two weeks. With the data constructed during each period, I had the opportunity to do micro analyses in the field and extended analyses when I returned to Tallahassee, Florida. From interpretations of the data, I focused my attention on specific aspects that I wanted to pursue in further explorations through subsequent interactions with participants in the study.

The negotiation process to gain entry into this group occurred as part of our professional experience. As a former member of that group, I maintained professional contact and was aware of their professional goals. When it came time for me to decide on my research project, the members of the group, knowing my research interest, suggested the possibility for “us” to think and reflect on our own experiences. The teachers, my colleagues, took the responsibility of speaking to their principals and introduced me to their colleagues and students. They introduced me as a chemistry teacher who was a member of the regional group of chemistry teachers. Accordingly, collegiality was never an issue for me. The group accepted me as one of them, a colleague from whom they could learn. For my part, I was convinced that I could learn a great deal from them in the progress of the research.

The policy of Costa Rica's Ministry of Education required that I obtain permission to conduct my research project in the schools. Even though permission for the commencement of the study had already been given by the teachers and the principals, I

took the time to negotiate with all officers in charge of the preparation of the “official” permission to undertake the study. I took this step because I found that in this country, it was common for people to do research without the necessary permission. I think that it was important for those in charge of these offices in the Ministry of Education to know what was available in terms of research related to the school system in Costa Rica, and if they had to support researchers, it was beneficial for them to know the kind of research that was being done. In addition, besides keeping a record of research conducted in schools, it was important to protect participants by developing a supportive environment for learning about what happens in schools.

It was interesting to learn that the principals and regional directors were open and supportive of projects such as mine. Yet, in the Ministry of Education there were difficulties in identifying the person responsible for providing permission for a study such as this. It took a long time for me to receive the letter of permission from the Ministry representative (more than three weeks), even though I was just five minutes from the regional office, and only an oral confirmation from the principals was needed. As a former member of the chemistry group, I knew many people holding administrative positions, and I was supported as a member of the group in this negotiation. The only significant concern mentioned was that the project not disturb classes in the school.

### Strategies to Frame Data

The data construction strategies that I used in this project included the reconstruction of teachers' stories through interviews, participant observations in school settings, informal conversations as well as interviews with principals, science teacher educators from universities and supervisors. Other sources for constructing

data were writings by students about their relationships with the focus teachers<sup>1</sup> in the school setting. Moreover, I used documents from different levels of the Ministry of Education, documents from the secondary schools, university programs and other relevant documents from public institutions that referred to teachers' professionalism.

In August of 1992 I started working with the group of chemistry teachers, and I began the process of reconstructing the story of the group. I used the idea of telling stories as a starting point because of the positive connotations associated with the idea of a story. MacIntyre (1984) says that "the story of my life is always embedded in the story of those communities from which I derive my identity" (p. 221).

My purpose was to listen the stories and observe the connections that teachers establish with others. Working with the group was a good place to start identifying key connections. Focus group techniques (Krueger, 1988) were used each time I met with the whole group of chemistry teachers. These were opportunities in which we could reflect on particular issues that helped clarify concepts about professionalism as they related to teaching practices. As Reitzug and Reeves (1992) state, "The purpose of the focus groups [is] to facilitate interaction among teachers that might surface data not obtained through other sources" (p. 190). It was in these meetings, when teachers talked about their own experiences and the connections they established with others in order to make sense of their professional experiences, that they came to realize the importance of understanding their own personal stories as a means for improving what they were doing. For some of them, it was exciting to remember the way they had met each other and all the things they had been doing together since then. Their stories were

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<sup>1</sup> Teachers who participated in the study and who were resources for data that facilitated an in-depth analysis of their professional actions, including school, family, and other social actions.



replete with meaning and emotion. The stories were neither objective nor neutral. Names were spoken of with a lot of respect and consideration. Former teachers, science teacher educators, principals, colleagues and students were mentioned as sources for learning to be a teacher.

The personal life histories (stories) of two teachers (focus teachers) have been analyzed. In order to facilitate the story telling process, I encouraged the two participating teachers to talk while I recorded and transcribed the discourse. Based on the transcripts, we scheduled further sessions during which we attempted to add more elements to the stories. I had informal conversations with the focus teachers, encouraging them to reflect on their experiences as a means of eliciting thinking that is conducive to learning and changing in professional practices. As part of the story reconstruction, I encouraged teachers to use dialogue journals (Roderick & Berman, 1984; Duffy & Goldsby, 1993). The idea was that they would continue thinking about issues they wanted to include in their professional stories. It seemed that, if we kept thinking and reacting to questions and comments, our experiences would emerge fluently in the process. Roderick and Berman (1984) state the following:

Life is a series of encounters with others. As we meet another person either in real life or through the written word, we are constantly reacting, perhaps feeling perplexed, perhaps questioning, perhaps giving birth to a new thought. (p. 686)

Even though I suggested the use of dialogue journals, teachers argued that they had neither the time nor the ability to write in ways that made sense for others to read. They indicated that writing is difficult, and for them it would be better to talk because, after all, that is the way in which much of their daily work is done.

Observations (Wax, 1971; Bogdan & Biklen, 1982; Patton, 1990) of participants in school settings were conducted to see teachers in the whole process of

creating curriculum (Grundy, 1987; Tobin, 1991a; Connelly & Clandinin, 1988). My understanding of curriculum, as it applied to this study, included all the learning experiences that school participants had. Teachers, administrators and students' parents were curriculum developers. All kinds of situations in which teachers got involved in the school had the potential to influence the evolving curriculum (evaluation committee, department meetings, faculty meetings, parent conferences, and etc.). Notes were taken on the ways teachers, students, colleagues and administrators interacted in the school. I tried to identify patterns that revealed the kinds of beliefs on which teachers developed and based their interactions in order to construct learning opportunities in schools.

Students were asked to write about their perceptions of their relationship with their teachers. This was a way to get students' stories as they discussed themselves in relation to a particular teacher. In order to get students involved in this study, I asked teachers to invite them to come to a special session at which I explained to them the purpose of my study and the way they could participate. Approximately 25-30 students from each school participated in that session. The idea of using stories was suggested to students as a way to think about their personal experiences and their interactions with others. My suggestion was to imagine that they were living 15 or 20 years from then and wanted to tell about their learning experiences with their high school chemistry teacher. It was interesting to note that, for many of them, writing a story was easy, while for others, stories about chemistry teaching just did not make any sense.

Administrators were asked to participate in interviews to express their ideas about professionalism and the way they saw this concept used in the school setting.. Likewise, they were asked to describe their impressions of the teachers who were participating in this research project. I also had the opportunity to observe teachers

interacting with colleagues in informal settings as well as in meetings organized by administrators.

Other administrators of the school system (assessors) were interviewed, and I requested documents from both the regional offices and the National Center of Teaching, which specified the ideals on which the interactions with teachers were based.

### Data Analysis

As is evident, the techniques used in constructing data for this project varied in nature. The purpose of using diverse approaches was to obtain different perspectives in order to support the authenticity of the study. To ensure viability and authenticity of the data, all transcriptions and interpretations were open and shared with the participants. The idea of sharing with them was to enrich the analysis as well as to contrast my interpretations with those of the participants. I did not expect to come to an agreement, but rather, I wanted all participants to recognize that interpretations were personal constructions of understandings that emerged from social interactions.

Triangulation of data (Elliot, 1976; Erickson, 1986; Patton, 1980) helped to construct the stories, using the perspective of the context from which teachers were looking at their professional life histories. Different categories were used according to the main aspects to be considered in the analysis: Setting, process, activities, events, relationships and social structure among others, as suggested by Bogdan and Biklen (1982). From construction of different categories as a way to reduce the data in order to make sense of the life histories involved in the research project, personal stories of what I learned from the research project were generated. From this perspective I was not attempting to tell the stories of the teachers, students, colleagues, principals, supervisors, etc., but what I learned from their stories. Evidence and "counter

evidence" (Gallagher & Tobin, 1991, p. 91), were used in the way of vignettes and quotes from notes, interviews and conversations in order to present data or to support theoretical discussions.

The final story is based on my interpretations as well as on the interpretations of the participant teachers. I think that my interpretations, and those generated by the teachers, provide valuable elements in understanding professional teachers working in the Costa Rican school culture. I see the final story that emerges in this process of interpretation of data coming from "a multiplicity of approaches used to learn about the multiple realities in a complex enterprise" (Spector & Glass, 1991, p. 25).

As a researcher I am accountable for my interpretations. As an educator, I am responsible for sharing these experiences as a way to facilitate conversations with teachers and educators in general in order for them to start thinking of alternative ways of conducting educational practices. As a result of conducting research, what I envision is that our experiences will provide opportunities for enriched discussions from which we can generate alternative visions of possible worlds (Bruner, 1986).

## CHAPTER 4

### SCHOOLS SHOULD BE PLACES WHERE TEACHERS LEARN

#### Introduction

This chapter describes what I learned as part of my research when visiting schools in Costa Rica. What I observed was influenced by my theoretical framework; however, it was only in interaction with others that I came to see the culture from which they made sense of their actions. Accordingly, while trying to understand what was going on in schools, there was tension between what was meaningful for me and the participants' perspectives.

I spent time observing chemistry classes and talking with teachers, principals, and students. When I first arrived at the site where this research took place, I went with this idea: Schools are centers for learning. That was the vision I expected teachers, students and administrators to have, and what I expected to see happening in schools. My idea was that the teacher, the center of this study, would be interacting with others as a way to learn and generate possibilities for professional growth (see appendix A). I saw teachers as professionals interacting with others. After gaining entry to schools and observing for some days, it seemed to me that teachers, students and administrators were doing something other than learning or engaging in opportunities for learning.

#### A Secondary Public School

It was 6.45 a.m. on a Monday in August in the school year 1992 in Costa Rica. I

was at the entrance of a public secondary school and I saw students everywhere. Students came in pairs, alone, in big groups, or on buses; all were running to arrive on time, before the bell that indicated they are tardy for class rang.

Around 1450 students from grades 7 to 11 attended this school. Students wore uniforms, as was mandated by Costa Rica's Ministry of Education. The uniform included blue pants for boys and blue skirts for girls. Boys and girls wore light blue shirts. All students wore black shoes and blue socks. Students from grades 7 through 10 had an insignia of the school placed on the left sleeve of their shirts. Each secondary school in Costa Rica has its own insignia. There was a further distinction for those in 11th grade, and that was a purple jacket with the number 11 on it, indicating that this was their final year in secondary school<sup>1</sup>. Teachers were responsible for checking their classes to ensure that students were wearing the uniform in the appropriate way. This was something that teachers were supposed to do before each lesson; if not, teachers could be sanctioned by the principal. The teachers could only accept students in the classroom without the appropriate dress if students had the permission of the school administrators.

While I was waiting for Marta (the chemistry teacher) to arrive and introduce me to the principal, I observed some teachers walking or in cars, but all were hurrying to reach the office where they had to sign in before they went to class. Once the teachers signed in, they were relieved because they fulfilled an administrative requirement that controlled their presence in school. If teachers did not sign in, it was as if they were absent. It seemed that the majority of teachers arrived just in time for class. Those teachers who arrived before I came to school, around 6:30 a.m., seemed to be looking for

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<sup>1</sup> Schooling in Costa Rica starts in kindergarten and goes to 11th grade in the academic system.

time or opportunities to discuss with others some of the problems they face in their courses or to complain about the system. Some teachers got together to talk, tell jokes or comment on the football (soccer) game of the previous day. My first school visit was on Monday, and for Costa Ricans football games are a part of Sunday culture.

On the first day of my visit to the school, there was a big commotion related to a group of students who had cheated on a mathematics exam that took place the previous Friday. Apart from those telling jokes or talking about football, there was a group of teachers talking in the hall about the ethical issues regarding a teacher's school duties. Some members of this group accused the students of being dishonest when taking exams, arguing that they were supposed to be honest with themselves and with the educational system. Others argued against teachers (their own colleagues) because they said that what happens in classes and during exams is what teachers permit their students to do. When the bell rang at 7:00 a.m., the conflict of who was responsible was still unresolved, but teachers had to run to their classrooms where students were waiting for them. According to the teachers at the school, it was common to have these kinds of unresolved debates. Just before the mathematics teacher hurried to his class, Marta, who was a member of the evaluation committee and the chemistry teacher participating in this research, gave this recommendation:

Los estudiantes son muy honestos, si ellos ven que usted es firme en lo que dice. No les muestre a ellos que usted está inseguro, ellos son demasiado inteligentes. Yo pienso que es mejor para usted resolver el problema con los estudiantes, que tratar de encontrar afuera lo que sucedió. Usted sabe que nosotros tenemos problemas con los colegas que no quieren asumir la responsabilidad que otros les asignan cuando hay que aplicar exámenes a un grupo de estudiantes. Si usted tiene la posibilidad de resolver el problema con sus estudiantes, eso será mucho mejor.

*Students are very honest if they see that you are firm in your position. Do not show them that you are insecure; they are very intelligent too. I think it is better for you to resolve the problem with students than try to*

*find out from the outside what happened. You know that we have a problem with colleagues who do not want to assume the responsibility that others assign to them when they give an exam to be applied to a group of students. If you have the opportunity to resolve a problem with your own students, it is much better.*

After hearing the teachers discuss the exam issue and while walking to the class that I came to observe, I wondered how much an incident like this affects the life within the school as a whole or within a group of teachers and students who have to deal with this kind of situation? The face of the mathematics teacher reflected anger and insecurity. His fate was beyond his immediate control. What kind of day was ahead of him and those in the evaluation committee who would determine the sanctions to be applied to students and teachers? Some teachers supported the position of the mathematics teacher, but others just avoided the conflict. My study of teachers' professionalism started here with my observations of classes, formal teacher meetings, committee meetings and lounge meetings in one of the schools. That incident reflected part of the school culture as it related to conflicts endured by teachers and students.

At 7:00 a.m. students were waiting for teachers to open their classroom doors. In this school, teachers had their own rooms, a procedure that required students to walk around the school looking for a teacher's room each time they had to change classes. In the morning students were supposed to wait at the door of the room of the teacher with whom they had their first class of the day.

Marta had her room in the wing of the building where the department of science teaching was located. Marta had been working in this public school for more than 10 years. She started as a chemistry teacher in the school when she received her bachelor's degree in biology. Marta began by substituting for her husband who was the former chemistry teacher. Her husband had been a main source of professional support and inspiration in her career as a chemistry teacher. Marta explained this support and



inspiration as follows:

**Roberto tiene mucha experiencia en cómo enseñar química, así que yo aprovecho y siempre discuto con él los conceptos nuevos que voy a enseñar o las técnicas que voy a utilizar, él siempre me ayuda en mi trabajo.**

*Roberto has a lot of experience in chemistry teaching. That's why I always discuss with him new concepts that I will teach or the techniques that I will use. He always helps me in my job.*

Marta began by teaching at the school where she was taking courses in education because she planned to become a certified general science teacher after completing her bachelor's degree in biology. Because of her limited choices, Marta chose biology. According to Marta, she selected biology was in part because of limitations imposed on her by her mother. Marta had to study at a branch of the university, and she was not allowed to go to the main campus that is in the capital of the country. Marta remembered her mother saying, "a San José ni un paso" to *San José even not one step*. Her first intention was to study pharmacy, but that was not available at the branch campus where she studied. According to her comments, Marta's education courses were quite unrelated to her experiences of working in the school. Marta referred to her education courses as follows:

**En los cursos de educación todo muy lindo, usted gasta un montón de plata y prepara unas cosas lindísimas, pero como le decía yo a la profesora, usted cree que con lo que nosotros ganamos como educadores vamos a poder seguir haciendo esto? En parte ese cuestionamiento permanente en aquellas clases fue la razón para perder un curso, el único curso en mi historia académica que no aprobé, en el que por razones personales no pude entregar un trabajo el día que tenía que ser y la profesora no me quiso aceptar el trabajo el día siguiente. Por cuestionar me había convertido en la estudiante rebelde, pero mi resistencia estaba basada en mi experiencia trabajando en la escuela.**

*In the education courses everything was beautiful. You spend a lot of money and prepare wonderful things, but as I said to the professor, do you believe that, with the money we make as teachers in school, we will continue doing this? This questioning was in part the reason why I flunked that course. The only course in my academic history that I did not*

*pass, was because I could not hand in a paper the day I was supposed to for personal reasons, and the following day, the professor did not want to accept it. Questioning in the class was the reason to be categorized as a rebel student. But my resistance was based on my experience of working in the school.*

Ironically, Marta was penalized in this course for attempting to make connections between what she was learning in the course and what she was learning at her school site. Ironically, when Marta started to teach chemistry, she got involved with another university, the Universidad Nacional, that was developing a program for in-service chemistry teachers. The idea of the program was to help chemistry teachers improve on what they were doing in their classrooms by providing them with opportunities to reflect on their own experiences, and at the same time, it allowed them to take courses which helped them formalize their pedagogical content knowledge (Ruiz & Sánchez, 1982). When Marta talked about the program and the way she related it to her life as a chemistry teacher, she said the following:

*La experiencia que tuvimos en la Universidad Nacional era más real y mucho más enriquecedora. Uno sabía que ahí estábamos partiendo de la realidad. Los cursos los entendíamos desde los problemas que estábamos viviendo en la escuela, además de que el grupo que estamos ahí uno se identificaba con todos. Éramos un grupo y como grupo, cada uno tenía sus especialidades. Yo recuerdo que uno siempre estaba pendiente de quién es el que presenta hoy, para ver de qué era lo que había que sacar provecho. Esa experiencia me dio a mí la base para casi todo lo que hago ahora en mis clases de química. Uno siempre cambia porque va aprendiendo, pero allá aprendí a aprender de lo que uno hace todos los días en la escuela.*

*The experience we had in the Universidad Nacional was more real and contributed much more to my education as a chemistry teacher. I knew that we were talking about real problems. The courses were approached from the perspective of the problems that we were living with in school. Moreover, I came to identify with all members in the group. We were a group, and as a group, each one had his/her own qualities. I remember that I was always looking to see who was presenting something, to see what I would learn that day. That experience gave me the base for almost everything that I do in my chemistry class. You always change because you learn, but it was there where I learned how to learn from my own experience.*

From these two experiences, Marta seemed to identify, in a personal way, a crisis about which teacher educators in Costa Rica were becoming increasingly aware. Some teacher educators debate the relevance of teacher programs like the one in which Marta participated. They see the advantages of providing site based programs that interrelate theory and practice, such as the program offered by the Universidad Nacional. It is interesting that the first experience described was part of a school of education program that strongly emphasized learning educational theory as a body of knowledge which was somewhat isolated from the day to day lives of teachers. In contrast, the in-service program was developed and implemented by a department of chemistry. In the latter instance, those offering the course were resolved to make a difference in the education of chemistry students through the education of their teachers. The following excerpt from an interview with a teacher educator highlights his growing dissatisfaction with the science teacher preparation program offered by schools of education:

Las escuelas de educación cometieron un error al caer en la trampa del academicismo. Hubo un tiempo cuando en las escuelas de educación se protegía a los estudiantes, se les daba un ambiente en el que ellos se veían como parte de una comunidad, aspecto muy importante en el ser educador. Hoy día los estudiantes de educación no saben quienes son ellos ni tampoco existe un grupo con quien identificarse.

*Schools of education made a mistake of falling into the trap of the academicism. There was a time when schools of education took care of students, providing them an environment in which they came to see themselves as part of a community, a very important part of being a teacher. Today students of education do not know who they are, nor is there a group with whom they can identify.*

In 1992, Marta was teaching 33 chemistry lessons a week, plus one lesson as a guide teacher, four lessons as a participant in the evaluation committee, and two lessons as part of other committee assignments in the school. Her 33 chemistry lessons were

divided between 10th and 11th grades. She taught three lessons a week to each group. This required her to have 11 groups with an average of 35 students per group. Marta recognized the difficulty of having so many lessons and the consequent impositions for her family. In order for Marta to accomplish all that the school demands of her, she received assistance from her husband in correcting exams, preparing some materials and planning lessons. She felt, though, that if this was her job, then she was supposed to give as much as she could to fulfill expectations of the school as a faculty member. Her school duties demanded a lot of her time, but at home her family has learned to see these as natural activities. Marta was so busy with school duties that the family has learned to cooperate and be patient. The family was and is an important part of her life, but they understood that they would have a full time mother during her vacations.

Because of her attitude of collaboration and the responsibility she assumed when she took charge of something, she was often selected to coordinate and participate in many extracurricular activities in school. In 1992 she was part of the evaluation committee, the assessor committee to the principal, the curriculum committee as well as additional activities that required temporary committees in which she volunteered.

Hay pequeños detalles que a veces la gente no ve, y uno está ahí para decir tal y tal cosa hace falta, porque con la experiencia como que uno va viendo más adelante que los demás.

*There are small details that many times others do not see. Then one is there to say such and such is needed, because with the experience, it is like one starts looking beyond, while the others are just trying to figure out what to do.*

Marta's classroom in the school was organized for an average of 35 students. Students' desks were arranged in six or seven rows of five students each. On the walls there were bulletins or posters with information related to the subject. In the case of this chemistry class, on the wall there was a diagram of a laboratory scale with a

description of the concept "quantity of substance". In addition, there was a calendar with information about exam days. On the other wall there was a poster that was used as a decoration in class. Moreover, there was a picture of a river in a mountain. It was interesting to note that, during my time in school, I never saw Marta using the information in the diagrams she had on the walls. The wall decorations were part of an implicit sign system that this was a chemistry room within which participants would teach and learn the subject of chemistry. The artifacts on the wall differed from those in other classrooms, and they were a part of the school culture that I was seeking to understand.

Walking in the halls of the school, I got an immediate sense of the different subject matter that is taught and learned in different areas of the school. The approaches were diverse. In some places, students were allowed to work outside of the room, in others they worked in groups in the room, while in others teachers dictated notes and students wrote them verbatim into their books.

Students looked relaxed in Marta's class. There was no obvious tension between teacher and students. They talked to one another and the teacher in a friendly manner: Students called each other by their first names, the teacher called the students by their first names, and the students showed their respect for Marta by referring to her as "profesora" *teacher*. Some routines were expected to be followed at the beginning of each new class. For example, the teacher was supposed to call roll to check attendance. Sometimes Marta asked one student to come to the front of the room and call roll while she finished organizing things that she needed for the class, or she had a discussion with a student. Once students were in the class, there was a period of time when they socialized with one another and the teacher. After a few questions about the previous class, some comments or information about which students need to know, the class began.

During the class Marta tried to use examples that seemed familiar to students, or shed used some lab demonstrations that were performed with the help of students in front of the class. According to Marta, the laboratory was not used very much because there was no time to organize all that she needed. She had no assistance in preparing or cleaning things in the laboratory. She used to take students to the laboratory at least once a year but because there was pressure to cover all of the content of the program, demonstrations served her purpose of clarifying the points she wanted to teach. She preferred to organize the class in ways that she did not have to talk too much due to the problem with her voice. If she talked too much in one class, then she could not speak in the other classes. Marta was planning to take a course and to follow some medical recommendations because “los profesores que no saben como usar la voz, tienen muchos problemas de salud,” *Teachers who do not know how to use their voice have many health problems.*

### School Organization

After a few days in the school, I learned other aspects related to the school's culture. As all regular secondary schools in the country, this school was organized by departments: Science, mathematics, Spanish, foreign languages (English and French), social studies, sports, music and arts. In addition, there were general committees in charge of coordinating curriculum and evaluation issues. Within each department there were further divisions related to subject matter. For example, in the case of science, teachers identified themselves with the subject that they taught rather than with science in general. Teachers talked about general science when they taught grades 7 through 9, and they talked about chemistry, physics, and biology when they taught grades 10 and 11. Within this division, Marta was responsible for teaching chemistry, and her main

goal was to prepare the students for the baccalaureate exam at the end of 11th grade. According to Marta, there was a problem with this division because the responsibility for preparing students for the national exams was on the teachers who taught the 10th and 11th grades. National exams focus on the content of specific areas of science (e.g., chemistry) not on science in general. Marta stated the following:

Preparar a los estudiantes para los exámenes de bachillerato es una responsabilidad que solo los profesores de décimo y undécimo nivel cargan en sus espaldas.

*Preparing students for the baccalaureate exam is a responsibility that 10th and 11th grade teachers carry on their backs.*

Her complaint regarding her obligations was that “esta es una carga muy pesada de la cual otros en la escuela no asumen ninguna responsabilidad.” *This is a heavy burden for which others in the school do not assume any responsibility.* As a chemistry teacher, she was the only one who worked toward this goal; general science teachers did not assist in this process.

The division by departments provided a framework for administrators to divide the building into sections where teachers who belonged to a department had their rooms in the same wing of the building. It was assumed that teachers would coordinate and collaborate among themselves because they were close to their departmental colleagues. However, even though teachers were physically close, coordination and sharing were not part of the school culture. For example, in the case of science, Marta argued that she could not collaborate with other members of the department because some of them did not see their connection with chemistry, while others claimed that chemistry was her responsibility not theirs. The visions that teachers had about their responsibilities in the teaching and learning processes were so different. There were science teachers who preferred to dictate notes in their classes so that students could copy “the truths” that

they would be asked to reproduce on exams. In the case of chemistry, Marta was aware that dictating notes did not make sense because there were many ways in which students could approach and solve problems. Accordingly, coordination and collaboration were not easy tasks, even when teachers were physically close.

In this school the principal envisioned his role as a school coordinator and a provider of support for curriculum development. Nevertheless, this was not possible for him because he had to take care of many issues that consumed the majority of his time. In an interview, he stated the following:

Yo tengo que ver con problemas de estudiantes que vienen a preguntar qué hacer si un profesor no está en la clase, alguien que viene a reportar que hay un tubo roto que esta goteando, otros vienen a quejarse de que no hay papel para los exámenes, en otros casos yo tengo que escuchar los problemas personales de los profesores que necesitan ayuda o permiso para hacer algo, y así muchas cosas más.

*I have to see the problems of students who come to ask what to do if a teacher is not in the class. Somebody comes to report that there is a broken faucet that is leaking; others come to complain that there is no paper for exams; in other cases I have to listen to personal problems of teachers who need help or permission to do something, etc.*

Since he had to spend most of his time running from one place to another, his role as provider of curriculum support was pushed aside.

According to the principal, in order to get teachers involved in the administration of the school, he had been using a consensus system. In some cases it worked, but there were cases when teachers, for instance, did not want to make decisions nor assume responsibility for those decisions. For instance, the distributions of courses and the number of hours that the school had for each department was something that teachers could negotiate, but this implied that teachers would be responsible for the distribution that they formulated. In the majority of cases, they refused to do that. When this happened, the principal had to make those decisions on his own. From my perspective,



this was an opportunity that teachers could take to organize and coordinate the actions in their school. As professionals, they could have identified the potential of each one of the members of the department and organize the schedule in a way that reflected the strengths and weaknesses of the faculty. However, the teachers were reluctant to get involved in this way, preferring instead to focus on teaching. Accordingly, administration at the department level was left to the principal, not because he wanted it that way, but because the roles of teachers were bound by the traditions of the country and the school. In the country and the school, the principal was responsible for determining the school schedule, and teachers were responsible for teaching that schedule and assisting students to learn.

As an incentive to teachers, the principal tried to distribute the number of lessons in such a way that all teachers can have more than 32 lessons a week. According to what was considered a full time commitment, this was the maximum number of lessons that a teacher could be required to prepare. Additional lessons, up to a maximum of 40, were permitted by the Law of Public Administration, but these extra assignments were supposed to be temporary.

The principal commented on the issue of having support or reaching agreements with teachers and supervisors as a way to facilitate teaching in the school, as well as to provide and maintain a good working environment for teachers. He commented as follows:

Es muy difícil cuando uno tiene que lidiar con 63 profesores en la institución, si uno no puede confiar en la estructura y apoyo que el sistema se supone debe proveer.

*It is difficult when you have to deal with 63 teachers in the institution if you cannot rely on the structure and support that the system is supposed to provide.*

From this principal's point of view, this inability to rely on individuals within

and outside of the school made it difficult to operate the school in the way it was envisioned as a part of the whole system. He argued that there was no uniform criteria that different offices used to deal with the school organization. In terms of curriculum coordination, even when the curriculum was defined in advance, as are Costa Rica's national programs, there was a lack of coordination among teachers in school as well as among teachers and those in charge of the implementation of such a curriculum, such as regional and national assessors. From the principal's perspective, there were good teachers in the school who took their professional responsibilities (maintain order, up-to-date knowledge, interest, collaboration, caring, positive attitude toward teaching and students, good personal relationships, etc.) seriously. However, there were others who did not care about their job responsibilities. They just saw this as a job that they were paid to do. For him, teachers were supposed to be responsible for their jobs. He could facilitate opportunities for them to coordinate, but he could not impose on them what they should do. This was a public school, and each one of the participants was responsible for a part of what happens in the school. As a principal, he saw himself as part of the school system, but not as the owner of the institution.

For Marta, the school provided her with opportunities to perform as a professional, and with the active support of the principal, she made the most of those opportunities. However, many of her colleagues did not take advantage of these same opportunities. Marta had a good relationship with the principal, and she was well known and respected in the school. In some ways, this positive notoriety was limiting because she was called on to do so many tasks, and thus she became fragmented. Marta was happy to participate in a wide variety of activities and to assist her colleagues in seeing the institution as a whole and the significance of their part in it. However, she believed that her major responsibility was to be a chemistry teacher, and in that regard, she was

isolated within the school community.

### School Relationships

According to the principal and the comments made by teachers in general, the relationship of this school with the whole school system was not a good one. The school was considered an isolated entity within the system that, for its own convenience, tried to avoid too much interaction with those in the school system who were in charge of controlling what happened in each school. According to the principal, when there was a need to make a change in the school activities that were scheduled in the school calendar, there were two options. He stated these as follows:

Pedir permiso y esperar a que los administradores superiores digan que no, o tomar el riesgo y hacer los cambios. El problema es que si uno hace cambios y los administradores se enteran, entonces el director puede ser sancionado, pero es que en la escuela existe demasiada incertidumbre que uno no puede saber qué es lo que va a pasar al día siguiente. Es muy difícil apegarse al calendario escolar, pero es más difícil negociar para obtener permiso y hacer cambios.

*Ask permission and expect that superior administrator will say no, or just take the risk and make the changes. The problem is that if you make changes and administrators are informed about it, the principal can be sanctioned. But in the school there is much uncertainty that you never know what will happens tomorrow. It is difficult to be attached to the school calendar, but it is much more difficult to negotiate permission to make changes.*

Teachers and administrators complained about the fact that, when they came back from vacation, there were new policies that had to be implemented, or teachers discovered these new policies some days after they began teaching. This problem was associated with a lack of communication, but from my perspective, it could be explained as a consequence of the organization of teachers' and administrators' vacation time. Vacation time for teachers ended one week before school courses began. In many cases,

that was when assessors and supervisors returned to their offices or new assessors and supervisors were appointed for the new school year. Information sent to schools by assessors had to pass through many hands before it was sent to the post office. Mailing took time in the country; therefore, information regarding new directions or policies was available to teachers when they were already developing the courses. This created conflicts and uncertainty in the way teachers organized their teaching practices. Having to depend on information that usually arrived late to school did not help in the creation of a professional image. Accordingly, at the beginning of the year teachers had difficulty in developing a coherent plan to present to students and to use as a basis for organizing their professional actions in the classroom and in the school.

In general, teachers had little confidence in the people who assessed and supervised the school system. Assessors and supervisors were appointed on a different system than the one by which teachers were hired. Generally, these positions were politically influenced. Those assessors and supervisors who agreed to accept and remain in these positions were those who were tired of working in the classroom. Once assessors and supervisors accepted these positions, they had to take a leadership role in coordinating the areas for which they were responsible. There was a conflict in their leadership roles within a group; the members of the group were familiar with the assessors and supervisors' previous professional experiences and backgrounds.

According to the teachers in this school, supervisors and assessors had to be effective links in connecting each school with the entire system. However, what supervisors and assessors provided generally was not useful because teachers saw them as ill-prepared for what they were doing. Part of the problem was that some supervisors and assessors were from the school system in which they enjoyed little success as teachers. Another problem was that many of them had been out of the

classroom for a long time. When assessors and supervisors promoted the implementation of ideas for which they were never successful, it caused much confusion. This reflected the way people perceived others based on their experiences or the images of them. Assessors were supposed to help teachers implement new policies and ideas. Supervisors were responsible for ensuring that the implementation of new ideas fit into the school organization. This chain of control generated uncertainty when teachers observed different criteria for implementation that emanated from people who worked in the same office.

The problem with the positions of assessors and supervisors seemed to be associated with their appointment by the Minister of Education or those who worked for him as well as the fact that this happened every four years when there was a change in the political administration of the country. From this perspective, politics were associated with the process of selecting people for these positions. I think that in part, it was the political appointment process that teachers and administrators resented the most. This resentment toward supervisors, assessors and the system as a whole reduced the potential for school system participants to construct learning environments where all collaborated and willingly learned from their professional practices.

Another form of resentment, that teachers and the principal of this school mentioned, was the feeling that they were at the bottom of a curriculum decision-making pyramid. When assessors and supervisors suggested something, they were rigid in their decisions, and their actions often precluded teachers and administrators in the school from making their own decisions. As the principal in this school stated, "Ellos no consideran que el curriculum depende de la cultura y que los profesores necesitan hacer adaptaciones de acuerdo a la región," *There is no consideration that curriculum is culturally dependent and that teachers need to adapt it to the region.* Accordingly, it

seemed that assessors and supervisors had as their objectives something that Gallard (1990) describes as the maintenance of the integrity of the national curriculum. In this way they ensured that the national curriculum pervaded school practices in Costa Rica, even when new educational policies indicated the need for a different orientation for developing curriculum as stated by Herrera, et al. (1990).

It was in this cultural context that Marta developed her teaching practices. As a social institution, the school had conflicts that were embedded and not openly discussed. Issues such as cheating on exams were discussed when formally presented in the privacy of the evaluation committee meetings. Problems with teachers who did not perform professionally as was expected were hardly addressed by the principal. In order for him to do that, he needed convincing evidence before taking action. Obtaining the evidence was difficult because teachers had many ways to protect themselves when questions arose about their professional competence. Marta made comments about colleagues who were not effectively teaching. She knew about these teachers because students informed her of their shortcomings. If anyone had considered taking action against these teachers, this type of evidence would have been considered inadmissible because of the heresay nature of it. Her position regarding this issue was that she made a commitment to be a professional and to do the best that she could. She could not assume responsibility for the entire school, but she would have preferred viewing all school participants as good role models for students.

From my conversations with Marta, the principal and other teachers in the school who considered themselves to be professionals, this was a risk because, in a setting in which professionalism does not pervade all actions, the level of exigency for students is not homogeneous. Some students had minimal requirements of teachers. In the culture of exams, particularly national examinations, students tended to value those

teachers who did not give them much to do, but rather facilitate their passing of the course. Marta stated the following:

los estudiantes vuelven y agradecen que uno haya sido exigente con ellos porque muchas cosas se les facilita en la vida cuando ellos han tenido una buena experiencia educativa en la escuela.

*[Years later, when ]students return, they recognize as something good the fact that one was exigent with them, because many things result easier for them when they have had a good educative experience in school.*

### Looking Through Windows Into a Semi-Official Institution

The second school that I visited was a semi-official institution<sup>2</sup> in which the principal had much more control over what happened in the school. The principal saw herself as the owner of the institution. She referred to the school as “mi institución” *my institution* and teachers as “mis profesores” *my teachers*. Because this was a smaller institution, the presence of a stranger in the school was more evident, thus my presence hindered people from acting as they were normally accustomed. I became aware of this when Elissa, the chemistry teacher, made a comment regarding the way teachers acted the first day I went to the cafeteria. Thus, at this school I was only able to look through windows<sup>3</sup>.

In semi-official schools, principals are able to select the teachers with whom they want to work. Even though teachers are paid by the Ministry of Education, principals select teachers from a qualified group that the Ministry’s personnel office

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<sup>2</sup> A semi-official institution in education is a school for which a group assumes the administrative responsibility and the Ministry of Education pays the salary of the teachers.

<sup>3</sup> Window is used as a metaphor to describe the fact that in this school observations were more restricted, because, as a small institution, there was more control over strangers.

suggests. For teachers, there are some benefits as well as problems in working in these types of institutions. Once a teacher gets in the system of semi-official institutions, he/she belongs to that system. That is, he/she cannot be moved to the public system unless he/she resigns his/her position and starts the tenure earning process again. A teacher can be moved from one semi-official institution to another if he/she requests it and a position is available, but he/she cannot be moved to schools in the public system. The principals in these schools recognizes that these institutions have a select group of teachers, because principals decide with whom they want to work.

Elissa had been the chemistry teacher of this semi-official institution for about 15 years. Her only absence was a three year leave of absence for study. Her experience as a teacher started in a public institution where she taught general sciences and chemistry. Before she graduated as a science teacher, she had an opportunity to teach a course that prepared night school students for the baccalaureate exam in chemistry. Moreover, she had an opportunity to be a teaching assistant in chemistry while she was a student at the university. Consequently, her experience in teaching was broad. Her first certification was in general science, but she found that, in order to be certified to teach chemistry, she needed only a few additional courses. Therefore, she decided to take those courses even though she had a full time job. It was difficult for her, but she wanted to teach chemistry, so she felt that the effort was worth it. Like Marta, Elissa planned to study pharmacy when she was a young student, but her course of action was limited. She explained this as follows:

La carrera no se ofrecía en el campus donde yo estudiaba, además yo tenía una beca que era para estudiantes de educación. Mi intención era que una vez que terminara educación, podría trabajar y continuar con farmacia, pero es muy difícil porque una vez que una empieza a trabajar, se independiza un poco económicamente, y ya se hace de su grupo es difícil salirse de ahí, y la verdad es que a mi me gustaba educación.



*The program was not offered on the campus where I studied. Besides, I had a scholarship that was only for students of education. My intention was that when I finished with education I could continue with pharmacy, but it proved difficult because once one starts working, one gains certain economical independence, one makes a group, and after that it is difficult to go out. Certainly, education was one thing that I liked.*

In 1992, Elissa was teaching 32 lessons: 21 lessons in chemistry (four groups of 10th graders, and three groups of 11th graders, with an average of 30 students per group), 10 lessons in general science to two groups of 9th graders and one lesson as a guide teacher of one group. Elissa tried not to have more than 32 lessons a week because she wanted to have time for her family. She remembered the time when she was teaching 40 lessons in the school. She was busy all the time and did not have time for her children. One day when she came home, she found that one of her children had not completed his homework because he did not know what to do. She realized the following:

*Mis hijos necesitan a la mamá en la casa, no es posible que ellos no puedan llevar una tarea porque no tienen en la casa quién les ayude. Así que decidí renunciar a unas lecciones y pedir siempre que me acomoden el horario de tal forma que yo pueda atender a mis hijos como ellos se merecen, después de todo ellos son mi responsabilidad.*

*My children need to have a mother at home. It is not acceptable that they cannot complete their homework because they do not have somebody to help them at home. One day I decided to relinquish some hours, and asked for a schedule to permit me to assist my children as they deserve to be assisted. After all, they are my major responsibility.*

Unlike Marta, Elissa tried to do most of her school tasks during school hours. She was committed to not taking work home, because at home she wanted to see her family and to have time to pursue other goals. She found time for planning and correcting exams during the periods she did not teach. Making arrangements for this kind of organization was a challenge for her, because, at the beginning of her teaching career, she was busy with school duties all of the time. At the time I interviewed her, when she went home, her family knew that she was there for them. She had time to read for pleasure and just

enjoy being at home. Elissa's husband was a former chemistry teacher. This gave her the opportunity to talk with him about chemistry and discuss issues regarding her teaching. They had three children that attended the school where Elissa was teaching. In addition, in 1992 Elissa assumed the responsibility of her nephew as a parent representative.

Being a teacher and a parent in the same school presented some challenges and conflicting interests. It was difficult to separate the roles of parent and teacher. When to be the parent? When to be the teacher? Being responsible for her nephew led to conflicts with the principal because there were problems with him as a student. In this particular case, there was not a good principal-teacher relationship. Conflict was evident in conversations in different places (the teacher lounge, faculty room, and at home). As far as her professional performance was concerned, this was the main source of stress for Elissa.

The way this school was organized as well as the relationships of the site administration and parents differed from what I observed in the public school. As the principal stated in an interview, if one day she decided to work with teachers on something that she considered important for their professional development, she just asked students to stay home. She explained this as follows:

**Yo puedo hacer esto porque este es un colegio semi-oficial. Si el Ministerio de Educación me preguntara, yo puedo decir que yo estoy en una labor educativa. Yo no estoy dejando de trabajar. La única diferencia es que hoy decidí trabajar solo con los docentes y yo administro mi institución.**

***I can do this because this is a semi-official institution. If the Ministry of Education asks about it, I can say I am engaged in an educational activity. I am working. The only difference is that today I decided to work only with faculty. I am the one who administers my institution.***

There was a sense of empowerment in the words of the principal, and it was

evident that she had many good opportunities for her to develop a rich environment in which teachers could learn. Nevertheless, teaching in this school did not seem that different from teaching in other schools. Teachers did not seem to avail themselves of the opportunities to learn and improve on what they did as professionals.

This institution had approximately 650 students from K-12. In some ways it resembled a public institution. Teachers and students still ran into the building before 7:00 a.m.; teachers still ran to the teacher's room to talk about what happened and what would happen in school. Every day the principal placed announcements on a board in the faculty room. This was the way the school informed the teachers as to who was absent, when or where they would have meetings, and the kinds of activities they had to organize. Teachers needed to come to this room to see what was on the board, otherwise they would not be informed. Before 7:00 a.m. there was a line of teachers entering the room. In addition, there were some students who knew that this was the place where information about the day's school activities was displayed. Sometimes teachers left the room with disappointed faces when they discovered that they had to become a member of a new committee, or when they learn that the principal had removed them from a committee of which they were a part. This was the case with Elissa, who was a member of the school's curriculum committee. Without prior warning, she was removed from this committee. The principal could make such decisions, and she did not have to discuss her decisions or request permission to make them. The teachers in this school did not talk too much before they went to their classes. They simply read the information that the principal provided on the board and went to their rooms.

Unlike the public school, students had their own rooms, and they waited for teachers to rotate into their rooms throughout the day. Each class was organized for 30 students. Students' desks were arranged in five to six rows of five students each. Each

class was decorated with religious motifs. The classes that I visited, the ones in which Elissa taught, displayed posters containing information about mathematics and biology. The artifacts on the walls of the classrooms in this school suggested that this school was primarily Christian. The suggestion was that the participants in these classrooms belonged to a Christian culture and would act accordingly. In comparison to the public school described earlier, chemistry content-related artifacts were not as prominent on the walls in this school.

The students who attended this school could be categorized middle class students. In general, they were not wealthy people, but in the majority of cases, their parents had an education, and consequently jobs, that allowed them to live in relatively good social conditions. The socio-cultural background of the students at this school was better than those who attended public schools. In this school, parents paid an average of \$10 a month for tuition as well as \$80 in registration fees at the beginning of the school year.

As with all students in Costa Rica, students in this institution had to wear a uniform<sup>4</sup> with the insignia of the institution. In this institution there were two different uniforms because both the elementary grades (K-6) and the secondary school grades (7-11) were all in the same building.

Within the context of this semi-official institution, there seemed to be tension between the principal and faculty. This tension was openly recognized by Elissa, who organized most of her time and energy to prevent confrontations with the principal. Elissa saw herself trying to be responsible in the school (classrooms) and doing what she thought was good and necessary for students. However, she did not receive any support from the principal, who decided that the laboratory could be used for another

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<sup>4</sup> There is an effort to eliminate this official uniform and return to the use of traditional uniforms that schools used some years ago.

purpose since teachers did not use it daily. It seems to me that struggling to be a professional in the context of this tension must be a difficult task to accomplish.

### School Organization

This semi-official school was organized by departments and committees in a way that was similar to the other institutions I described. The rationale for using departments did not affect the distribution of classrooms for teachers in the school. Teachers did not have rooms; students were the ones who had rooms, and teachers had to move to the groups with whom they were to work. The rationale for distributing students in the building was based on their grades. Students were distributed by grades in the different wings of the building. Because teachers moved from classroom to classroom, it made having their materials organized before class began very difficult. The need to move strained what can happen in the classroom. This may have been the reason that teachers tended to dictate notes or just use the books that were given to students to copy from or to use as a basis for work in groups.

As I described previously, the principal saw her role as the owner of the school. She was accustomed to saying "mi escuela, mis profesores" *my school, my teachers*. She sounded like a property owner, and she viewed her responsibility as guiding teachers, students, and parents to achieve the goals of the school according to her perspective. She promoted the idea that teachers had to see their role as something beyond the transmission of information. She said, "Un educador debe contribuir a desarrollar un sentido humano, i.e., un educador debe ser un modelo para los estudiantes, los padres, y la comunidad en general" *A teacher must develop a humanist sense, i.e., as an educator whose role is to be a model for students, parents and the community at large*. In order for the school to achieve its goals, she had been promoting the idea that education was

guided by the spirituality that teachers had. She believed that the way people conducted their actions was based on their beliefs about how to interact with others as well as the issues with which they had to deal. From her viewpoint, there were economical, educational, religious, and familiar spiritualities of which teachers had to be aware. When the principal referred to the concept of spirituality, she meant the ways that people conduct their lives. She preferred to use spirituality because this was a word that, according to her, had been used in an incorrect way. Spirituality was associated with religion, but her point was that religion was just one part of our lives. She said, "Nosotros tenemos una serie de creencias que son las que orientan nuestras acciones en todos los campos de nuestra experiencia" *We have a set of beliefs that are the ones that orient our actions in all the fields of our experience.* Then, she emphasized "esta es una idea que yo estoy tratando de venderles a los profesores, estudiantes y padres" *this is an idea that I am trying to sell to teachers, students, and parents.*

The ideal of a good school administrator seemed to be an opportunity to act as professionals with an academic leader who had a vision of what to do in the school. Nevertheless, this was an environment in which there was so much tension that teachers did not pay much attention to what the academic leader suggested. This was evident when I asked Elissa to explain the meaning of spirituality in education. She was not aware that this was a concept that they had used in school. It was when she looked into her notes that she said the following:

Sí, parece que lo hemos usado en nuestras reuniones porque yo lo escribí, pero yo no tengo idea a que se refiere la directora cuando habla de eso y no se como esa idea es aplicada en la escuela.

*It seems that we have used it in our meetings because I wrote it, but I do not have any idea of the meaning of it. What does the principal mean when she talks about that? I do not know how this idea is applied in the school.*

### School Relationships

According to the principal, her relationship with parents was through the “La Escuela de Padres” *School of Parents*<sup>5</sup> that functioned in the school. The purpose of the School of Parents was for parents to understand the role of the school in the education of their children. The principal saw the School of Parents as an important part of the school because the school could not be responsible for the whole education of students.

She explains this as follows:

La escuela colabora en la educación, pero son los padres los que se supone deben facilitar la formación de sus hijos. Ellos son los que tienen la responsabilidad de la educación de sus hijos. Esta es la razón por la cual, yo no matriculo estudiantes sin padres, o alguien que asuma la responsabilidad de ellos.

*The school collaborates in education, but parents are supposed to facilitate the formation of their children. They are the ones who have the responsibility of children's education. This is why, I do not register students without parents, or somebody who takes responsibility for them.*

I saw the way that students were selected to come to this school as an implicit way to control or select particular types of students as well as a way to pressure them once they were accepted. If they wanted to remain in the school, they had to perform first in the way the principal wanted, and then in the way teachers wanted, and then they way parents wanted.

Within this principal-controlled environment, the principal saw the potential for teachers to develop curriculum in a very enriched way. One of the problems that she saw was as follows:

Los nuevos programas traen más espíritu que materia, lo cual es muy difícil para el profesor y se llega a patinar, . . . porque ellos están

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<sup>5</sup> This is a program organized by this school to keep parents informed of the pedagogical orientation of the school as a basis to have their support. There is an assumption that if education is the responsibility of the family, then parents need to be educated to assume this role.

formados de otro modo. Están formados para dar materia, no para ayudar en los otros aspectos, entonces ahí estamos patinando, pero el patinar no significa que no se vaya logrando algo. Los profesores tradicionales prefieren tener una clase de organización que les de las bases para justificar a los padres lo que ellos están haciendo.

*The new programs are more spirit than content. This is difficult for teachers and they skid by in trying to apply new programs. This happens because teachers are prepared to work in a different way. Teachers are prepared to give content, not to collaborate in the development of other aspects. That is why teachers skid by, but it does not mean that something is not going to be achieved. Traditional teachers prefer to have a kind of organization that gives them a basis to justify to parents what they are doing.*

It was here that the concept of teachers' professionalism emerged in the conversation. From this principal's point of view, professionalism was a concept that had not been used appropriately in Costa Rica. Teachers had claimed rights related to salary, but they had not claimed rights about decisions that they, as professionals, had to make. According to this principal, teachers did not have a professional consciousness. They wanted to shield themselves from rules imposed from outside; it is as if they were fearful of assuming the responsibility for their own decisions. It was common to hear teachers criticizing other teachers. From her point of view, this did not fit with the ideals of professional ethics and honesty. At this stage, it seemed that the principal did not believe that the teachers were professionals. That was why she saw a need to re-educate teachers according to the possibilities that she could provide.

In faculty meeting, teachers discussed the possibility of alternative ways of doing their work in school. As an innovation in this school, faculty meetings were no longer called faculty meetings, but rather, "jornadas pedagógicas" *pedagogical journeys*<sup>6</sup>

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<sup>6</sup> This is the name that the principal assigned to faculty meetings. She believed that teachers should get together to talk about pedagogical issues. This was a task that they had to do as part of their professional journey.



which was part of the principle's viewpoint. Teachers were supposed to participate in the organization of such meetings, and the principal stated that when they come "ellos participan activamente" *they participate actively*.

From my observations in other settings of the school (the teachers' lounge particularly), there were many other school problems that seemed to be discussed besides the pedagogical journeys. Issues regarding personal relationships with the principal and school policies that were developed by the administration were usually discussed in the teachers' lounge. The teachers' lounge was the place where many teachers talked about their complaints. When teachers complained, there were some teachers, or perhaps administrators (I could not identify the role of all participants in the school), who encouraged the complaining teachers to present their viewpoints in the faculty meetings. However, these teachers were afraid to discuss these matters in faculty meetings because, as they mentioned, "el poder que tiene la directora puede crearles problemas a ellos en la institución." *the power, that the principal has, can create problems for them in the institution*. Accordingly, it was better for them to avoid conflict and not raise potentially problematic issues.

Different school cultures--cultures in which teachers had to deal with professional actions--were revealed in each school. As Erickson (1987) and Corbett, et al. (1987) describe, there are many cultural elements in schools that can be considered sacred for teachers, while there are others that teachers and administrators can discuss and seek to change. In the instances of the schools where Marta and Elissa worked, there were both possibilities and limitations for change. Marta and Elissa came to a position in which they were able to maintain a stable balance between these possibilities and limitations in order to survive in their cultures. Within their social contexts, they have struggled in isolation; therefore, they have constructed themselves as working

alone.

### Chemistry Teachers' Experiences

Marta and Elissa were part of a group of chemistry teachers who got together once a month to discuss problems related to the schools in which they worked as well as to discuss the national program in which they prepared students for success. This group traced its roots to 1972, when it first started with the help of Marta's and Elissa's husbands, plus others who subsequently joined the group. Marta and Elissa saw the group as an opportunity to discuss specific chemistry teaching problems as they related to the cultural contexts in which they were teaching. They had to do that, particularly that year, because they did not have a national assessor<sup>7</sup> in chemistry. Moreover, whenever they are invited to participate in meetings with assessors as members of the department of science, the meetings concentrate on problems that general science teachers have in 7th-9th grades. As a teacher mentioned in one of our meetings "asuntos relacionados con enseñanza de química son pocas veces discutidos en las reuniones de ciencias generales" *issues regarding chemistry teaching are rarely discussed in general science meetings*. Elissa stated the following:

Este grupo es un grupo de apoyo. Nosotros sabemos que podemos discutir problemas que todos entendemos, incluyendo problemas que tenemos con nuestros directores en las escuelas, porque muchas veces no podemos hablar acerca de esos problemas con otros colegas.

*This group is a support group. We know that we can discuss problems that all of us understand, including problems that we have with our own principals in schools, because many times we cannot talk about these problems with other colleagues.*

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<sup>7</sup> There used to be a national assessor for each discipline. This assessor prepared general guidelines and assisted teachers in clarifying issues related to national programs.

After participating in a group meeting, teachers were not expected to do what they talked about; rather, this seemed to be an opportunity for them to speak out and reflect on their own teaching. Teachers could teach however they wanted, and if there was a suggestion that suited their needs, they were welcome to use or adapt it. The group was not there to control or give recipes, but to provide opportunities for teachers to talk about their professional practices and concerns.

The chemistry classes that I observed as part of this study generally were organized in the same way. Students sat rows of five or six, or sometimes they worked in small groups of five or six students. According to a planning method that had been advocated by the assessors of the Ministry of Education (Molina & Pérez, 1991), all teachers were supposed to plan their learning activities in ways that provided opportunities for students to interact as the means for learning. These suggestions were grounded in the idea that learning was a social process. Based on these suggestions, teachers were using individual, small group and general learning activities. It was mandated that evaluation take into consideration these aspects of the learning process (República de Costa Rica, 1991). Chemistry teachers who participated in this group were struggling with new regulations for the evaluation process that had been mandated by the Superior Council of Education. Thus, this gave them other concerns to deal with.

Marta, for example, believed that these suggestions sounded good when you read them in the book, but usually in her class, that was not the way students learned. Perhaps this was because she felt that her way was the only way of doing things. She said it was difficult to change just because others said that you had to change. In her class, it was common to see her presenting a topic. Following her presentation, students then read some notes and commented on them. One also saw the students taking notes. After taking notes, students talked among themselves about their notes. Marta suggested that

students read from other sources, and she encouraged them to discuss what they read among themselves after class. Students who performed well on exams were encouraged to help those who had problems understanding the topics that they discussed in class. Marta insisted that learning was a social activity, that students needed to talk about what they learned, because when they talked or asked questions, they better understood what they were studying. She said that this may not be what the assessors suggest, but this was what made sense for her. She wanted the autonomy to experiment based on what she knew about her classroom, rather than follow the methodology suggested by someone else. When she intended to follow a methodology suggested by the Ministry of Education, she said, "Yo me sentía totalmente fuera de lugar." *I was feeling so disempowered.*

Elissa tried to follow the methodology suggested by the assessors of the Ministry of Education. In part she said, "Yo estoy tratando de evitar problemas con la administración de la escuela, porque ellos quieren que se aplique lo que ha sido sugerido." *I am trying to avoid problems with the administrators of the school, because they want to apply what has been suggested.*

In 1992, the 10th graders began their year with new programs and new methodology, while the 11th graders began with new methodology but used old programs. Because students resisted the new methodologies, this was a concern that was discussed in the group of chemistry teachers. However, the new curricular program did not seem to be a big issue for the students. In Elissa's case, she explained to the students that this methodology was not the way she was accustomed to teach, but this was what had been suggested by assessors from the Ministry of Education. In one instance when students were working in groups, struggling with concepts about electronic distribution, Marvin, a student, had a question about what they were studying. The teacher said, "Esta es solo la parte individual. Trate de entender por usted mismo. Cuando trabajemos en grupos

podemos discutir más. Esta es la metodología que estamos siguiendo." *This is just the individual part. Try to understand by yourself. When we come to work in groups, we can discuss more. This is the methodology that we are following.* Marvin put his pencil down in anger and said:

Metodología, metodología, yo no se para que sirve esto. Oh señor Ministro de Educación, te he de conocer algún día!

*Methodology, methodology, I do not know what is the purpose of doing this. Oh Mister Education Minister I will meet you some day!*

The way the class was organized required students to study notes that Elissa had selected from a book. The students had to read in order to construct an understanding of the concepts related to the electronic structure of atoms. Elissa tried to advise the students, but at that stage, the main purpose was for each student to read by him/herself to come up with some questions or explanations of what he/she was reading. Elissa did not intend to explain much at that stage because, according to her understanding of the methodology to develop the new programs (Molina & Pérez, 1991), the students needed to have time to construct their own understandings before they worked in groups. For the students, this was a new way of learning in school. They were used to the approach in which teachers gave the content that students needed to memorize, or they simply explained the content in front of the class, assuming that the message would be absorbed by students. According to the traditional way of understanding teaching, a teacher who did not explain the content was not a good teacher.

In the case of chemistry in the 11th grade, that was the first year that students were exposed to a new methodology, even though they were not following new programs. That was a transition year for the use of new programs and methodology. Teachers were supposed to use new methodology and old programs with the 11th grade students who were getting ready for the baccalaureate exam.

The possibilities that this group of teachers had created--to discuss school issues and to explore alternative ways of understanding, all based on the collaboration--seemed to be a means for teachers to generate autonomy, which is an important feature of professionalism. Autonomy for making decisions about where, when and with whom to get together, without the interventions of assessors or supervisors, is a need for teachers. This was what this group was accomplishing. Even when assessors and supervisors knew about the group, they did not participate, nor did they interfere. At that point in time, they seemed to take it for granted in the region.

#### Students' Stories as Related to Chemistry Teachers

A group of 60 students participated in this study by writing about the way they saw themselves in relation to their chemistry teachers. Even though students had been exposed to all the propaganda associated with the new educational policies, new programs, and the role that all participants should have in the learning process (Herrera, et al., 1990, Ministerio de Educación Pública, 1992), they still saw themselves as separate from what teachers do. In a bulletin distributed by the Ministry of Education in the 1992 school year, there was a description of the expectations that teachers should have for students:

Asumir la responsabilidad de su propio aprendizaje. Compartir con el docente la búsqueda de una práctica pedagógica dinámica, activa, participativa e innovadora. Poner sus mejores esfuerzos en el desarrollo de las situaciones de aprendizaje que se propocian dentro y fuera del aula, buscando, la construcción del conocimiento y el desarrollo de sus habilidades y destrezas.

*Assume the responsibility for their own learning. Share with the teacher the search for a dynamic, active, participatory, and innovative pedagogical practice. Devote their best efforts in the development of the learning situation that takes place in and out of the classroom, looking for*

*the construction of knowledge and development of their abilities and skills.*

According to the stories or descriptions that the students wrote, the majority expected something different from what they had experienced in their chemistry classes. Students justified the difference, between what they expected and what they received, in terms of the need to cover the national science program. They expected chemistry to provide more practice than theory. Specifically, they wanted to have more laboratory experiences in the chemistry course.

When they came to the chemistry course, they had an idea of who their chemistry teacher would be, but they did not have an idea of the content they were supposed to learn. By the time they wrote about their chemistry teachers and their experiences regarding the learning of chemistry, they saw chemistry as something that existed out there (solutions, mixtures, elements, symbols, compounds, and formulae). They saw the benefit of learning chemistry as a way of understanding their surroundings. The students did not go beyond the terms that were commonly used in class. Many comments were based on the idea that chemistry was related to matter, formulae, symbols, solutions and compounds. Some students indicated that chemistry gave them an opportunity to realize that they were surrounded by substances. Even though Marta had mentioned that chemistry provided a basis for developing a critical attitude, students did not mention nor use any means to critically analyze their understanding of what they experienced.

The way students expressed their relationship with their chemistry teachers and with the course varied in extension and format. When they recalled what happened in their chemistry classes, some students created stories from the perspective of 20 or more years in the future. Other students just made comments on what happened in those

classes in terms of the routines that they and their teachers adopted. For the majority of students, the most important thing that happened in their chemistry course was the affection they received from their teachers. The following is evidence of this kind of description. A female student made an attempt to use an alternative format to express what she saw as the most important aspect of the chemistry class. (I include this in the form that she wrote it, without editing, because I think it makes sense in the language, and because there are many things that I learned from the way she wrote it.)

Era si una vez una estudiante del colegio Rafael Sancho, que como todas las demás materias recibía Lecciones de Química. Su profesora se llamaba Marta y la sección de la chica era 10-3.

A La chica se le dificultaba un poco la materia pero la motivaba el gran incentivo de la profesora. Ella era bastante comunicativa aunque un poco estricta. La muchacha en su lección no temía preguntar porque ella le contestaba de buen modo aunque siempre estaba insistiendolo en aprender los símbolos y valencias de la tabla periódica. (Se preocupaba por nosotros).

Doña Marta en ocasiones se quejaba por su gran trabajo, pero una vez q' nunca se le olvidará a su alumna estaba comentando con una compañera los nuevos programas de educación y llamó a una compañera de su alumna y a ella, y les pidió una opinión sobre la forma de la educación ya que para ella los estudiantes son los que dicen si está bien o mal la educación. Le gusta luchar por lo mejor y la justicia y ayudar a sus alumnos, en ocasiones se observava dando clases extras en sus recreos, por eso y más la llegó a admirar su estudiante por su gran calidad humana y profesional. En resumen es una gran persona. Quizás a muchos estudiantes reveldes les cae mal ya que ella no tolera la vagancia y es lógico.

*Once upon a time, there was a student in the school Rafael Sancho. She had to take Chemistry classes as all the other subjects she received. Her teacher was Marta and the girl was in the section 10-3.*

*For that girl chemistry was a little bit difficult, but she had a motive based on the incentive provided by the teacher. The teacher was communicative but strict. The girl in that class was not afraid of asking questions because the teacher used to answer in a good manner even when she always was insisting that we have to learn the symbols and valences of the periodic table. (She took care of us.)*

*Teacher Marta, on some occasions, complained about all her work, but there was an occasion that her student cannot forget when the teacher was talking about the new programs and called two of her students to ask their opinion about education because she believed that students are the ones who know if education is good or bad. Marta enjoys struggling to get the*



*best, to be fair and help students. In some occasions, Marta gave extra classes during the recess periods, that's why this student admired her, because her high human qualities and her professionalism. Marta is a wonderful person. Perhaps many students did not like her because she doesn't tolerate laziness and that's logic.*

All the comments were equally important, and they served to provide an example of the way students wanted to say something, and to suggest that what they valued most was the relationship with the teacher, not the subject that was being taught.

#### Relationships Among Teachers, Assessor, and Teacher Educators

When Marta and Elissa told their stories about themselves as chemistry teachers they described the isolation in which they lived.

*No hay oportunidades de hablar con otros, o aprender de otros acerca de asuntos de química. Todos en la escuela están muy ocupados, nunca hay tiempo de hablar, ni siquiera de hablar acerca de lo que estamos haciendo, porque todo el tiempo estamos corriendo para llegar a la próxima clase. Para poder terminar los programas no se les puede dar a los estudiantes muchos laboratorios u otras actividades que uno quiera darles a ellos. El problema también es que las escuelas no proveen laboratorios y personal auxiliar para el uso de estos. Con todos los grupos que uno tiene que trabajar, usted solo puede estar en clase.*

*There are not opportunities to talk with others, nor to learn from others regarding chemistry issues. Everybody in the school is so busy. We never have time to talk, even to think about what we are doing because all the time you are running to your new class. In order to finish with the programs you cannot get students involved in as many laboratories or other activities as you would like for them to do. The problem too is that schools do not provide laboratories and personnel to help you to use them. With all the groups that you have to deal with, you just stay in class.*

Since these teachers did not view administrators, assessors and supervisors as persons able to help teachers learn, they did not value the opportunities for teachers to learn about the subject matter and pedagogical approaches from their interactions with administrators, assessors and supervisors. Usually, when assessors and supervisors came to school, they came as controllers, and the recommendations provided by them

were disconnected from school life. They looked for the teachers' plans or for mistakes that they could out to the teacher. They never identified any possibilities to learn with teachers.

When Marta participated in a reverse role playing activity, I asked her to take the role of a supervisor. She took the role of her ideal chemistry supervisor. Once she felt comfortable with the idea of being the supervisor, she said the following:

En una clase yo observaría primero que todo la relación alumno-profesor. Exploraría si hay una buena relación o no, si existe confianza entre el profesor y los alumnos. Observaría además el comportamiento de los estudiantes. Comportamiento ante la clase, ante la lección que están recibiendo, a ver cómo se sienten, si uno los ve que están aburridos, contentos, si están trabajando. Respecto al profesor, yo observaría el dominio que tiene para hacer lo que hace, como la técnica que está utilizando, no importa la técnica, pero lo que está haciendo, si se ve que hay planeamiento o no, o si está a lo que salga. En este sentido yo vería cómo el profesor planea su clase. Además, observaría cómo el profesor utiliza los recursos que tiene a mano, sean estos sus estudiantes o los objetos materiales que tiene a su alrededor. Esta observación tendría que ser valorada dependiendo de la clase que se esté enseñando. Lógicamente, que si esta fuera una clase de química yo pondría mucha atención al tema que se está desarrollando para ver si hay dominio del tema, y si hay una buena interrelación entre los conceptos. Esto es un asunto que a mi siempre me ha preocupado, si los estudiantes estarán entendiendo lo que uno planea que ellos entiendan. Para terminar, creo que sobre todo, a lo que más énfasis le daría en mi observación es a la relación alumno-profesor, cómo está? Cómo se siente el ambiente de esa clase?

*In a class I will observe, first of all, the student-teacher relationships. I will explore if there is a good relationship or not, if there is confidence between teacher and students. I will also explore the behavior of students--behavior, in the sense of their attitude toward the class--to see if they are happy or bored, and if they are working on what they are supposed to do. Regarding the teacher, I will observe if he/she knows what he/she is doing, like the techniques that he/she is using. It does not matter which technique, but what he/she is doing, if there is evidence that he/she planned or if in the class he/she is just waiting to see what will happen. In this sense, I will look at the way the teacher plans the class. Moreover, I will observe how the teacher uses the resources available, be it resources, students or materials. This observation has to be understood depending on the topic that is taught. Logically, if this were a chemistry class, I will pay attention to the topic to see if the teacher has*

*a good understanding of it and if there is a good integration of the concepts. This is an issue that always concerns me, if students understand what we intend them to understand. To finish, I want to emphasize that the first and most important thing that I will observe is the relationship of students to the teacher. How is this relationship? How is the environment in the class?*

During her role playing, she expected the supervisor to be a specialist in the field of chemistry teaching, and she would have liked to hear some opinions regarding the way the topic was approached. In her role playing of a supervisor, she reflected the image of the supervisor she would like to have had. However, as she said, "Esto no es lo que nosotros tenemos, cuando un supervisor viene a visitar la clase. Los supervisores piden planes de lección (objetivos, actividades de aprendizaje, tareas de evaluación, control del tiempo)." *This is not what you have when a supervisor comes to visit you in the class. Supervisors ask for lesson plans (objectives, learning activities, evaluation tasks, control of time).* Moreover, from Marta's perspective, supervisors wanted to know in which part of the program you were teaching and the extent to which teachers had progressed through the prescribed curriculum. According to the idea of programs, teachers were supposed to cover the whole content program that was defined for the year. The role of supervisors was to ensure that teachers were at the level they were supposed to be according to the plan they wrote at the beginning of the year. After talking for some minutes and reflecting about her views about supervision, Marta was disappointed with the traditional view associated with supervisors. She envisioned something different, an interaction from which both the teacher and the supervisor could learn.

#### A Curriculum Assessor Viewpoint

One of the assessors that I interviewed, did not see a healthy relationship between assessors, supervisors and teachers. She said that this was part of the school culture,

but it was so difficult to change it. From her experiences, she saw the resistance of teachers to talk about their experiences, and how they always thought that they were doing fine in school. Even differences of opinion between assessors and supervisors were evident in the school system, with each one wanting to maintain control.

This assessor had been trying to understand what was going on in secondary school classrooms. Her role in the system was to provide technical assistance to teachers. However, if she did not have a general picture of what was going on, she could not be of any assistance in her capacity as an assessor, particularly as a curriculum assessor. This assessor decided to spend time observing in different secondary schools. She said, "No todos los asesores y supervisores quieren ir a las escuelas secundarias, porque existe la idea de que los que en la escuela secundaria todos los docentes son especialistas en sus áreas" *Not all the assessors and supervisors want to go to secondary schools because there is the idea that, in secondary schools, all teachers are specialists in their fields.* From her perspective, secondary schools were so fragmented that it was difficult for a teacher to have an idea about everything that happened in a group.

When this assessor observed classes in different secondary schools, her idea was to observe one group during the entire day to see what she could learn from them. She said that after three periods of 80 minutes in the same room, she was exasperated because all teachers went through the same routine (individual work, group work, general discussion, or, in the worst cases, teachers were dictating all day), even when none of these things made sense to the students. She said, that from this experience, she learned that teachers need to coordinate with each other. As a group, teachers needed to find ways to develop strategies to engage students in meaningful learning experiences. However, at the same time she said the following:

Cómo le presenta uno esto a los educadores en una forma que ellos estén dispuestos a oírlo? Generalmente cuando los asesores y supervisores sugieren algo, los educadores creen que nosotros estamos imponiéndoles esto, que nosotros no sabemos acerca de la escuela debido a que nuestras oficinas están en otro lugar. Pero nosotros hemos sido educadores, y ahora tenemos la oportunidad de ver la escuela desde otras perspectivas. El hecho de que nosotros podamos hacer sugerencias, eso no quiere decir que nosotros tengamos que hacer el trabajo de ellos. Incluso la nueva política del Ministerio de Educación es dar más autonomía a los educadores, el problema es que por muchos años ellos han estado esperando por recetas y ahora nosotros no queremos hacer eso. Nuestro problema es cómo cambiar la imagen de dadores de recetas y la resistencia que esto genera.

*How do you present this to teachers in a way that they will be willing to listen? Usually when assessors or supervisors suggest something, teachers think that we are trying to impose something, that we do not know about their school because our offices are somewhere else. But we have been teachers, and now we have an opportunity to see schools from different perspectives.*

*Because we can offer suggestions, it does not mean that we have to do their jobs. Even when the new policy of the Ministry of Education is to promote more autonomy for teachers, the problem is that, for many years, teachers have been waiting for recipes, and now we do not want to do that. But the problem is how to change the image of recipe givers and the resistance that that image generates.*

This assessor was aware of other problems regarding the understanding of the policies that come from the Ministry of Education. She said that part of the problem was that teacher associations wanted teachers to fighting with the Ministry of Education all the time:

Ahora yo entiendo, dijo la asesora, por qué es que yo odio a los que trabajan en las oficinas de las asociaciones de educadores. Cuando ellos vienen a trabajar con los educadores, vienen en esos carritos, y lo único que ellos hacen es criticar y buscar formas de lograr aumentos de salario, pero nunca promueven la profesionalización de los educadores.

*Now I understand, she said, why I hate people who work in teacher association offices. When they come to work with teachers, they come in big cars, and the only thing they do is criticize and look for ways to get increases in salary and not promote teachers' professionalism.*

### Teacher Educators' Viewpoints

The preparation of teachers in Costa Rica is the responsibility of the universities. The common model for secondary school teacher preparation includes (a)- content courses from specific science fields and (b)- courses from education. Content courses are taught as if students were getting prepared to be specialists in those fields. Courses in education are taught as if all students, who take the courses, are from the same discipline field and are going to the same school. It is expected that students are good enough to integrate these two fields and to construct an image of themselves, not as experts in the field nor in education, but as good teachers who will deal with school culture wherever they go. There have been many evaluations, criticisms and suggestions to improve this approach. Stucky (1969) developed an evaluation of the secondary school teacher preparation programs in Costa Rica, and he made suggestions to improve the program's organization as a means to provide prospective secondary school teachers with opportunities to better understand their roles in schools.

New models of teacher preparation programs have been developed and implemented in Costa Rica (Ruiz & Sánchez, 1982; Sánchez, Alfaro, Madrigal, Sibaja, Víquez, Hidalgo, & Castro, 1989; Universidad de Costa Rica, 1991). The new models provide students with opportunities to experience what it is like to live and learn in the school culture. In the old model, students received school-based experience when they were almost at the end of their program. In the model that is currently used, courses are organized to provide students with opportunities to visit school settings from the first semester they come to the program. The majority of courses in teacher preparation programs require students to visit schools to generate questions and build an understanding of the school culture.

Those who have been involved in the preparation of teachers see this process as a

very serious matter, since the professionals they are preparing will influence many other people. One teacher educator said the following:

En la formación de educadores no hemos sido capaces de identificar los prospectos de buenos educadores. Tal vez podemos identificar cuando tenemos enfrente a un maestro de verdad, pero no hemos sido capaces de identificar antes de que lleguen a ser maestros aquellos que van a ir a destruir niños, que no van a construir nada, a estos no los debiéramos dejar llegar, pero esta es una carrera en la que no hay selección.

*In the preparation of teachers we have not been able to identify good prospective teachers. Perhaps we can identify a good teacher when we have one before us, but we have not been able to identify bad teachers before they come to the classrooms and destroy children. We cannot let these teachers complete their programs, because they will not contribute to the education of the child. The problem is that in this profession there is no selection.*

There are concerns among teacher educators because the job market that these professionals are dependent on is controlled by the Ministry of Education, and from their view, communication and coordination between those who prepare teachers and those who employ these professionals are poor. For example, when a coordinator of a science education program referred to this issue she said the following:

Yo no creo que uno tiene que formar a alguien como encajonado totalmente, dirigido exactamente a lo que el empleador quiere, porque el empleador mañana puede volver a cambiar, como es lógico en educación. Yo sí creo que usted tiene que darles una formación sólida que les permita afrontar los cambios, y lo que es más, muchas veces ser los promotores del cambio en lugar de esperar a que el empleador genere el cambio. Pero a como nosotros estamos formando los educadores, yo no creo que formemos gente así. En parte el problema es que la mayoría de la gente que nosotros tenemos no tiene vocación nata para enseñar y lo ha buscado como un oficio, como una salida.

*I don't believe that one has to prepare teachers to be boxed into the system, ready to do whatever the Ministry of Education asks them to do at a certain time. Tomorrow they can change their minds. I strongly believe that we have to provide them with a solid background that allows them to confront changes, and perhaps, to be the promoters of those changes. But I don't think that we are preparing those kinds of educators. The problem is that the majority of people, with whom we work, do not see teaching as a profession. They see this as an occupation only.*

At the university level the complaint regarding the traditional teacher preparation programs is that research is not associated with these programs. Courses are taught, but there are few attempts to analyze and learn from experience. Teacher preparation programs are general aggregates of courses that, in very few cases, professors get together to discuss. This need of collaboration and coordination was emphasized by a teacher educator when she mentioned that, according to the academic university model, one could not obligate any professor to coordinate with those who participated in teacher preparation programs. Professors in the same program have to be able to see the program as a whole and be clear about his/her contribution to the preparation of future professional teachers; this is the ideal. This is commonly seen as the sin of the "School of the Nifia Pochita." This is an expression that is used in Costa Rica to describe a style of teaching that is used mostly by elementary teachers, that is, with a lot of caring for students. According to the way university teaching is traditionally conceptualized, there is an impersonal relationship among students and professors. University teaching is organized as an information delivery system. This system has been highly criticized, but it is still part of the university culture.

The majority of comments were criticisms regarding the way that teacher preparation programs are structured. These programs do not provide students with opportunities to develop an integrated theoretical framework<sup>8</sup> from which they can operate when they go to school. There is a need for a theoretical framework that provides a basis for a teacher to construct herself as a professional. According to a

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<sup>8</sup> From my perspective, teachers need to have a theoretical basis from which they can explain and understand what happens in the school culture. I see this theoretical basis constructed from the formal and informal experiences of education. A teacher preparation program has to provide a good environment for prospective teachers to reflect on their beliefs about teaching that help them to clarify their theoretical frameworks.



science teacher educator, professional teachers need to have the following characteristics:

1. Un buen educador debe tener sensibilidad para identificar el talento en los estudiantes y la habilidad para orientarlos en la construcción de sus proyectos de vida;
  2. Debe tener un gran respeto por las ideas de los estudiantes y tener voluntad para aprender;
  3. Debe ser capaz de llenar las necesidades de afecto de los estudiantes;
  4. Debe poseer una excelente preparación académica en su especialidad.
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1. *Sensibility to identify talent in students and the ability to orient them in the creation of a life project;*
  2. *Respect for students' ideas and willingness to learn;*
  3. *Capability to fulfill affective needs of the students;*
  4. *Strong academic background in subject matter.*

According to this teacher educator, if teachers do not have these characteristics, it is not worth sending them to a school. This science teacher educator said, "Si ellos no son capaces de proveer actividades significativas de aprendizaje para los estudiantes, cuál es el propósito de su enseñanza?" *If they are not able to provide significant learning experiences for students, what is the purpose of their teaching?*

When these teacher educators (four participated in the interviews) reflected on their experiences with prospective teachers or experiences as coordinators of teacher education programs, there was a sense of frustration about what they tried to do and what they see happening in school settings.

Nosotros (Universidades y Ministerio de Educación) nos hemos resistido a coordinar. Nosotros estamos preparando empleados (educadores en este caso) para ocupar posiciones de las cuales no conocemos mucho. El Ministerio de Educación siempre está cambiando y es natural que estos cambios ocurran, pero nosotros nunca planeamos los cambios juntos, ni tampoco preparamos a los

educadores para generar estos cambios a partir de sus experiencias. Los educadores están siempre esperando a que lleguen los nuevos cambios, para resistirse a estos o para ir con la corriente hasta que venga el próximo cambio.

*We (Universities and the Ministry of Education) have been so reluctant to coordinate. We are preparing employees (teachers in this case) for positions that we do not know much about. The Ministry of Education is always changing, and it is natural that these changes occur, but we never plan the changes together, nor prepare the teachers to generate changes from their experiences. Teachers are always waiting for the new change to come, to resist it or to go with the main stream, until the next wave of changes come.*

A coordinator of a science teacher preparation program pointed out that she envisions a program that gives students the tools to go into the school system as members of a professional community and learn to generate changes within the system based on their experiences. "Yo sueño con el día cuando los cambios no vengan desde afuera sino que sean generados por los educadores desde sus experiencias de trabajo en los salones de clase." *I dream of the day when changes do not come from outside but are generated by teachers from their experiences working in classrooms.*

Another teacher educator stated the following:

El problema con la profesionalización docente en Costa Rica es que los docentes no se ven a sí mismos como profesionales. Los docentes no estudian. Usted no los ve tomando cursos o leyendo sobre su materia. Pero al mismo tiempo el Ministerio de Educación perdió una buena oportunidad de pedir a los educadores la realización de un trabajo realmente profesional, cuando las asociaciones reclamaron equiparación de salarios. Por otra parte, usted no les puede pedir a los educadores trabajar como profesionales dentro de la estructura existente.

*The problem with teachers' professionalism in Costa Rica is that teachers do not see themselves as professionals. Teachers do not study. You do not see them taking courses or reading in their content area. But at the same time, the Ministry of Education lost a good opportunity to ask teachers to work as real professionals when teacher associations claimed salary equality. On the other hand, you cannot ask teachers to work as professionals within the existing structure.*

He was referring to the way teachers are hired by the school system. In Costa

Rica, teachers are paid by the number of lessons they teach. He stated the following:

Esta estructura no da oportunidad a los educadores para ser profesionales, debido a que todo el tiempo que ellos pasan en la escuela están enseñando y nunca tienen tiempo para hacer algo diferente. Además, hay pocos incentivos para mejorar.

*This structure does not provide opportunities for teachers to be professionals. Because all of their time is spent in schools teaching, they never have the time to do something different. Moreover, there are few incentives to do better.*

Another teacher educator reflected on the fact that, when prospective teachers are in the university, they do very well. However, she said the following:

Uno nunca sabe las condiciones que ellos van a encontrar en las escuelas donde les toque trabajar. Las escuelas alrededor de la universidad y especialmente aquellas donde los futuros educadores hacen su práctica, colaboran y tienen las facilidades que los estudiantes practicantes necesitan (e.g., laboratorios y equipo), pero este no es el caso de la mayoría de las escuelas en el resto del país. Uno no puede culpar a los docentes por no hacer las cosas mejor.

You never know the conditions they will find in the school where they are employed. Schools around the university, and especially those where prospective teachers have their internship, collaborate or have the facilities that student teachers need for their internship (e.g., laboratories and equipment), but this is not the case with the majority of the schools around the country. You cannot blame teachers for not doing better.

#### Relationships Among These Stories

Looking into all of these stories, I wondered if they were related. The time that I spent talking with participants about the school system (the ones who participated in the study), was like talking with people from different worlds. They did not see themselves as part of a system. It was only after talking for some time that they made connections and realized that they were talking about others who were related to them.

### Constructing a Metaphor

In order to make sense of all these stories, I put myself in and out of the stories, trying to see them from different perspectives and trying to understand the perspective that each of the participants had when he/she talked about the school system. I want to use a metaphorical description to re-present the way I see the school system as generated from this experience.

From my experience, the school system looks like if it were a conical pyramid building (see Appendix B). As a regular building, there are floors, passages, corridors, stairs, elevators that allow people to move from one floor to the other or within the same floor. Each floor is arranged in ways to facilitate those who have space there to operate in the building.

In order to explore the inside of the conical pyramid building, I enter, talk with participants and look through the windows. This is what I find in each floor. All participants call this building the school system, and when they talk, they mention that they belong to that building. We are all part of the school system, said someone. As a social system there are groups organized in particular ways to fulfill particular functions. The groups seem to be distributed according to the number of participants. The smallest group occupies the top level of the building and the largest group is on the first floor. Within each group there are divisions according to the specific functions that members are supposed to fulfill. In walking around the building, I was surprised to note that members of each group did not talk much among themselves, and when someone talked, the others did not seem to pay much attention because they continued doing what they were doing. When someone from a higher floor had something to say to somebody on a floor below, he wrote and sent a note that took a long time get there. When the note arrived where it was supposed to arrive, there was a person who in charge of filing it in

a cabinet and, after some days, to read what was in the note. If someone needed to communicate something from a lower floor to a higher floor, he/she had to send a note to a person on the floor immediately above him/her. This person took the time to see if the message was important enough to continue to the next floor until it reached the person to whom it was addressed. On each floor, people are called by different titles, and each one keeps a label with this title on the front of their door (e.g., teacher, assessor, supervisor, principal, secretary, assistant to the principal, assistant secretary, librarian, Minister, counsel member).

It is interesting to note that when those who occupied this building talked, the majority of time, they referred to people who were not in the building. They talked about parents and teacher educators who did not have rooms there. "These are the others with whom we have to deal," said a principal and an assessor.

If the conical pyramid building is a metaphor for the school system, then I will start using it to make sense of the way I saw school participants interacting in school settings. This metaphor emerged when I was reading my notes, listening to tapes and reading transcriptions. Through this process, I discovered a need to figure out how to put all of these things together. In conversations with teachers, for example, they referred to themselves as the ones at the bottom of the school system:

Aún cuando nosotros somos la mayoría no tenemos el poder para cambiar nada, nosotros tenemos que esperar por los de afuera que están en la cúspide.

*Even when we are the majority, we do not have the power to change anything; we have to wait for outsiders from the top.*

This seems to be the same attitude or belief described by Sarason (1982) when he refers to the fact that, traditionally, changes in the school are promoted from outside of the classrooms.

Teachers see the top occupied by a few people who have the power to make decisions. These are the ones who can send messages that, in one way or another, have to go down in the pyramidal system. One teacher said that the problem is that, when teachers receive the messages, it is too late; it is after these teachers have decided what to do, and this necessitates that the teachers stop whatever they are doing to do what the people at the top say has to be done. Sometimes the advantage is that the teachers receive the message, and for some days or months, the people at the top keep talking about it. However, after awhile the teacher can return to his/her own way of doing things. From this idea, it seems to me that it is fair to assert that there is confusion among participants in the school system. Some of the teachers have the feeling that they have to do what others say, even when it may not make sense, and others see themselves as those who have to enforce whatever application is recommended. There is an assessor who sees herself as a teacher, but she is temporarily an assessor. Her idea is that she cannot impose anything on the others because of her own experiences which she did not like. What she is trying to do is to learn from what teachers are doing and talk with them about the value of their own beliefs. And, she wants to help teachers to use teaching strategies with which they feel more confident. From time to time, she says "Yo presiono hacia cosas que me gustaría ver, pero de una forma que ellos sientan que la sugerencia emerge de la conversación." *I push toward the things I would like to see, but in a way that they feel that the suggestion emerged from the conversation.*

Teachers' isolation. I was surprised by the few conversations among teachers regarding classroom issues. They spoke about the differences between their criteria and their administrators' criteria regarding things such as planning, the ways to dress in school and the discipline of students. Why did these people not talk about their

professional experiences with those who teach in different areas? It seems to me that teachers do not have ways to communicate regarding what happens in their classrooms in terms of teaching and learning. In some cases, the answer is that they do not see the need and in other cases the answer is that they believe each one speaks a different language.

While she was in a meeting organized to discuss methodological aspects for the implementation of the new programs, one teacher said, "Eso es fácil para los profesores de ciencias, pero para nosotros eso no es posible." *That is easy for science teachers, but for us that is not possible.* She was referring to the idea of getting students engaged in discussions as part of the learning process. She said that, in history, the story is different, in science teachers can create, while history is already done. This example indicates that teachers construct their actions from the beliefs they have about the subject matter they teach. At the same time, the subject matter provides a framework to construct an image of themselves within the system in which they operate. In this case, it was interesting to see that the social studies teacher constructed herself and others from different perspectives which provided her different options. Her problem was that social studies as a subject is constrained. She did not question the principles on which she based her teaching. Rather, she simply associated teaching with the subject matter. It is in this environment of isolation where chemistry teachers, and teachers in general, deal with their professional actions.

Building bridges. The potential for teachers to interact seems to be one key element to success in educational settings. The chemistry teachers who participated in this study seem to be the exception, not because they are able to communicate with their colleagues within their own institutions, but because they see the need to communicate with other chemistry teachers with whom they have opportunities to interact. These

opportunities to interact are based on their belief that they have a common understanding of their roles in their schools. After many years of interaction, these teachers seem to have created a culture that mediates their actions, as Wertsch (1991) discusses when he refers to actions in general as culturally mediated processes. It is not by accident that in this group teachers can discuss issues related to the nature of chemistry as science as well as the way students make sense of concepts that usually are difficult for them to understand.

Even when a member of the group mentioned that their discussions deal basically with how to organize the program, how to teach a particular topic or how to approach problems they have with principals in schools, during my observations of group discussions, I saw them engaged in in-depth analyses of chemical concepts. For instance, a week before the meeting I attended in August, some chemistry teachers participated in a session coordinated by the regional assessor of science. The purpose of that session was to work with a chemist who came to promote a chemistry book for secondary schools. As part of her promotion, the chemist wanted to present and discuss a topic with all science teachers. For discussion, she presented the concepts of heat and temperature. According to the description that chemistry teachers presented, it seemed that this was a very simplistic way of describing these two concepts, and "Por supuesto," *Of course*, said one of the teachers, "para aquellos que no quieren pensar en el asunto, aquella fue una explicación maravillosa." *for those who do not want to think about this, that was a marvelous explanation.*

The teachers, who teach chemistry but are not certified to teach this subject, liked the explanation, but those, who have degrees in chemistry teaching and have been involved in seminars, courses, and teacher preparation programs with a strong emphasis in understanding chemistry, thought the explanation was a disaster. The



majority of chemistry teachers who participate in this group have been part of formal programs at the university level that are designed to improve teaching science and chemistry . They earned degrees in chemistry teaching while working as chemistry teachers. These teachers (four out of seven) participated in an in-service teacher education program in chemistry, in which the main purpose was for in-service chemistry teachers to reflect on and learn from their own experiences.

From my perspective, to arrive at a level where professionals are engaged in discussions of controversial concepts requires the maturity and understanding that is grounded in experience. Having participated in the same program and having the experience of teaching chemistry for some years provided the group with a common means for understanding their professional experiences, even when those experiences occurred in a variety of settings. These secondary school chemistry teachers took time to discuss concepts of the discipline, trying to understand them from different perspectives and trying to figure out the implications of teaching them from those perspectives. This seems to be a way for teachers to gain ownership of their understandings of the discipline. However, in order for them to have interacted and learned from their experiences, they have had to develop their own culture that allowed them to interact.

Supporting a metaphor. Going back to the conical pyramid building metaphor, I see the actions of other participants of the school system as supporting the metaphor. Principals, supervisors, regional directors, ministry assessors, and at the top, the Minister as a figure of maximum authority, were mentioned by those who participated in the interviews. They also referred to this pyramidal structure in informal conversations. Teachers tended to rank participants of the school system in a

hierarchical order. The need to ask permission or to communicate with “my superiors” as described by principals, was a relationship that supports this metaphor. In one case, the principal saw layers of the system on top of him, and he had to follow the hierarchical order or simply not communicate about intended changes and take the associated risks of failing to obtain permission. In other cases, the principal saw the structure, and she looked for ways to avoid it because of the special character of the institution in which she works. Then, “ Yo puedo decirles a ellos que hoy yo estoy trabajando con los docentes, porque yo considero que esto es parte de mi trabajo.” *I can say to them that today I am working with faculty, because I consider this part of my work.* It seems that there are different options in establishing relationships, and it depends of the way each one of the participants constructs herself in relation to others.

When supervisors come to school, principals, teachers, and staff have a feeling of being controlled. Many things that are organized in the school in a particular fashion are changed that day to be consistent with the supervisors' requirements. One day Marta went to talk to the principal about an activity for which she was the coordinator. On this occasion a former teacher from the school, now a supervisor, was present. Marta approached the principal to explore the possibility of arranging for some of the teachers to leave their classes in order to complete the organization of the activity. With a grave and confident voice, the supervisor said that this was not possible since schools are not supposed to take class time for activities other than teaching. She said, “Los profesores se supone que deben estar con los estudiantes todo el tiempo,” *Teachers are supposed to be with their students all the time.* Marta left the office disappointed. When we were ready leave the school, the principal approached Marta to talk about the incident. He said the following:

Usted sabe que cuando nosotros organizamos algo en la escuela, nosotros

podemos hacer los arreglos que necesitemos, pero cuando tenemos que pedir permiso, o si las autoridades superiores están aquí, ellos son los que tienen el control.

*You know that, when we organize something in the school, we can make the arrangements we need, but when we have to ask permission, or if superior authorities are here, they are the ones who control.*

It was evident that this principal was aware of his need to play a game with the teachers and supervisors. He did not want to make any of them angry with him, but he viewed their roles and status in terms of what he perceives to be the greater interests of the school and those in it. When the authorities are present, the principal plays by the rules, but when they are not there, he makes the decisions based on the welfare of the curriculum. In terms of this control game, the conical pyramid building seems to represent the distribution of power and control in the school system fairly. Gallard (1990) describes this situation with a similar metaphor, saying that, in terms of power relationships, the school system is a pyramid in which the ones who have the power to make decisions are at the top, even when they are few in number, and the ones who have to implement the effects of those decisions are at the bottom and constitute the majority. A minority of participants in the system has greatest power and makes decisions that relate to the actions of a majority. In terms of control, the school system is an inverted pyramid. Control is represented by the wider part of the pyramid at the top (policy makers and policy mediators), and the ones with less control are in the narrower part of the pyramid at the bottom (teachers).

### Where are the Others?

In conversations and interviews, participants mentioned others who are related to the school system. It is difficult to figure out the specific identities of the others, since "others" was used as a generic term. It was through careful observation in the

context that I came to see that what they meant by others was students, teacher educators and parents. These “others” represent a milieu in which the school curriculum, including the actions of teachers, is embedded. The milieu is characterized by a culture that saturates all activities in the school.

Students. At this stage, the description of the school system seems to be made up of those in the conical pyramid. Nevertheless, when teachers saw that representation, they were concerned about the placement of others (i.e., teachers, parents, teacher educators). Teachers see students beneath them (see Appendix C). From this model, the implication is that teachers also assume responsibility for control at a local level.

It is in this sense that students enter into the system under the control of teachers. For teachers, to assume the responsibility of being controllers has its professional implications. Constructing themselves as followers of policies that come from the top leads teachers to feel insecure, because they do not have ownership of their teaching practices. When teachers talk about methodology, programs and the evaluation system, they refer to them outside factors. As I described before, a teacher said “Esta es la metodología que nosotros estamos usando. Esto es lo que el Ministerio de Educación quiere que nosotros hagamos.” *This is the methodology we are following. This is what the Ministry of Education wants us to do.* This sounds as if they are saying, I do not assume the responsibility for what happens here. This is not my style. It seems that some teachers avoid conflict by saying “Yo estoy siguiendo la metodología” *I am following the methodology.* That way they cannot be blamed if students fail. In this case, teachers are not respected by students because of their failure to assume responsibility for their own actions.

Other teachers take the risk and have the courage to develop and implement

innovations in their classes. For these teachers, it is necessary to create a cultural environment in the class in which students are engaged in learning situations for which they feel ownership. Marta, for instance, mentioned her decision to implement her "own approach" after negotiating with students.

Después de un mes de tratar de implementar una cosa que para mi no tenía sentido, tal vez no porque no sirva, sino porque no es lo mio, yo me sentía como amarrada. Un día paré, les expliqué a los estudiantes que íbamos a cambiar, definimos cual iba a ser el papel de cada uno en la clase (profesor y estudiantes) y cuál iba a ser el propósito de otras actividades, y ahora yo siento que estoy haciendo lo que yo se hacer. sí alguien viene a observar y me pregunta por qué no estoy siguiendo la metodología que ellos sugieren les voy a explicar que para mi no funciona, pero que me hagan observaciones para mejorar lo que yo hago.

*After a month of trying to implement something that was senseless for me, perhaps not because it does not make sense by itself, but because it is not my way, I was feeling constrained. One day, I explained to the students that we would change. We defined the role for each one in the class (teacher and students) and the purpose of other's activities. Now I feel very much on my own. If somebody comes to observe my class and asks why I am not following what they recommended as methodology, I will explain that it did not function for me, but that they can observe me and help to improve what I am doing.*

From my perspective, there are professional implications of following methodologies designed by others. For instance, when students realize that what their teachers do is mandated by others, then teachers are not models of creativity and criticism. Teachers show disempowerment when they say, "Este no es mi estilo" *This is not my style*, but they do not have the courage to develop or pursue teaching styles based on their beliefs. From my perspective, the outsiders' attempts to control the curriculum promote de-professionalization. The suggestions given by the Ministry of Education are valid, but the expectation that teachers are only supposed to do exactly what they suggest is degrading. Thus, students become the bottom of the system, under teachers who blame the top for the ways they have to conduct their actions.

Teacher educators. In general, teacher educators are constructed as outsiders of the school system, not only by school participants, but also by themselves. They are regarded as not knowing what happens in schools and, in many cases, teachers have the idea that they learned something at a university that did not fit with what they found in the school culture. One chemistry teacher said, "Uno aprende con ellos si ellos le dan a uno el apoyo y si ellos tienen la sensibilidad para guiarlo en el proceso" *You learn with them if they give you support and if they have the sensibility to guide you in the process.* Teacher educators have to be aware of the reality that teachers construct as they live their lives in their schools. At this point, there seems to be a lack of respect for the roles of teacher educators and their potential to contribute meaningfully to the solutions of the real world problems encountered in schools.

There were exceptions to this trend. One of the teachers remembered his experiences during an internship and recounted how helpful the contributions of his supervisor were because of the friendship he established with him. The teacher came to consider the supervisor as his mentor. Thus, it is possible for teacher educators to have a positive impact on teaching and learning, but few do. The challenge to be addressed is how to build and maintain productive roles for teacher educators.

Teacher educators talk about the school system as something that is there. Universities, as autonomous institutions, do not belong to the system. The teacher educators who were interviewed agreed that the university faculty members, in this case teacher educators, see the university structure as a constraint for doing a better job in teacher preparation programs. For the most part, these university educators failed to see that they had constructed the university as something separate from the educational system and that this construction constrained their actions in relation to assisting chemistry teachers do a better job in the classroom. As Schwartzman (1984) states,

each one of the participants in an institution constructs the institution in which they want to be. However, individuals do not construct in isolation of their culture. The customs of those in universities are in a sense defined by tradition, and they act as referents for the actions of teacher educators. Actions that are consistent with the customs of the university culture make sense and feel comfortable to teacher educators. To take the risks needed to change roles is asking teacher educators to swim against a strong current that is supported by a culture that has been in place since the advent of universities in Costa Rica.

According to the academic model of the universities in Costa Rica, professors are supposed to have time in their academic responsibilities for teaching, research and extension or social service. This is the general university framework in which a teacher educator is supposed to conduct his actions as a professional. Even when they divide their time in these three areas, teacher educators usually do not connect activities in each area. Teacher educators believe that the institution prevents them from integrating their activities. They believe they have too much to do, and they see their professional lives as fragmented. In only a few cases, teacher educators were able to provide examples where they had integrated the actions of their professional lives.

The disconnection among actions described by teacher educators is highly criticized by teachers, assessors and principals. One of the assessors mentioned the fact that student-teachers coming into the school system are not prepared to face the reforms that the school system is implementing. At the same time, she referred to a lack of effort from teacher educators to provide opportunities for students to be prepared when they go to school. For example, she mentioned that civic education is an important component of elementary and secondary education, but this aspect is not considered in the preparation of teachers. There seems to be an assumption that getting a degree from a university

will make student teachers leaders in the school.

Teachers feel that once they have finished a program that is the end of their education. There are some exceptions, but these occur more because of the personal interests of a particular teacher educator rather than for professional and institutional commitments. These are opportunities that can strengthen the link between universities and the school system, but not all professors are willing to take the chance.

Principals have to deal with the product that universities provide in the form of new educators. In general terms, principals believe that new teachers are not well prepared to deal with school issues. For example, they do not receive anything on ethical dilemmas that teachers have to face. Yet, the school has to employ these new teachers because they are certified. However, it is necessary to give them time to get re-educated and to be part of the school culture. One principal said that the problem with some of the new teachers "es que algunos de ellos creen que con un título se vuelven expertos. Hay otros que están dispuestos a aprender." *is that some of them believe that with a degree they become experts. There are others who are willing to learn.* According to one of the principals interviewed, the role of the principal is to give new teachers opportunities to learn. "Algunas veces, toma cuatro o cinco años antes de que uno pueda decir que ellos pertenecen a la escuela: Este es un largo proceso de re-educación, adaptación y evolución," *Sometimes, it will take you four or five years before you can say that they belong to the school: This is a long process of re-education, adaptation, and evolution.*

Parents. The role of parents as "others" is barely mentioned by school participants. Many times parents are seen as obstacles in the school system because those parents who come to school are the ones whose children have problems. There is a common idea that parents do not have to participate in making decisions about education.



According to my understanding, this idea seems to be based on a law that establishes education as the responsibility of the state. Education is compulsory and free for all parents. Parents seem to think that the teachers are responsible for what happens in schools. *At some point in history, this was considered a sign of respect for teachers.* Teachers were the ones who knew. The message at home was that students should do what teachers ask them to do. In that respect, home was a support or a reinforcement for teachers' strategies.

Traditionally when parents come to school, they expect to hear something bad about their children and suggestions from teachers as to what to do. In this way, the role of teachers as controllers of what happens in school is supported by parents. Parents of good students rarely come to school. From this perspective, the relationship between the teachers and parents, as part of the school culture, is not very deep.

According to a bulletin of the Ministry of Education (Ministerio de Educación Pública, 1992), there is an expectation that parents will do the following:

1. Constantly support their children by recounting traditions, customs, stories, and providing all the information that they require;
2. When required, help children in developing research and other homework;
3. Stimulate children's achievements and the efforts that teachers carry out to offer a quality education for their children.

Even when parents adopt the new vision suggested by the Ministry of Education, parents are not necessarily considered part of the school system. Tradition separates parents from the formal education of their children, and an idea presented in a bulletin does not seem to have the power to provoke a change in the school culture.

One of the principals talked about the School of Parents. The School of Parents is an organization created to inform parents about the responsibilities they have regarding

the education of their children. In general, it is one way of telling parents how to prepare students to perform in school. The principal said the following:

Los padres necesitan conocer la clase de educación que sus hijos están recibiendo. Ellos tienen que ser responsables y decidir si esto es lo que ellos quieren para sus hijos.

*Parents need to know the kind of education their children are receiving. They have to be responsible and decide if this is what they want for their kids.*

The School of Parents seems to be an interesting approach, but I still see that the school has control over the curriculum, and there does not seem to be a planned curriculum to educate parents with respect to their roles as supporters of the learning of their children.

One of the chemistry teachers was trying to organize a meeting with parents to explore the ways they can assist students taking the chemistry examination for the high school baccalaureate. Her intention was to make them aware of the responsibility students assume and to develop some strategies to help students accomplish their goals. From this teacher's perspective, parents can be collaborators, but not part of the system. Failure to see parents as part of a culture in which the curricula are embedded might have implications for making changes to curricula.

Especially in secondary education, students assume that the assistance their parents can give is negligible. There are many parents who did not go through secondary education and who do not understand the system. In the majority of cases, teachers and students interact within the school system without the overt participation of parents.

It is interesting that the principal of the semi-official institution and the teacher who sees parents as collaborators are taking the position of getting the support of parents to implement their ideas. I did not see any intention from their perspectives to get suggestions from parents as a basis to transform the culture that pervades their

relationships. The idea of the School of Parents in one part and the meetings to discuss with parents in the other part can be used to promote parents' education. Parents need to be educated if they are to have a different and formal role in the school culture.

### Gluing Stories Together

In putting pieces of a system together, there is an expectation that those pieces are going to fit. The glue that holds the pieces of the school system together has to be found in the actions of the participants in the school culture as described by Connelly and Clandinin (1988). From this perspective school system participants are curriculum developers. Each one of the participants contributes to the construction of a curriculum. By looking at participants as curriculum developers, it is then that we can understand the relationships they establish among themselves and the justifications they have for such relationships.

### The Curriculum

According to the notion of control, I need to consider the reasons teachers have to see themselves as controllers. Teachers' actions occur in an institutional and historical context in which teachers construct themselves. Teachers' actions are influenced by the institutions, the historical forces that guide the development of culture there, and personal experiences. Teachers know that exams are valued by the community and that exams are used to select students for jobs or for the university. Passing the exams from the national testing service is evidence that teachers performed well in school. This is an institutionalization of the culture of exams, and this is what has value in the school culture at this point in time.

Because of they contrast with the baccalaureate exams, teachers rejected the

usefulness of new programs and associated new methodologies. In general terms, teachers follow what is in the program. Even though the general curriculum framework provides opportunities for innovations, teachers attach themselves to the program under the justification that students need to finish the program for the baccalaureate exams. Teachers construct themselves as controllers of the curriculum because this is the means by which students and teachers are assessed. For them, curriculum is a program, and this is something that keeps all participants joined in an effort to provide students the tools for success on the exams. I assert that the driving force of the curriculum is the examination system. Teachers have to utilize roles to prepare students for success on an external examination. Accordingly, in the construction of self as chemistry teacher, a major constraint is the need to prepare students for these examinations. This belief is a powerful referent for chemistry teachers as they make decisions about their roles and their effectiveness as teachers. If meaningful changes are to be introduced in Costa Rica's chemistry curricula, teachers' beliefs about the examination system will have to be addressed in a direct way.

#### Chemistry as a Subject Matter

In the case of chemistry as a subject matter, teachers have an option. That option was valid in 1992, and teachers were wondering for how long it would remain. Thus, it could be that today that option is obsolete. In the way the baccalaureate examinations were organized for science in 1992, teachers could convince students to take the course of science (biology, chemistry, or physics) but not the national exam. The baccalaureate exam in science only included one area (e.g., chemistry only or physics only). Then, if students wanted to take the national exam in chemistry, teachers felt compelled to complete the entire program. If students do not take the examination, then teachers and

students can plan a course in chemistry in a way that covering all of the content is not a necessity. If the purpose were to learn chemistry rather than take national examinations, then teachers and students would not so concerned about following the program. The problem is that students do not decide which science examination to take at the beginning of the year. Therefore, covering less than all of the content is a risk that many teachers do not want to take.

At the time of my visits to Costa Rica, there was a discussion in the Superior Council of Education aimed at the inclusion of physics, chemistry and biology on a high school science baccalaureate examination. The idea was to develop a test that includes content from these three areas as a means of compelling students and teachers to learn and teach particular science content in school (i.e., from each of the three science areas). This is another way to control what teachers and students do in the classroom.

The selection of which exam to take in science for the baccalaureate exam generally is based on the relationship that students establish with the teacher more than the content they have to study. Students know the experience that particular teachers have in preparing students for those exams. Thus, teachers are compromised by their students, but at the same time, teachers can make an effort to influence students' selection of the science subject in the baccalaureate examination system. For instance, Marta encourages students to take the chemistry exam only if they assume the responsibility of studying hard from the beginning of the year. In contrast, Elissa encourages students to take other subjects, giving them a chance to work in chemistry without the pressure of examinations. Who is right?

Should chemistry be constructed as a potential subject to prepare students for an examination, or as a subject in which learning occurs? According to my understanding from conversations with teachers, this is a dilemma that confronts them and about which

they are confused. Having students who take the baccalaureate exam is a sign in the community of being a good a teacher, but at the same time, preparing students to take examinations is not what they envision a good educational model to be.

### The School as a Factory

From my experience in the school system and what I could learn during the time that I visited schools and talked with participants, I believe that one of the major concerns of all participants is the products students will produce at the end of the school system. Perhaps the products that each one expects are different, but there is an idea that the school is a factory, just as Wexler (1989) describes the school management models in which "a formalist culture of scientism . . . reinforce a rationalized and alienating daily social life." (p. 96) For instance, industry people expect to have a uniform product that performs well and contributes to the economy of the company. Professors expect that schools will provide them with students who perform well in university courses.

I see the majority of teachers in elementary and secondary schools encouraging students to go into higher levels of education, but not valuing the meaning of work as something students will do in the future. Working is a labor for which education is not needed. The idea of work is associated with cultivating, and that is something that the school does not promote in a country where its main source of income is the richness of the land. Students are supposed to go as products into university packages. Since the university cannot take all students, what we have are many incomplete products that are not well prepared for anything. Intermediate institutions are the ones that take these incomplete products to reshape them, usually for the workplace.

It seems to me that it is not productive to think of the school system in terms of a

factory metaphor that lacks quality control, even though many are trying to exercise control over the school system and those within it. When what school provides is not good enough for those who are outside of the system, then society tends to undervalue the school system because it is not effective as well as those who work in the system because they are not efficient workers. The emergence of a generation of private schools in the country seems to be a reaction to the public schools being based on a factory model of teaching and learning. Ironically, private schools seem to be following the same metaphor.

Culturally, the expectation is that school has to provide students with certain basic tools for them to read, to make some calculations, and to have a general understanding of the cultural development of society. Literacy is the main purpose of education. Teachers are supposed to provide students enough learning activities for them to have many notes in their notebooks, an indication to parents and society of the good educations that students are receiving. Teachers who promote innovations and do not value the writing of notes as a sign of learning are commonly criticized, because of the lack of good work according to parents. In general, society seems to be satisfied with the factory model that is operating in schools. This is a source of resistance for the promotion of change or for the support of the generation of innovations in school.

### Teachers' Professionalism

When I asked teachers about schools as places where they learn and grow as professionals, Elissa's response was as follows:

Yo pienso que la escuela debe ser un lugar donde los profesores aprenden y crecen profesionalmente, pero no es un proceso continuo. Este proceso muchas veces se ve cortado dependiendo del director que se tenga. Por ejemplo en mi caso, yo siento que en los últimos años he decrecido montones por la relación con el director. La dirección y los profesores no

seguimos la misma orientación.

*I think school should be a place where teachers learn and grow professionally, but this is not a continuous process. This process, many times, is altered depending on the principal with whom you work. For instance, in my case, I feel that in the last few years I have decreased a lot because of my relationship with the principal. The administration and faculty are following different orientations.*

Decrease is used to indicate a loss of autonomy and opportunities for collegial relationships. She does not feel confident to make changes, nor does she feel that the school is supportive. Elissa said, "Un día uno propone algo que es aceptado, al siguiente día cuando uno viene, el interés de la escuela ha cambiado, usted nunca sabe para donde va." *One day you propose something that is accepted, and the next day when you come, the interest of the school has changed. You never know where you are going.* At this stage in her life, Elissa feels that she is able to make some decisions as a professional in class, not the same professional that she was when she started her career. Now there are so many things that come pre-fabricated that she cannot create much, and at the same time, the pressure of examinations reduces the time for opportunities to talk with others as a basis for sharing experiences. It seems that teachers are not learning from each other. There was an expression of sorrow in her face when she said, "Yo siento que en los últimos dos años he decrecido montones como profesional" *I feel that in the last two years I have decreased a lot as a professional.* The pressure to prepare students for examinations and the need for students to have notes in their notebooks seems to pervade the teaching practices in school. Elissa is not exempt from these practices and tries to follow the program and the methodology to avoid conflicts with the principal. This is a way to protect herself from the criticism of not having enough content for students to be assessed. It seems that the factory metaphor is supported here. By expecting students to have many notes, teachers are becoming the workers of the factory who provide the



content as a product that has to be checked and returned in the form of exams.

From Marta's viewpoint, being a professional is something that she has to create herself. Being a professional implies responsibility, care, a willingness to give a lot to the institution for which she works, and it is a full time responsibility. She stated this as follows:

Cuando uno viene a la escuela los estudiantes esperan que uno se desempeñe bien, los administradores y colegas esperan mucho de uno, y cuando uno está fuera del edificio escolar, los padres de familia y la comunidad en general lo sigue llamando a uno profesor. "mire ahí la profesora de química" oigo cuando voy al mercado o cuando camino por la calle. El profesor tiene que ser un modelo, yo se que esto no es fácil pero a mi me gusta la idea. El problema es que el sistema no le da a uno el apoyo para ser profesional. Uno ve muchos trabajadores en educación pero no hay muchos profesionales.

*When you come to school, students expect that you will perform well. Administrators and colleagues expect a lot. And when you are out of school, parents and the community in general still call you teacher. "Look the chemistry teacher" I hear when I go to the market or when I am just walking on the street. The teacher has to be a model. I know that this is not easy, but I like the idea. The problem is that the system does not provide support for teachers to be professionals. You see many workers in education but there are not many professionals.*

It seems that Marta and Elissa had different views about professionalism, but both miss the collaboration coming from the system. The relationship with others is an essential part for them, even when they do not see much support from the system to promote collaboration. Life in school seems to be reduced to a series of routines that teachers have to perform in order to cover the content of the curriculum to prepare students for examinations. This inclination affects what students learn and what they can do when they leave the school system. Although the school system has geared its program toward the needs of those who continue with a university education in chemistry, most do not go on to university. Furthermore, the school courses do not seem to prepare adequately those who do opt to study chemistry at a university.

In terms of teachers' professionalism, it is hard to see formal or real efforts to promote professionalism in the field of teaching. As the principal of the semi-official institution said, "El concepto de profesionalismo no ha sido bien elaborado en Costa Rica" *The concept of professionalism has not been well elaborated on in Costa Rica*. And, a teacher educator said, "El problema es que los educadores no se ven a si mismos como profesionales." *The problem is that teachers do not see themselves as professionals*.

On the other hand, the way teacher unions have approached professionalism has been based more on salaries rather than on decision making. Teacher associations advocate better conditions for teachers in terms of number of students per class, the availability of materials for teaching and learning and better salaries. Unfortunately, they have not put much effort into the professionalization of teachers to make decisions in their own classrooms. As Duke (1984), Larson (1977), and Sykes (1990) state, teacher unions have been looking to protect the interests of the teachers, not the interests of the profession. As described by an assessor, there is tension between Ministry of Education representatives and teacher union representatives; they construct themselves on different sides of the river. On one side of the river, teacher union representatives play the role of defending teachers' interests. On the other side of the river, Ministry of Education representatives, as controllers or promoters and implementors of new ideas, play the role of the boss who are perceived in many cases as the authority in the school culture. Not all teachers buy the idea of having a union to defend them; therefore, those who do not like the idea, do not belong to the unions. In this way, because there is no questioning of such a model, teacher unions perpetuate the model that they have been promoting. Teachers who feel they are professionals or distinguish themselves by their responsibility in school usually do not participate in teacher union activities due to the negative connotations associated with teacher unions.

For instance Marta and Elissa do not get involved in activities related to teacher unions. During one of my visits, there was a meeting of one of the teachers' unions, and a chemistry teacher of one of the schools said the following:

Usted ve, todos los profesores que trabajan en undécimo nivel, no asisten a esas reuniones porque ellos son muy responsables, ellos no quieren perder su tiempo. Nosotros tenemos que trabajar duro con los estudiantes que van a hacer el examen de bachillerato.

*You see, all the teachers who work in the 11th grade do not go to the meeting because they are very responsible. They do not want to waste their time. We have to work hard with the students who are taking the baccalaureate exams.*

The implicit message that I got from that comment was as follows: Look, teacher's unions are not important to the professional goals of those of us who are important. Personally, I was a member of one of the teachers' unions during my first years as a teacher, and I always had the feeling that something better could be done. The meetings were opportunities for the union to make points against the Ministry of Education, and the majority of attendants were there to change the daily routine of the school. I do not remember any session in which we got involved in serious discussions about pedagogical matters.

The group of chemistry teachers seems to be interested in developing opportunities for themselves to learn. As I described before, in developing their own culture, I see these teachers bringing together elements that help them to construct themselves as learners. For instance, they recognize a need to understand chemistry and a need to see this as part of science in general. They have a vision of science in which they want chemistry to fit. At the same time, they recognize some people who belong to the culture of science as models for them to follow. For them the construction of a chemistry teacher, or the image they have, is part scientist and part educator. There

are times when the discussion follows the path of the chemist, but at the end, the educator calls attention by saying, "Bueno, pero cómo vamos a enseñar esto?" *Well, but how do we teach this?* As a consequence of learning, it is a permanent struggle in which chemistry teachers are continually redefining their roles.

### Learning Together

In terms of using metaphors, just to emphasize the richness of such a tool, I want to think of teachers as learners. This idea has to be understood taking into consideration the way teachers construct themselves. Traditionally in the school system, teachers have seen themselves as the ones who teach groups of students to learn. However, there is not an explicit idea in the school system that indicates that teachers have to learn while they are teaching. Nevertheless, for teachers to positively impact the quality of learning, their learning necessitates success in the contexts in which they are to teach. This is a fact that universities have to take into consideration if they intend to contribute to the preparation of professional teachers, those professionals who are willing to always be learners. Teacher educators need to think about the image of professionals that prospective teachers are constructing of themselves while they are in universities. The construction of learning environments where prospective teachers have opportunities to explore school settings, identify problems, generate and confront ideas, look for viable solutions, generate a sense of community and the openness to keep looking for something better are challenges that have to be provided by teacher preparation programs.

When there are discussions and complaints among a group of chemistry teachers about ways of developing content programs and the ways of evaluation, I see a conflict between what they believe is their role as professional educators and what they have to

do for students to substantiate, according to the regulations, that they learned something. There is tension between what society expects and what these chemistry teachers believe about learning. Society values education as far as it follows the regulations. Strong emphasis is placed on supporting a technical approach for developing curriculum (Grundy, 1987). The success of such education is demonstrated by the success in examinations. Teachers' goals at their individual level are oriented toward students' learning. Learning by understanding has a different purpose; therefore, the roles of teacher and students to engage in such kinds of processes have to be different. As Grundy (1987) suggests, this approach in developing curricula serves a different interest; its main purpose being emancipation. Emancipation requires conscious participation as well as conscious control of the self as participant in the development of an action. In this sense, learning with understanding should guide the curriculum with more emphasis if students are expected to be able to participate in the construction of alternative solutions for the problems they find daily.

When the group of chemistry teachers get together to discuss the problems they see as related to content programs, methodology and evaluation, they seem to be looking for their own alternatives. That is, they create a context in which emancipation can occur. By preparing examinations together, looking at the language they use to better explain to students what they intend to ask, clarifying the concepts for themselves first, these chemistry teachers must be willing to learn from each other and from students in order to be successful.

A problem teachers face in the culture is that they are not used to recognizing what they learn from their colleagues as knowledge, because knowledge is commonly associated with official recognition by an authority. If an expert in evaluation comes and says to them that it is important to prepare examinations together, to take into

consideration the language that students use, and the way in which concepts are presented, then they would recognize that as knowledge.

From what I have seen in this group of chemistry teachers, they have gone through a process of negotiating in which they have constructed themselves in different ways according to the circumstances. In terms of promoting professionalism in teaching, I think that teachers have to learn how to construct themselves as learners. I see the experience of this group of chemistry teachers as a potential model for enhancing teachers' professionalism. The concept of professionalism, as a social construction, has to become a part of the culture of teachers. In order to do this, there is a need not only to construct a meaning for the concept but also to construct a social structure in which the concept makes sense. Once the social structure and the meaning can be understood, other concepts related to professionalism, will have to be reallocated. Salary increases, for example, have to be seen just as part of a reorganization of the school system structure in which professionals interact, and the organization of the school has to provide teachers with opportunities to construct themselves as learners. Moreover, they need opportunities to build the autonomy to perform actions from different perspectives, each of which facilitates the learning of those involved in high school chemistry.

## CHAPTER 5

### IF WE HAD

#### Introduction

This chapter deals with those pieces of data that, at the beginning, I was putting under the category named "Dreams". Those dreams after a time evolved into a category named "if we had". The transformation of the name came about because those dreams were so real and looked so possible under the condition of "if we had".

Students, teachers, principals, assessors and teacher educators see alternative ways in which the schooling process can occur. They envision ways that are not far away and views that one can not say are difficult to achieve. The majority of constraints described by school participants seem to be inside, rather than outside of the school system. Since all the constraints seem to be personal constructions, solving these problems will require cultural adjustments within the school culture more than outside it. I cannot say that resolving those constraints in school is an easy task, but if school participants come to understand that school is a social organization, and as such, is a human construction (Grundy,1987), then they will be able to deal with alternative views or possibilities.

Restructuring schools, school policy making and questioning related to people or school institutions are major concerns throughout the world (Barth, 1991; Thomas, 1990; Elmore & Associates, 1990; Goodlad, 1990; Goodlad, et al., 1991; Papagiannis, et al., 1992; Leavitt, 1991; Ginsburg & Chaturvedi, 1988). The development of new

visions about schools and the implementation of those visions is not a matter that can be resolved individually; rather, this is a challenge that has to be met by all involved in the school system. Referring to Goodlad's idea about school change, Sirotnik (1983) states the following:

Pervasive changes [in schools] cannot occur without restructuring societal values and priorities. With sufficient reorganization and endowment, schools can become more viable hosts for teacher-learner activities, and teachers can become more effective when trained [sic] properly, treated as professionals, and rewarded appropriately. (p. 29)

### Alternative Metaphors for Understanding Schools

As language constructions, metaphors help us to project and establish semantic connections or imaginative structures through which we put in evidence our level of understanding about the phenomena of which we are trying to make sense (Lakoff, 1987; Johnson, 1987; and Muscari, 1988).

Different metaphors can be used to describe what happens in schools. Each metaphor related to schools suggests particular roles for school participants and helps to construct perspectives to look into the system (Gregory, 1985; Collins & Green, 1990; Tobin & Ulerick LaMaster, 1992). My metaphor of the conical pyramid building describes school participants in a cage. This is not what I wanted to see, but that was the metaphor that came to best represent what I observed.

There are other metaphors that have been used to describe the school and the roles of school participants. The school as a working place or as a learning place used by Marshall (1990) are two contrasting metaphors that describe some of the situations in which school participants get engaged. For instance, the teacher who has been in school for 24 years, and as he mentioned, the only thing that he is doing is waiting for six more



years to retire, seems to be an example of a person for whom the school is a working place. The concept of work is for him not related to producing something. In this case, it is just a position from which this person gets a salary from minor efforts in taking care of students in his classroom. On the other hand, when Marta encourages students to ask questions in the class, to collaborate with each other, to take opportunities to explain to others what they have learned, or to talk about the questions that emerge in the process of learning, it seems to be a different way of constructing the school based on a metaphor of the school as a learning place.

Teaching and learning as problem solving (Shuell, 1990), seems to be the metaphor behind the general ideas that guide the new programs and teaching methodologies that teachers are supposed to use now in Costa Rica. According to documents distributed by the Ministry of Education (Herrera, et al., 1990; Pérez, et al., 1991; Molina & Pérez, 1991), teachers, administrators, students and parents are supposed to participate in the construction of learning environments in which students have opportunities to experience learning as problem solving. Learning activities suggested in the new programs include opportunities to explore the community. The expectation is that from such explorations students will identify problems, generate explanations and propose solutions. The problem that teachers have is that they do not understand or see the idea in an integrated way because it seems that there are many pieces of a metaphor that are disconnected. The principal in one of the schools stated the following:

Los nuevos programas son más espíritu que materia. El problema es que los educadores no saben como generar contenidos de los problemas que ellos identifican a su alrededor.

*The new programs are more spirit than substance. The problem is that teachers do not know how to generate the content from the problems they find around them.*

In the case of chemistry, teachers talked about the identification of problems as ways to find alternative means of assessing students in order to fulfill the evaluative regulations required for individual or group work. I did not see a conscious attempt on their part to make those activities an integral part of the content in the chemistry course. In the case of chemistry, restructuring was an opportunity to restructure the content program, but with the development of new evaluative regulations, teachers were again in the situation in which evaluation drove the curriculum; therefore, the problem solving metaphor could not be used to enrich the curriculum in school.

The idea of being a supervisor, a metaphor that Cohen and Lotan (1990) use to describe the role of school participants, seems to pervade the actions of the majority of school system participants. Each person in the system appears to play a role in a supervision mode. It seems to me that the problem with exam cheating that I described the first day I went to school was related to a lack of support for the supervision metaphor. Perhaps the person who does not support such a metaphor is the one who is doing wrong in the eye of the others. But what is this person's metaphor, and what are the implications of his/her metaphor in terms of teaching, learning and assessment? There is no question that there are different perspectives for understanding schooling; nevertheless, it seems that school participants believe that all understand the process of schooling in the same way, or that all ought to.

The use of metaphors is a line of thinking that teachers are not using in the Costa Rican school culture. The need to understand the metaphors that guide teachers' actions seems to be crucial for those who are promoting the development of alternative views of schooling. If teacher educators, policy makers and policy mediators come to understand their guiding metaphors and their beliefs behind them, it might be possible to have what Tobin (1990) calls a master switch for teaching. For example, when teachers talk

about what they would like to do in the classroom, they seem to have innovative ideas and the potential to develop them. Also, they have a theoretical basis for understanding the meaning of an innovation. When they come to implement an innovation in the classroom, their problem is that their beliefs about knowledge and control guide their teaching practices. The teacher as facilitator metaphor is betrayed by the teacher as supervisor metaphor.

### Developing Alternative Views

When school participants referred to their roles, as defined by the school culture, there was a sense of dissatisfaction with the things they were doing. In the discourse of school, there is a tendency to talk in the conditional tense: "If I had" or "If we had." This is a pattern that I observed when people talked about what happens in their classes, offices, programs or relationships. When they referred to present conditions, in general the motive was to complain. Having described what is going on in the school system in the previous chapter, now I intend to re-examine those "If we had" instances. It seems to me that in teachers' conditional statements there is an expectation that their experiences could be different. In many cases they said that the opportunity to participate in this project gave them a chance to think and to put language to their thoughts in ways that alternative views started to seem real possibilities to be implemented in school settings.

Alternative ways for interaction. After discussing the model described in Appendix B and trying to make sense of its implicit ideas, teachers suggested the development of another model found in Appendix C. Teachers wanted to include students, but still they wanted to see something different. Even when it seems to represent

effectively what happens in the school system, the model, as a pyramid, is not what teachers like because of the connotation of power relationships that it implies. Even though teachers recognize that there is a power relationship in the school system, they at least would like to see that this power relationship is developed in a horizontal way, rather than in a vertical one. Pushing the model described in Appendix B from the bottom and the top, it is possible to build model D (Appendix D) with some effort and consideration of the elasticity of the material. The significant implication of this model is that school participants would have to communicate face to face. As the base for social interaction among school participants, communication has to happen, recognizing the potential contribution of others. As described by Habermas (1982), social interactions can occur in two ways: By communicative action in which the main purpose is oriented to reaching understanding, or by strategic action that is oriented to success. Strategic action supposes the use of techniques as a means to achieve the purpose. Communicative action supposes the development of negotiations and agreements as the base for understanding. In terms of the implementation of innovations or the promotion of changes in the school system, it seems to me that strategic actions have guided the process. At the top of the school system, there are efforts to develop "the techniques" through which success will be reached. Through a series of strategies that many times school participants do not understand, it is expected that the models will be effective.

From my perspective, the experience of the group of chemistry teachers who participated in this research project seems to be based on communicative action as a way for them to reach understanding. It is from their personal experiences that these chemistry teachers are trying to make sense of the new educational policies regarding content program and evaluative regulations.

According to the chemistry teachers, the implications of model D are that all

school system participants have to feel that the responsibility of the system; they should not rely on those at the top nor on those at the bottom, but on all participants. Policy makers in the country are talking about the need to develop a school system that facilitates the creation of opportunities for understanding democracy (Pérez, et al., 1991). Nevertheless, the concept of democracy as described by Strike (1993) is difficult to be accomplished in a social organization that, for long time, has been organized in a different way. The division of school participants in categories seems to be a necessary way to maintain the organization of the system, but these divisions are not supposed to be ones that limit social collaboration or interaction. From the teachers' perspective, the main idea behind this model is that the system has to provide opportunities for all participants to interact. The idea of a system is that this is not something static, but constituted by elements that are interacting all the time. The system is changing, but the equilibrium is there. This idea is similar to that of a chemical system. A chemical system in equilibrium is always changing. This means there are interactions that change the system, but the equilibrium is still there.

Model E (Appendix, E) emerged after discussing the concept of equilibrium. This model intends to represent the need for interaction of participants within the same category or among different categories. The need for these interactions in the school system is not for control but for collaboration and learning. According to Rosaen and Hoekwater (1990) and Artis and Carver (1990), collaboration has a potential for empowering educators if they value the experiences of others and learn from them. I think that the school system, as a teaching-learning system, has to provide opportunities for everybody to learn, not just students. It seems to me that playing with the idea of the power relationships that are established in the school culture ( Apple, 1982; Giroux, 1981, 1983, 1988; Grundy, 1987), school participants can see the

potential that each one has to contribute in the dynamic of the system. School participants can be empowered by an understanding of their roles in the system and their contribution to the dynamics of the model.

Teachers learning in a community of learners. When the group of chemistry teachers who participated in this study discuss their experiences in school, they see the potential of something different happening in school. As I described in chapter 4, the experience of these chemistry teachers is unique, because of the possibilities for collaboration that have been developed among them and with other teachers. During the last time that I participated with them, part of their discussion in the group was about problems that they have regarding students' learning. One of the issues addressed in that meeting was the basic skills in mathematics needed to understand chemistry. For instance, problems in chemistry dealing with concentration of solutions or problems based on chemical equations require students to apply basic mathematics skills. These kinds of problems are analyzed carefully to develop alternative ways to help students to construct basic mathematics skills that are required for understanding and solving those problems. It is in these meetings where teachers reflect on their experiences and develop alternative ideas for their actions in schools. This is a way for teachers to grow as professionals who are transforming their ways of thinking. "[G]rowth implies the transformation of knowledge into the development of the individual" (Duke, 1993, p. 703).

In making sense of model E, teachers suggested that, rather than taking their time to teach mathematics in their chemistry classes, they could establish collaborative relationships with the mathematics teachers at the beginning of the year and maintain these close relationships in a way that enabled them to coordinate the development of

both courses. At this point, one of the teachers went to the diagram (model E) and started drawing circles to indicate the possible interactions that could be established among teachers working together in the same school .

There is a problem with the use of language and the understanding of science concepts that are addressed in the literature (Lemke, 1989; Russell & Munby, 1989). This was another example of a potential area for collaboration among teachers of the same school or the same level. In order to coordinate programs in a horizontal and vertical manner, the need for collaboration with other science teachers became another reasonable thing to do. As the conversation progressed, the circles in the picture started getting bigger because new connections were established and new visions were developed.

In thinking about connections that they were making and the possibilities they were developing, Marta stated the following:

Si nosotros tuviéramos una organización en la escuela en la cual como grupo propusiéramos alguna cosa al director que él vea que es un buen intento por mejorar, yo no creo que el director va a decir que no. En esta forma nosotros estaríamos rompiendo una línea en el diagrama. Este es un proceso que tomará tiempo, pero esta es la única manera que yo veo para que nosotros nos sintamos dueños de los cambios que ocurren en la escuela.

*If we had an organization in the school in which, as a group, we proposed something to the principal that he saw as a good and serious attempt to improve, I don't think that the principal would say no. In this way, we are breaking a line in the diagram. This is a process that will take a long time, but this is the only way I see that we will gain ownership of school change.*

The analysis of this model provided opportunities to see alternative interactions within the school system. Teachers found ways to establish collaboration in the system. As I understand how teachers made sense of it, collaboration is a way to help teachers in their schools develop their actions, rather than complicate their lives. Through collaboration, teachers can develop a sense of autonomy, since from collaboration they

will be able to better handle school responsibilities. It is interesting that the concept of collaboration and autonomy emerged as part of the discussion of the "if we had," because when they were talking about what they do in school, they discussed isolation but not autonomy. It is important to see that the teachers' concept of autonomy was associated with the concept of collaboration as a way to better handle what they do in school, not only in the field of chemistry teaching, but in other aspects related to teaching. Since professionalism is associated with the degree of autonomy that professionals have in order to take control of their actions in their field of expertise, autonomy is an essential concept of professionalism. According to Pratte and Rury (1988, p. 17), "[t]o achieve a high degree of autonomy a professional group must maintain that the power to control its own affairs is essential to performing its job." In the case of teachers, Stenhouse (1985, p. 105) asserts that "only they are in the position to create good teaching." Lampert and Clark (1990) justify the need of autonomy for teachers because "teaching is a complex act requiring the moment-by-moment adjustment of plans to fit continually changing and uncertain conditions." (p. 21)

Getting together to discuss common concerns regarding school is the way that this group of chemistry teachers have found useful for them to reflect and learn. Learning as it is understood in constructivism (von Glasersfeld, 1987; Tobin, 1993; Pines & West, 1986) is a social and individual enterprise. I see this group of chemistry teachers creating the social conditions for them to learn and developing alternative ways of interaction with others in the school culture. At this stage, the group is still in the process of creating alternative visions, and still this stage is grounded on the conditional "if we had." The creation of new visions is grounded on experience as well as in a sense of autonomy that provides the opportunity to think that one can develop certain rules to govern one's own actions (Haworth, 1986).



Assessors' alternative views. In talking with an assessor, she described the relationship between teachers and assessors as follows:

Si nosotros tuviéramos una buena relación con los docentes, nosotros podríamos colaborar más y ayudarlos a ellos a mejorar lo que hacen en la escuela.

*If we had a good relationship with teachers, we could collaborate more and help them to improve on what they do in school.*

The way teachers and assessors interact in the school system has been through what Blumberg (1980) describes as a cold war. The relationship among teachers and assessors or supervisors is viewed as something that has to happen in school. One has to accept the other, even when they do not trust each other. The acceptance is done as a base to avoid conflicts. It is under the model of supervision as control that teachers construct supervisors and assessors. Supervisors construct themselves as controllers in the system since this is the traditional way in which they have seen their role.

The idea of a change in the construction of this relationship is to establish collaboration as the base for learning. According to an assessor, in the case of secondary schools, the problem is as follows:

[El problema] es que los profesores se ven a sí mismos como especialistas, y nadie quiere entrar a ese territorio. Los supervisores tienden a pensar que las escuelas secundarias son territorio peligroso para ellos.

*[The problem] is that teachers see themselves as specialists, and nobody wants to go into that territory. Supervisors tend to think that secondary schools are dangerous territories for them to enter.*

In terms of the relationships among supervisors, assessors and secondary school teachers as I perceive them, the problems are as follows: 1- In general, those who assume the role of supervisors are former elementary teachers who, in the majority of cases, have spent many years as principals in schools. The resistance from secondary

school teachers is generated by the belief that these people do not know anything about the discipline and that their views are more of the administrators and controllers rather than the promoters of learning; 2- On the other hand, secondary school teachers have been prepared with a vision based on a conception of knowledge that is grounded in the teaching and learning of a discipline. Knowledge is seen as a commodity possessed only by specialists of a discipline.

From my perspective, there is a lack of understanding of the role of supervisors and a lack of understanding of disciplines as knowledge. The school culture has separated disciplines as a base to facilitate a person to concentrate in one area, but this has been a source for the disintegration of the curriculum and the isolation of teachers in schools.

Because of a limitation in the number of assessors in each region, the science assessor rarely visits secondary schools. The science assessor I interviewed said that, if she had more contact with science teachers in secondary schools, that would help her work with elementary teachers, who are the majority of population that she assists. As part of this assessor's strategy to cope with many of her responsibilities, she has invited secondary school science teachers to prepare workshops to share their ideas. Some of the chemistry teachers have participated in these kinds of events with high levels of success. During the interview, the science assessor thought that this was a good strategy for her to follow with elementary teachers to help them with concepts of science.

Si nosotros tuviéramos la posibilidad de desarrollar talleres de trabajo en los que los profesores de secundaria discutieran conceptos de ciencias con los educadores de primaria, esto sería una gran ayuda para los maestros y para mí como asesora.

*If we had the possibility to develop workshops in which secondary science teachers discussed concepts of science with elementary teachers, it would be a good help for teachers and for me as assessor.*

It seems that in the case of this assessor, her vision is related to the social interaction from which teachers and assessors can learn. She does not see herself as controlling the development of programs or the application of methodologies. As Pratte and Rury (1988) explain, the pressure on teachers to work in the program is coming from other sources such as parents, structure of the programs, examinations, and even their peers.

Coordination with teacher educators is a weak point of assessors and supervisors. The Ministry of Education is implementing something that teacher educators are not taking into consideration. An assessor stated one problem as follows:

Nosotros encontramos que los futuros educadores vienen a la escuela para su práctica docente sin entender las orientaciones curriculares que nosotros seguimos.

*We find prospective teachers coming to school for their internship without an understanding of the curriculum orientations that we follow.*

This division between teacher educators and supervisors, mentioned both by teachers and principals, is coming from the traditional idea that universities are autonomous institutions that do not have to coordinate with others, much less accept what others want them to do. This is a challenge for supervisors if they are to achieve the goal expressed in their "if we had."

Universities in Costa Rica function under the principle of "autonomía universitaria" *university autonomy*. This means that universities decide on the orientation they want to give to their programs. According to this principle, outsiders cannot impose a particular orientation for the development of a program. When assessors, supervisors and teacher educators come together to a negotiating meeting, this is one of the problems they encounter.

Teacher educators' alternative views. Teacher educators express the need to work closer with the school system. The models that they have been applying do not seem to be effective for the purposes teachers have to fulfill in school settings. According to the descriptions provided by teacher educators, universities have been following a traditional model for the preparation of teachers. Fien (1991) describes three models of teacher preparation. First, the traditional model sees teaching as a technical craft. In this model teacher preparation programs involve a relatively haphazard socialization into the skills and the work contexts of teaching. A second model is based on rationalism. This model is based on principles and practices derived from "scientific" research on teaching. The third model, a radical or critical approach, encourages student teachers to reflect critically on the craft of teaching, the social context of education and the interests served by alternative educational practices. (pp. 242-243).

In their analyses of teacher preparation programs, teacher educators would like to have opportunities for developing something similar to the third model described by Fien. A teacher educator said the following:

Si nosotros tuviéramos la oportunidad de coordinar los programas universitarios con todos los participantes del sistema educativo sería posible que los futuros educadores se involucraran en experiencias enriquecedoras que los ayudarían a desarrollar visiones alternativas y mejorar lo que está sucediendo actualmente en las escuelas.

*If we had the opportunity to coordinate the university programs with all participants of the school system, it would be possible to get prospective teachers engaged in rich experiences that help them to develop alternative views and to improve what is currently happening in schools.*

According to this teacher educator, the problem is that not all teacher educators have realized that they have prospective teachers in their classrooms. For many university professors teaching is not highly valued. Therefore, university professors as teacher educators are not the best models for prospective teachers to follow. A former

teacher educator stated the following:

La preparación de educadores se desarrolla bajo un modelo academicista. Los futuros docentes no tienen la oportunidad de experimentar el sentido de ser educador porque aquellos que trabajan en la preparación de educadores no son modelos de buenos educadores. Los ambientes que proveen las universidades no son buenos terrenos para cultivar futuros maestros. Si nosotros tuviéramos las condiciones en las cuales los futuros educadores se vieran a sí mismos como parte de una comunidad, donde ellos experimentarían el sentido de pertenencia a un grupo, los retos de participar en la resolución de problemas con educadores en servicio apoyados por la colaboración de sus profesores universitarios, entonces nuestros futuros educadores tendrían la voluntad para lidiar con las dificultades del ser educador en el sentido global de la profesión. De otra manera, lo que nosotros tenemos son docentes tradicionales que están a cargo de dar clases.

*The preparation of teachers is under the academic model. Prospective teachers do not have an opportunity to experience the meaning of being a teacher because those who are working in the preparation of teachers are not models of good teaching. The environments provided by the university are not good terrain for the cultivation of a prospective teacher. If we had conditions in which prospective teachers came to see themselves as part of a community, where they can experience the sense of belonging to a group, the challenge to participate in the resolution of problems with in-service teachers, supported by the collaboration of teacher educators, then our prospective teachers would be willing to struggle with the difficulties of being a teacher in the whole sense of the profession. Otherwise, what we have are traditional teachers who will be in charge of delivering courses.*

This idea of community, as envisioned by this former teacher educator, seems to be the idea proposed by those talking about professional practice communities as ways for teachers, prospective teachers, and teacher educators to learn together (Pasch & Pugach, 1990; Kremer-Hayon & Ben-Peretz, 1986). An idea similar to this was described by another teacher educator. She would like to have the opportunity of preparing teachers, not to implement the changes or programs developed by the Ministry of Education, but to generate their own programs and changes based on the experiences developed in the field. Teachers must be able to generate changes in the school based on their understanding of what they find as problems in the school. This

idea supports the need for teachers to be autonomous.

Students' alternative views. As part of the comments provided by students, there was a statement in the conditional tense that reads as follows:

Si nosotros tuviéramos laboratorio como parte de nuestro curso de química, sería más interesante y tal vez aprenderíamos más química. Nosotros sabemos que los profesores tienen que seguir un programa y entendemos por qué ellos enseñan en la forma en que ellos lo hacen

*If we had laboratory as part of our chemistry course, it would be more interesting, and maybe we would learn more chemistry. We know that teachers have to follow a program and we understand why they teach in the way they do.*

This comment represents the ideas that many students wrote about their perceptions of chemistry classes and the way they see their interactions with chemistry teachers. When students come to 10th grade where they take chemistry, they come with ideas of what could happen in a course related to this subject matter. Students construct their ideas about chemistry based on their experiences and on the experiences of others from previous years.

Before the national examinations changed the focus of the curriculum in this region, there was a strong emphasis on the use of the laboratory. In these courses, students would like to accomplish some of the ideas they developed before coming to the course through games they played at home with their parents or TV programs that presented a laboratory vision of chemistry. This is especially true in the semi-official institution where there is an idea that chemistry could be different if they had the laboratory. Students in this school have been exposed more to alternative ideas of what chemistry could be, and perhaps this made them feel more dissatisfied with the course they received.

Students did not think much about what they want to learn in chemistry in terms of content or skills; they just expected something different. Laboratory is a metonymy for chemistry and they want their course to fit with the model.

Teacher unions. Even though I did not directly analyze teacher unions, these were part of my data since they were mentioned by assessors, teacher educators, teachers and principals. Teacher unions are movement groups that started in Costa Rica at least 50 years ago with the creation of ANDE (Asociación Nacional de Educadores). This association included and includes teachers from all levels. Its main role is to ask the Ministry of Education to provide the conditions that teachers need for teaching. Other associations were created after ANDE: Asociación de Profesores de Segunda Enseñanza (APSE), Sindicato de Educadores Costarricenses (SEC); and other associations with a different orientation that still looked after teachers is the Colegio de Licenciados y Profesores en Letras, Filosofía, Ciencias y Artes. Being a member of the last association is compulsory for all secondary school teachers who have a university degree. The membership in other associations is voluntary. All these teacher unions form a larger association called CIMA (Consejo Intermagisterial).

Participation in teacher associations has not always been perceived well by those in schools. Being a member of a teacher union has been associated with persons looking for opportunities to use school days to participate in a congress, or with those wanting to protect themselves in the event of a problem. These are the most salient images of the associations, in addition to their role of seeking to better salaries and working conditions for teachers (Duke, 1984, p. 111). In general terms, as David (1990) describes, teacher unions have been looking into a political context, the creation of new coalitions and new conceptions of accountability. (pp. 237-242)

The activities of teacher unions are seen by many people as political games. One assessor addressed this issue as follows:

Si nosotros tuviéramos asociaciones de educadores tratando de mejorar la calidad de la profesión, ellos no estarían trabajando como si fueran en contra del Ministerio de Educación.

*If we had teacher associations trying to improve the quality of the profession, they would not do their job as going against the Ministry of Education.*

From this perspective, I think it is necessary to reconstruct the image of teacher associations and their roles within the school system if we want them to contribute to the development of the teaching profession.

A teacher educator was sorry to see that, in a special celebration they had, one of the teacher associations was more interested in the political relationship with the government than in the recognition of the contribution of teachers to the development of the nation. As Bascia (1993) refers to a familiar theme in the literature when he says, "Teacher unions have been charged, for example, with letting teachers down by supporting contractual provisions that reduce teaching to a routinized activity." (p. 37)

In the interviews with the teachers, principals, assessors and teacher educators, there was an expectation that teacher unions should do more than just look for better salaries. It seems that not all school participants are happy with the roles that teacher unions play in the country. Some of the participants described the role of teacher unions as an effort to deprofessionalize teaching rather than professionalize it. According to the participants, these organizations must gain respect and recognition for the teaching profession through their political and social interactions.

### Constructing a New Vision of School

From the contributions provided by all participants in this research project in



terms of alternative views and school interactions, I infer the need for the creation of a new school culture or an awareness that school culture is more complex than is generally described . As a social institution, school is constituted not only by those who are present in the classrooms and in the administrative offices in a particular building. School is an institution that transcends the walls of a building to include all those members of the society that, in one way or another, come to be related to it.

From their own positions, parents, teacher educators, teacher unions, policy makers, assessors, supervisors, school administrators, teachers and students interact in ways that help them frame the creation of a particular culture. In order to create a community in which all participants contribute to the development of the culture, all participants have to take a more comprehensive role. Donmoyer (1990) states that, "They must be not only the stranger who stands outside the action and analyzes and act on subjects, they must also function as a friend who interacts with and in the process, jointly to construct meanings." Applied to each one of the school participants, this statement can be the basis for developing a model that can recover the visions of participants. This vision regards the need for collaboration in the construction of an alternative view of the school and its role in society.

The model described in Appendix F is an attempt to see school as a social institution that is constructed on the basis of the contribution of all participants. It is important to be aware of the power relationships that we have in society that prevent the creation of such an institution or that have created the institution in the way we have it today. In the way I see the interactions in this model and what I understood from participants concerns and interests, the school has to be an institution that provides learning environments in which society can construct an understanding of the past and the present in order to generate views of the future and to integrate the new generations

into the culture to facilitate interactions among them.

### The School In Evolution Rather Than In Revolution

In this study I had an opportunity to see the experience of a group of chemistry teachers. Their challenge can be captured in the following description. Chemistry teachers coming from different schools get together on a Saturday in a small town in Costa Rica. Saturday is the day when teachers do not work in schools. Saturday is a day when teachers become parents, housekeepers or just family members. In our story, this is the Saturday of the month when these chemistry teachers are still teachers.

It is 8:30 a.m., and these teachers come from far away and some take buses at 6:00 a.m. in order to be on time for the meeting. Today, somebody else in the family had to go to the market. The possibility to talk and share with colleagues is as important or more important than getting fresh products in the market for the rest of the week.

With greetings, embraces and jokes the atmosphere is ready for the meeting. Descriptions of relevant issues that happened in their schools since the last time they were together made the conversation animated. The process of telling their stories is a way to attach language to their problems. This group of teachers started setting up an agenda for the meeting, because they started with what they call a blank agenda. Teaching and learning issues quickly became to be part of the agenda; then teaching strategies were discussed in order to improve what they do in their chemistry teaching practices.

New conceptions of how to organize the school require the construction of new metaphors that help us to figure out alternative ways to operate. When all participants in this project referred to their part of "If we had," they were trying to create alternative views of what they would like to see happening in the school. The chemistry

teachers' group has been developing and implementing alternative views. This is a challenge that they meet, even when it requires their time and energy. From their perspective there is no possibility for them to change and learn if they do not take risks.

Changes in the school culture cannot occur all at the same time. It is not convenient for school participants to get involved in breaking down an institution to create something if they do not know how it will work. Changing the school culture, as with any other culture, takes time. It is necessary for people to adapt to changes in an evolutionary process. Cultural evolution occurs in small steps in which participants adapt to change. For instance, McCrone (1991) states this as follows:

Cultural evolution is a simple idea and works just like biological evolution, except that instead of the inheritance of physical changes, it involves the inheritance of useful behaviors and patterns of thought. (p. 189)

I see this idea of cultural evolution supported by the octopus system metaphor that Geertz (1973) uses:

Culture moves rather like an octopus too--not all at once in a smoothly coordinated synergy of parts, a massive coaction of the whole, but by disjointed movements of this part, then that, and now the other which somehow cumulate to directional change. (P. 408)

This is the way I see how school changes can occur. School participants have to start questioning their roles as a way of generating alternative views that lead to viable possibilities within the system and that do not destroy the system as a whole. It is within the system that new interactions can be developed and still maintain a sense of equilibrium.

In order to promote changes in the school culture, it is necessary to understand that, as in all cultures, the school has sacred and profane norms (Corbett, et al., 1987). There are cultural issues that nobody questions, but that guide most of the actions of

those in the school. These issues can be categorized as myths and taboos (Gusfield, 1989, pp. 305-315) and can be considered as part of the sacred norms. Profane norms are those that are open to discussion and about which everybody in school talks or complains. Accordingly, it is not possible just to say change and expect change to occur.

Talking about change in the school culture generates resistance toward such changes. Resistance to changing sacred norms of the school system generates much more opposition, but cultural participants resist changing profane norms as well. "The difference is that attacks on the sacred [norms of the school culture] represent attacks on the professional *raison d'être*, on the cornerstones of teachers' constructions of reality" (Corbett, et al., 1987, p. 40).

School participants in this project claimed the need to have other conditions. There was an assumption that having different conditions would allow them to do different things in the school. This assumption is an implicit need for cultural changes. I do not see school participants as being very aware of the individual, social and cultural implications of promoting changes in school, an important element to take into consideration if we want changes to occur and be sustained as part of professional actions in school. Darling-Hamond (1993) states the following:

Reforms that rely on the transformative power of individuals to rethink their practice and to redesign their institutions can be accomplished only by investing in individual and organizational learning, in the human capital of the educational enterprise--the knowledge, skills, and dispositions of teachers and administrators, as well as those of parents and community members. (p. 754)

A change in the school culture will provide opportunities for alternative ways of interaction. New interactions will require different ways of constructing participants. With different ideas of who the participants are, different actions can be performed in school. It is by a permanent process of assessing their actions that school participants

will always maintain the school as a new institution. This need to incorporate others and to know their roles helps to enrich the context that can be created and re-created in the process of developing actions that are accepted as the norm by all or most of the participants in a school.

## CHAPTER 6

### FINDINGS AND RECOMMENDATIONS

#### Introduction

The purpose of this study was to learn about the way a group of chemistry teachers in Costa Rica socially construct their identities as professionals. This is a preliminary study on the issue of teachers' professionalism in Costa Rica from a perspective other than salary. The intention was to explore how a group of chemistry teachers set up situations so they could interact with other teachers and professionals in order to generate collaboration and autonomy in their careers. Others with whom they set up situations for interaction are students, colleagues, parents and community members. Another reason for meeting is content programs and regulations for evaluation with which they have to deal.

This study was conducted in four stages. Each stage consisted of a visit to Costa Rica in order to participate with this group of chemistry teachers and to learn how, in the process of their interactions, they came to construct themselves as professionals. During each visit I took time to observe these same chemistry teachers in school settings, to converse with teachers as a way to reconstruct their life histories, and to interview principals, assessors, teacher educators and students who, in one way or another, were related to the group of chemistry teachers.

From information that was gathered in the form of field notes, audiotapes, transcripts and documents, memos were written in order for me to indicate the kind of

information that was provided, and from there I was able to generate analytical categories, categories that reflected the meaning/interpretive structure of the teachers who participated in this topic. Those categories provided the elements that I used to construct the stories. The reason for using stories was to represent the complexities of the social interrelations in which chemistry teachers develop their professional actions. From the stories, I derived inferences and models that came to be the findings of this study. Inferences and models were shared with chemistry teachers to see to what degree my interpretations reflected their professional experiences in the school system in Costa Rica.

Chemistry teachers were the main focus of this study. However, principals, students, colleagues, assessors, teacher educators and teacher unions were entities I expected to see working closely in a relationship with the teachers. The findings regarding each one of these groups are listed separately because my intention was to make the contribution of each group evident to the chemistry teachers and their struggle to construct an identity as professionals.

### Findings

Findings coming from this research effort are listed by categories. It is important to keep in mind that these categories were constructed by me and I believe they represent principles of behavior developed in interaction and research experiences with participants in a system. Elements of the school system are interrelated in a manner that gives it cohesiveness and a sense of unity, even when participants talk about the disparities of policies in the school system.

### Chemistry Teachers

Some of my findings are based on the stories (life histories) of the chemistry teachers as individuals. Others are based on the story of a group struggling to accomplish a vision of chemistry teaching that best fits with their beliefs about education as it relates to the students' needs and to the expectations of the society. Some of these findings are listed below:

- Because chemistry is seen as a discipline for which only chemistry teachers have responsibility in secondary schools, chemistry teachers work in isolation in their own institutions. This is a consequence of the division in the curriculum in terms of what the school culture presents as the division by disciplines.
- Chemistry teachers expect that principals, assessors and others in the school who want to collaborate with them have an understanding of chemistry as a discipline. At this stage, they do not see regional assessors and supervisors as capable of collaborating with them in the classroom.
- Peer collaboration among the chemistry teachers of this group is used as a means of academic support in developing and adapting the chemistry program to the conditions of the institution and the needs of students. Institutional conditions are characterized by a lack of resources, and students needs are defined in terms of the national exams.
- The development of alternative visions on the part of principals and administrators is not seen by chemistry teachers as a way to promote professionalism. The process of communication between principals and teachers is not good enough to facilitate learning because they both tend to see education from different perspectives.
- Being paid as professionals does not mean that teachers are recognized in that capacity by policy makers, administrators and society in general. This happens in the case of Costa Rica where teachers are paid as professionals, but still they are not allowed to make decisions for developing curriculum.
- Teachers avoid relationships with parents, or they promote a kind of relationship in which parents support what teachers suggest students should do. Parents and schools had been two separate institutions, until recently when some efforts have been made to join them together. The construction of an environment in which teachers and parents can interact requires the development of a cultural change to facilitate such interaction. From my perspective this will require time.



- Chemistry teachers have different ideas about the implications of being called professionals. Their ideas and practices are based on the influence of former teachers and professors as well as their family life experiences in their childhood and in the present.
- In the case of these chemistry teachers, the construction of teaching images was influenced by early teaching experiences (for instance peer teaching as students in secondary school). This is why the possibility for prospective teachers to be university assistants provides them with opportunities for the development of images of being teachers.
- This group of teachers sees that the development of collaborative efforts among teachers has to be generated by teachers if there is an expectation for this to succeed. It is when teachers have opportunities to talk about teaching experiences that they are able to assess and reconstruct ideas that influence their practices. From this perspective, I assert that the promotion of professionalism is based on collaborative efforts.

### Teacher Unions

Because all communication between teachers and the Ministry of Education regarding issues of professionalism are done through the teacher unions, it is important for teacher representatives to ascertain what school participants think about the concept of professionalism. Based on this research project I came to understand the following:

- Professionalism is not a clear concept in the Costa Rican school culture because teachers have not actively participated in the construction of such a concept. Teacher unions use the concept of equity in salary as the basis for professionalism. Collaboration and autonomy are not part of the discourse associated with this concept in the school culture in Costa Rica.
- School participants perceive teacher unions more in the capacity of defenders of teachers' interests in the event that teachers have problems in school. This is why, for teachers who try to perform as professionals, to participate in teachers unions is a sign of a lack of professionalism. Another problem area that teachers need to be aware of regarding the teacher unions' interest in the issue of professionalism is that they do not see any coordination among teacher union representatives and assessors or supervisors as a basis for promoting collaboration among teachers.

### Assessors and Supervisors

- The division of the school system into regions and school districts (circuitos escolares) is a way to have representatives of the large school system on a regional scale. The intent of the system is to allow curricular adaptations to the area where schools are located. In general terms, this intention is not accomplished because the small scale system becomes a reproduction that enforces the policies developed at the top of the school system. In the case of assessors and supervisors, they assume the role of Ministry of Education representatives, and they construct themselves as controllers of the policies developed at the top of the Ministry of Education. The possibilities for them to influence teachers' professionalism are limited because a lack of trust among these groups, and the assistance provided by assessors is not valued much by teachers because assessors are not perceived to be qualified for their roles in staff development. The level of the division of subject matter has taken schools to a level of specialization so much so that it is difficult for teachers and assessors to use a common language that helps them develop understandings. From this lack of communication, teachers construct negative images of assessors based on the attitudes generated in the interrelations with them.
- In the role as controllers that the assessors and supervisors assume, there is a discrepancy between what assessors and supervisors propose and what they do. In general, they tend to talk about the development and implementation of innovations in school. Nevertheless, when they come to see the implementation of such innovations, they attempt to control the implementation of the innovation and make certain that it is implemented in the way they envisioned it. They do this without taking into consideration that the construction of the innovation could be made by teachers in a different way.
- The way assessors and supervisors are appointed seems to influence the way teachers construct them. According to an assessor, they are appointed on the basis of the Minister of Education's confidence in them. Based on this reason, supervisors and assessors are not perceived as persons prepared to work with secondary school teachers, and teachers, supervisors and assessors do not trust each other. There is a common belief that because assessors and supervisors do not understand the disciplines, the purpose of their participation in schools is primarily to control and identify problems.

### Principals

- School principals construct themselves depending on the institution in which they administer. They see themselves in the capacity of controllers of the school system, since they are the representatives of the Ministry of Education. Nevertheless, the real possibilities for principals to play a role as technical assistants for teachers, that influence and promote professionalism, are limited

because they have to take care of other issues in school. At the same time, principals cannot collaborate in the construction of rich learning environments in school for teachers to develop themselves as professionals because teachers expect principals to do other things.

- Because of their dependency on upper level administrators of the school system, the principals' leadership is not well established in schools. When principals want to support teachers' ideas or innovations, they have to ask permission or to take the risk and assume the responsibility of their actions. Principals are limited in the decisions they make that respond to needs of their schools because of the conception that the system works in a rigid way. From this conception, principals expect that professional teachers are those who fulfill the following characteristics: Order, discipline, ways of dressing, cooperation, interest for the institution and its work, responsibility, and a good base of knowledge.

### Colleagues

- The relationships among teachers in the school and the opportunities for them to learn and develop pedagogical content knowledge with others are limited by the following: 1- The way teachers' schedules are organized; 2- the failure to discuss pedagogical issues when teachers get together in informal meetings (e.g., corridors, teacher cafeteria); 3-the division of the school curriculum by disciplines and the concept of knowledge that limits the possibilities for collaboration among teachers.
- The division of the school curriculum by disciplines supports teachers' constructions of themselves as experts and does not favor the promotion of opportunities for them to learn with and from others. This construction of teachers as experts gives them the support to take the role of controllers of the curriculum and this idea mediates their actions in school.

### Students

- Students as the receivers of the benefits of the school system construct the system on the basis of their interactions with teachers. They value teachers for their attitudes toward them, rather than the way teachers approach teaching and the subject matter.
- When students start taking a chemistry course, they expect it to be taught differently. Nevertheless, once the course starts and they understand the way they are to be assessed and the purposes teachers have for developing the course, they accept it because within the school culture they are getting prepared for the national exams. From this perspective, the value of the chemistry program is

not associated with the content that is offered but on the extent to which it prepares students to succeed in the national exams.

### Teacher Educators

- From the perspective of teacher educators, there is a need to improve the way university teacher preparation programs are organized in order to provide environments where students learn to be professional teachers. From their perspective, they complain that teacher preparation programs are not coordinated so that they provide prospective teachers with an idea of the interrelatedness among disciplines.
- There is a need for teacher preparation programs to develop their standards in coordination with the Ministry of Education. In this way, it will be possible to facilitate the coordination between teacher preparation programs and the schools to develop alternative perspectives for teaching.
- Another area of concern for teacher educators in Costa Rica is that, at this point, there is little or no research in the field of teacher preparation; thus, nobody learns about the experience of preparing teachers.

### Content Programs and Evaluative Regulations

- From the perspective of chemistry teachers, the development and implementation of new content programs as related to methodology and evaluative regulations is a source of confusion and a way to limit possibilities for teachers to be autonomous. The development of content programs that give all kinds of suggestions to teachers as a way to have homogeneity in the development of 'teacher proof' programs contributes to the deprofessionalization of teachers. Moreover, national testing functions in a way that eliminates teachers' autonomy.
- National programs are developed under the assumption that those who will teach do not have the content knowledge nor the pedagogical understandings to organize their own program. Then, teaching techniques suggested by national programs contribute to diminish creativity and eliminate the idea of uncertainty that is always present in education. The pervading idea is that if something does not function, it is because of the students and not because the strategy that is used, since this is coming from experts who are in charge of the preparation of such programs.

### Recommendations

According to what I found as a result of this project, there are bases for some recommendations. The first recommendation involves all participants of the school system, and it has to do with the conceptualization of what the school system is. As I indicated in chapter 4, when one speaks with participants who work in different departments, it seems as if one is talking to people from different worlds. Even when I understand that each one of the participants constructs his/her own reality or institution in which he/she wants to participate, I see the need for them to realize that there is a system that requires cohesiveness and coordination. In this sense, I agree with the idea of communicative actions proposed by Habermas (1982) where we look for an understanding of the main purpose of the actions we perform, rather than strategic actions where my actions are guided by a need to achieve what I want. A social construction or reconstruction of the school system is necessary and requires the participation of all those related to education in the country (i.e., we need to understand that schooling and the coordination of it are social processes).

In order to create different visions of what the school system can do and how to achieve them, we need to think in terms of the contribution that each group or part of the system can provide. In order to improve what happens in schools, each one of the groups or main sources of influence for the teachers' professional actions can reconsider its ways of interacting with teachers.

### Teacher Preparation Programs

Teacher preparation programs have to be enriched with research developed as an integral part of the programs. This is one way in which teacher educators and university students can participate with teachers and elementary and secondary schools

in the development of understandings of the school culture. Educational research can be part of teacher preparation courses. This way, they are able to contribute to the preparation of teachers who are able to conduct their own research, develop understandings of school culture and establish links for collaboration.

There is a need for teacher educators to coordinate with school teachers and administrators to develop alternative ways of conducting the schooling process. As part of the implementation of courses, teachers and teacher educators can collaborate in the organization of learning environments for prospective teachers.

Teacher preparation programs require more coordination at the university level in order to become real possibilities for prospective teachers to learn. The academic potential of universities has to enrich teacher preparation programs on the basis of collaboration of faculty coming from different colleges or disciplines. The preparation of new teachers has to be based on a vision of the kind of teachers--teachers who will prepare the citizens of the future--that schools require . The construction of this vision has to be a socially negotiated process that is open to revision and change as experiences are developed. This is only possible if there is good coordination among all participants of university programs who work together with students and in-service teachers.

Teacher preparation programs need to keep in touch with in-service teachers as members of their own community. Teachers complained about this when they talked about their relationship with their "Alma mater." Universities invite them to come whenever they need something. However, one teacher educator said the following:

La universidad no tiene el presupuesto para mantenerse en contacto continuamente con los que fueron sus estudiantes. En general, después de algunos años, los profesores están completamente desconectados de la universidad. Es necesario en la preparación de profesores de ciencias mantener una relación estrecha con los profesores en servicio, no solo

para el beneficio de ellos sino como una forma de matener los programas de preparación de docentes actualizados de acuerdo con lo que ocurre en el campo de trabajo.

The university does not have a budget to keep in touch with those who were their students on a continuing basis. In general, after a few years teachers are completely disconnected from the university. It is necessary for science teacher preparation programs to maintain a relationship with teachers, not only for the benefit of teachers but also as a way to maintain the program in an up-dated form that is cognizant of what is going on in the field.

### Assessors and Supervisors

It is necessary to create an atmosphere of collaboration that brings policy mediators together. A resistance toward interaction between teachers, assessors and supervisors generated by political reasons could be resolved if supervisors and assessors are prepared professionally to occupy those positions. The system does not have to depend on the political decision of the new Minister of Education who is appointed, but it should develop a systematic approach to coordinate teachers' actions in the school system.

### Principals

Principals are the link between the central offices of the Ministry of Education and the teachers in the field. They have to see themselves as participants in the school curriculum and collaborate in the construction of learning environments for teachers to develop their professional interests. As administrators, principals have played the role of controllers, and teachers in general construct them in that capacity. There are some attempts on the part of these school participants to change, but still, control is playing a major role in their actions. The idea of being partners in school seems to be a better

metaphor for principals to explain and construct their roles as school participants.

### Parents

The role of parents in the education of children has been neglected in the Costa Rican school culture. Parents have given the responsibility of education to teachers because constitutionally the state is responsible for the education of children. It seems that this policy has influenced parents' beliefs about their roles in the education of their children. There have been some attempts in the last four years to incorporate parents into the school system and to change the relationship of parents and teachers as well as their responsibilities for education. The way this attempt has been understood is more for parents to help with control rather than in the learning process.

The participation of parents in education is a topic mentioned in the literature about the school reform movement (Lareau, 1987; Barth, 1991; Bull, 1990). There is an expectation that when parents contribute to their children's education, students will perform better in school as well as learn the value of family in the construction of a society. Even though there is an expectation that parents' participation will be positive, Van Galen (1987) found that "When parents enter the school, they trespass on territory that teachers defend as their own." (p. 88) In the case of Costa Rica, the type of parental participation that Molina and Pérez encourage (1991) is limited to helping students to do their homework or to visiting the school and collaborating there. It is important to explore further studies that describe the way teachers and parents conceptualize this kind of relationship, and it is necessary to develop alternative visions that are responsive to the needs of the school culture in Costa Rica.



### Students

The way students have constructed their roles in school has been mediated by the exam culture. Students study to take and pass exams. Learning has not been the main purpose of schooling. A recommendation regarding students and their relationship to teacher professionalism has to take into consideration that students in school have to constitute a challenge for teachers to learn and to generate innovations to fulfill students' interests. Students must play an active role in defining curriculum. They have to be curriculum creators, rather than playing the traditional role of curriculum consumers.

Learning chemistry at all levels requires the development of an interest for exploring in natural settings in order to see relationships that can be a base for generating many provocative chemistry questions. If students limit their learning time to the classroom, they will not have opportunities to explore and generate questions that can be used in the development of chemistry classes.

### Chemistry Teachers

The experience developed by the group of chemistry teachers who participated in this study is worthy of other studies, and as a group, these teachers deserve to be recognized for their effort. There is a potential for learning from this case, but still the experience can go further. At a regional level, this group of teachers have not participated in any kind of event to discuss their experiences. I think that it is important for them to share what they have learned. By sharing their experiences, these teachers will be able to reflect on their beliefs and the way they have been acting as professionals. Moreover, it will give them to opportunity to evaluate this experience. As a group, it is time for them to consider the possibility of developing other groups, not

only amongst chemistry teachers at the regional level, but also with multidisciplinary groups at the institutional level in order to generate models for curriculum integration in each school.

There is a need for teachers to do research in all areas. Chemistry teaching is one of the areas in which we need to develop research in the settings where chemistry is being taught. I believe that this group is doing research by the very nature of the social interaction that this group has developed. Since there are potential problems with the conception of research that is commonly used in the school culture in Costa Rica, the challenge then is to open the discussion on the use of alternative paradigms in doing educational research.

#### Content Programs and Evaluative Regulations

The definition of new programs and regulations for evaluation is a task which the Ministry of Education is in charge of, along with the collaboration of some university faculty members, who are willing to collaborate, as well as some teachers who are chosen to participate. Teachers resist new programs and evaluative regulations because they do not see a need for change or they do not see the difference in the changes. In the case of chemistry, one complaint regarding the program was that change implied more content rather than a reconceptualization of the whole purpose of teaching the discipline in school. Changes in the programs seem to serve the interests of the university faculty more than the need for students to understand the discipline as a basis for them to better interact with the environment in which they live.

Regulations pertaining to the assessment of achievement in science do not fit well with the goal of having students understand science and be able to apply it to their everyday life experiences. Teachers have to force the pace at which they cover the

content of the discipline so that students will be ready to participate in national examinations. The belief that a fast pace in covering the content is an adequate preparation for examinations remains unexamined. Moreover, the cliché that “less is more”, something prominent in the language of teachers in the United States of America at the present time, is virtually invisible in Costa Rica.

A recommendation regarding these two issues is that when new programs are designed, we have to think of teachers as professionals. Since teachers know the discipline and the learning process, it is necessary to give them opportunities to be autonomous in defining their own approaches to implementation of the curriculum. This has implications in terms of evaluation, supervision, kinds of materials, student participation and the purposes of teaching chemistry. We cannot expect all students to have to take courses as an introduction to what they will take in the university, because the majority will not attend university and because there are many other reasons for studying and learning chemistry.

#### Further Questions To Be Addressed

Professionalism is a complex concept that needs to be addressed from different perspectives. As described by Larson (1977), in the case of teaching, professionalism is an emergent force that intends to change the status of those in the profession. A change in the status of professionals implies a change in the definition of the profession itself and, consequently, the way professional actions are considered. Teaching as a technique or teaching as a profession generates different metaphors to describe the actions of the participants (Schön, 1983). A different way of constructing the self in an action implies a different role of the participant in the action. This is so when we think of teaching as a profession or as a technique. As Stenhouse (1985) and Lyons (1990) state

that the actions of teachers can be associated with professional actions, since teachers have to make decisions and assume responsibilities based on their own judgements of the situations in which they are engaged in classrooms.

Given these complexities generated by the introduction of the concept of professionalism into the school culture, I believe that in Costa Rica we need to conduct research related to teachers' professionalism in the following aspects:

- Relationships between teachers and students as the basis for teachers to develop themselves as professionals;
- Relationships among colleagues in the school and the potential for teachers to improve professional actions by collaborating among them;
- Possibilities for principals to collaborate in the creation of learning opportunities for teachers to maintain a professional environment in the school;
- Potential for the relationships between teachers and administrators (assessors and supervisors) to develop an understanding of the school system;
- The need for collaboration in school: The participation of parents and public and private institutions in the creation of partnership programs;
- Teacher preparation programs as the means for prospective teachers to learn how to be professionals;
- Potential for collaboration among educational institutions (universities, community colleges, elementary schools, secondary schools, INA, hospitals, others) for the promotion of professional actions in school settings;
- The role of teacher unions in the construction of images of professionalism that contribute to the development of the school system on the basis of collaboration and autonomy on the part of teachers.

The need to do research in these areas is evident because of the lack of information regarding these issues. The potential to develop collaborative efforts among school system participants to conduct research in these areas exists in the country.

What we need is to be aware of that need and to build research teams that help us to learn about the cultural milieu in which our actions take place.

### Conclusions

This project was an attempt to look at the professional actions that chemistry teachers develop in the school system. Before I started this project, my understanding of teacher professionalism assumed the need for collaboration and autonomy as bases for professional actions in school. The teacher in interaction with others was my ideal of professionalism in the school culture as a basis for learning and facilitating learning for others. One of my guiding questions in this study was how do teachers construct themselves as professionals? From the analysis of my experiences with a group of chemistry teachers and some of those with whom they are related in the school system in Costa Rica, I came to the following conclusions:

A - The structure of the school system in Costa Rica and the manners in which participants interact within it limit the possibilities for teachers to take leadership roles as a means to promote professionalism.

School as a social organization is a complex system. The idea of developing teaching as a "professional system" (Abbott, 1988) brings another complex element into the school organization. Strike (1993) sees the need to readdress the issue of school governance if there is an intention to provide teachers with opportunities to participate in making decisions. In the case of Costa Rica, the school system has included the idea of teacher professionalism as a way to improve the working conditions and the status of teachers in the society (teachers' salary has been increased). However, the issue of school governance has not been addressed yet. At this stage, it seems that talk of professionalism is an ideology (Larson, 1977, p. 235) that masks the social fact that teachers in practice operate as technicians, not as professionals. They have little or no control over content programs and evaluative regulations; therefore, their actions in school include lots of execution but very little control.

The school system in Costa Rica is divided into many levels with the intention of providing the basis for regional and local adaptation of the curriculum. This model has been formally promoted since the beginning of the 1970s. In his presentation of the "Reforma Integral de la Educación en Costa Rica," Gámez (1974) describes this trend as the result of the educational practice promoted in the country since the creation of the Second Republic in 1948. According to Gámez, the development of such a model was supported by the creation of the Universidad de Costa Rica in 1941 and the establishment of the Code of Education in 1944. From my perspective, this model has not been effective because there is an administrative structure in the system that pervades what happens in school. There are mechanisms of control from the top of the system that result in an elimination of possibilities to make regional decisions. As Miller (1988) suggests, the promotion of change from district and central offices is unlikely to occur unless there is an understanding of what happens in schools and a commitment to facilitate the development of a professional culture in the school. In such a culture bureaucrats will have to play a different role.

According to the idea of regional adaptation of curriculum, national programs are supposed to serve as general guidelines for the development of an adapted regional curriculum. Nevertheless, national tests, like the baccalaureate exams, focus on national programs. Therefore, the test system controls the actions of teachers, and the preparation of students to take the exams is the main force that drives the regional curricular adaptations. Teachers make adaptations to the curriculum so that it covers the content that will be on the tests. In the majority of cases, to avoid the responsibility of making decisions to teach one way or another, teachers decide to follow the suggestions given in the national program. This matter eliminates creativity on the part of teachers and leads to a lack of trust from students. From this perspective, I can say that the Costa

Rican school system is organized in a way that requires teachers to act as technicians rather than professionals.

It was under the philosophical umbrella of the "Reforma Integral de la Educación en Costa Rica" that the regional group of chemistry teachers started their meetings in the 1970s. From their stories, it seemed that they were looking to promote changes in their practice of teaching as well as searching for fundamental changes in student learning. This is similar to what Elmore (1990) describes as part of the second wave of school reform that has taken place in the United States. Even though Costa Rica's effort to change was supported by the framework of school reform, the public school organization and management did not endeavor to change according to the directions suggested by the school reform movement in the country. The administrators' reluctance to change limited the possibilities for successful reform such as the ones initiated by chemistry teachers. The chemistry teachers made an effort to promote changes, but the administrators did not provide the support for such an effort to be successful.

At the beginning of the 1980s, there was a concern over improving the quality of education in the school system in Costa Rica. The idea was that the school had to facilitate the preparation of the work force required for the industrial development of the country. The promotion of that idea did not come from school participants, but as Gallard (1990) states, it came from the groups with the economic power in the country. That part of the history of the school reform movement is, in a way, a combination of what Elmore (1990) describes as the first and the third waves of the school reform in the United States. The first wave was concerned with academic content that required the introduction of higher standards for students and teachers (definition of specific content that had to be covered, and the introduction of national tests), while the third wave was

concerned with the development of human capital to facilitate “economical growth, competitiveness, and [change in] living standards.” (Elmore, 1990; p. 1)

The school reform models are described by Elmore & Associates (1990): 1- Reforming the core technology of schools; 2- Reforming the educational conditions of teaching; and 3- Reforming the relationship between schools and their clients. All of these seem to be interweaved into the new agenda for school reform in Costa Rica that has been proposed by the current administration (Herrera, et al., 1990). The development and implementation of new programs, the change of the categorization of teachers from technicians to professionals, and the goal of incorporating parents and other members of the community into the school culture can be related easily to those three models.

The complexities those generated by the intention to promote reform in the school culture are not recognized by policy makers who seem to operate under the assumption that all school participants understand what kinds of changes are expected and how to operate in the new system to achieve the changes. This is an issue that Goodlad (1991) addresses nicely by using a metaphor. He states this as follows:

Proposals for educational reform usually proceed from the assumption that the train is on the tracks and just needs to go faster, more smoothly, or to new destinations--improvements that are straightforward and relatively minor. But what if that assumption is incorrect? If the train is derailed, the work needed is major indeed. (p. 270)

Goodlad further suggests the need to consider that maybe the cars are not coupled to the engine, maybe the passengers are not in the train, and maybe those who are in the train do not know that there is an intention to move the train. It is here where the conflicts generated by school restructuring emerge as a result of changes in power relationships and accountability. If school participants do not know what is expected of them, they do not have a vision of the whole idea for change.

In the Costa Rican system, hiring practices for teachers function to protect them,



even when they do not perform as professionals. Once certified teachers get into the system, they can remain there until they retire if they so desire. The only obligation teachers have in the system is to implement programs in accordance with the way they are mandated. Teachers are not challenged to participate in the generation of innovations in school. They have not been assigned leadership roles, and in the majority of cases, they have not assumed any kind of leadership role in the school community even when there were possibilities for them to do so (Barth, 1988). According to Larson (1977, p. 184), their opportunities to be considered professionals have been negotiated through the use of "unions and unionist tactics," giving the impression that teaching is at best a semi-profession.

The coordination of the school system with other institutions is hardly discernable. When some kind of coordination occurs, it is with reluctance and a fear of negotiating away conditions with which teachers are comfortable. Universities are the educational institutions (tertiary educational system) that are able to collaborate with the elementary and secondary school system, but these two systems are usually seen as having different roles. More than collaboration, those in the two institutions (schools and universities) generate competition, or they blame one another for the shortcomings of education as it is enacted in schools. The opportunities to develop a professional community in the school, or as Barth (1988) calls it, a community of leaders, are limited because of a reluctance to coordinate with others, the fear of leaving the apparent safety terrain of the classroom, and the inability to challenge the administrative structure. It seems that what we have at this stage is a tendency to maintain the established power relationships that are assumed as a natural part of the school system (Grundy, 1987) as well as a tendency to resist looking for new ways to change.

B - The construction of a professional identity is a lifelong process whereby professionals interact with others on a permanent basis.

The experiences of the group of chemistry teachers who participated in this study and particularly the experiences of the focus teachers provide evidence that teachers' ideas of themselves as professionals evolve according to the experiences they have in school and in daily life. It is from their experiences with students and colleagues that teachers generate new ideas of how to teach. Conflicts that teachers face with things such as new programs, new regulations for evaluation, or new organizations in the school make them see that they need to re-think their previous constructions of how to act in school settings if they want to act as professionals. As it is inferred from Abbott's (1988) perspective, professionalization is a process.

If the construction of a professional identity is a lifelong process, then it is necessary to take into consideration the kind of social interactions that prospective teachers and teachers have in their professional careers. Goodlad (1991) and Sykes (1990) highly criticize the traditional models and environments that universities provide for the preparation of teachers in the same way that teacher educators and assessors criticized this problem in Costa Rica. Among the criticisms that are made of teacher preparation programs and of the school system in general are the limitations to select and retain talented people for the profession. The teacher preparation programs and the school system have difficulty selecting and retaining talented people because these people are offered other opportunities where the working conditions are better and they are treated more professionally. Another reason is because "schools are not organized, managed, or provisioned to support good teaching." (Sykes, 1990, p. 59)

Goodlad (1991) suggests a way to facilitate the interaction of teachers with other teachers in the school system and with university faculty as a way to foster learning

(pp. 349-360). It is expected that, in the process of interaction between school districts and universities, a subsystem will be created. In this subsystem, there will be opportunities for social interactions among school participants of the same level as well as interactions across levels. All of these interactions will facilitate opportunities to exchange experiences, whereby a new culture will be generated and with it the possibilities of new social interactions. The group of chemistry teachers have been trying to survive in the Costa Rican school system by creating conditions for them to interact on a regular basis. Their experience is a good example to follow. Nevertheless, it seems to me that, in order for this group to make an impact, they will have to negotiate more terrain in the school, take more opportunities to promote their ideas and gain more power in the system. Teachers need more power: Power to facilitate others' learning; power to promote the participation of others in making decisions; power to generate a social structure in the school that facilitates learning in a more democratic way where everyone participates equally; and power to transform the bureaucratic system of management in which they have been participating.

C- The school culture in Costa Rica does not provide a basis for interaction to foster steady professional growth.

The kinds of interactions that teachers have in school are limited by the way schools are organized, and at the same time, teachers do not learn how to interact with others as a basis for professional growth while they were in teacher preparation programs. The levels of specialization in secondary school teachers tends to separate teachers, rather than provide them with opportunities to take leadership roles in the school culture. Each teacher assumes the responsibility of his/her discipline and isolates him/herself in the school; this contributes to the creation of isolated cultures in

their own classrooms.

When administrators organize meetings with teachers, it is for them to talk about administrative issues, rather than to facilitate opportunities for teachers to interact and discuss their professional concerns. There was an attempt to provide these opportunities in the semi-official institution, but it seemed that teachers did not see the value of the "pedagogical journeys". In general, the experience developed in teacher preparation programs limits interaction among those of the same discipline, or it forces students to concentrate on the performance of techniques or the development of management abilities to control classrooms. The experience does not focus on the possibilities for them to learn with others. This was the case with Marta. She mentioned that, for her, learning in the university came more from her interactions with classmates than from the professors, because her experience in the chemistry teacher preparation program was with in-service chemistry teachers. She had other experiences where the idea was that students came to university to learn from professors; these learning experiences were not relevant to what actually happens in schools. What are the issues here? Marta constructed herself as a learner with respect to teachers, because of the perceived relevance of what they had to say. Perhaps she could not see the relevance of what professors had to say because did not have the commitment to learn in those situations.

It is important to readdress the way teacher preparation programs are organized and to consider the value that universities assign to such programs. Since prospective teachers are attending teacher preparation programs, the construction of the idea of teaching professionalism has to start with these programs. According to Goodlad (1991), at this stage there is a knowledge base about teaching that can be used as evidence to support the idea that teaching can be classified as a profession. Goodlad

continues as follows:

But for an occupation to become a profession in its practice and for its practitioners to be professionals, this knowledge base must be codified and transmitted [sic]. For it to be transmitted [sic], it must be rather readily accessible, presumably in materials and programs organized for this purpose. These . . . must bear the stamp of scholarly effort and approval and not be the hunches and conjectures of individuals who possess political or bureaucratic authority but not professional authority. (p. 267)

This is a challenge for teacher educators and those who participate in different ways in the preparation of teachers. The role of the university in the construction of knowledge about teaching and in sharing and reconstructing it with those in the field is crucial for the teaching profession.

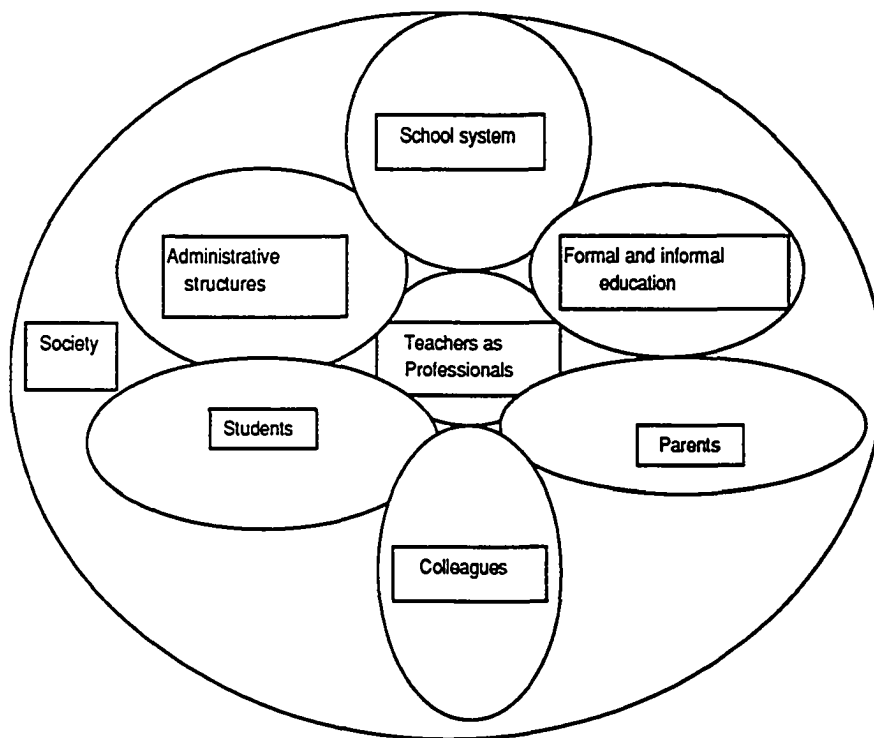
The traditional way for teachers to interact in the school culture is based on control and is grounded in their conceptions of the disciplines they teach. Each teacher sets up control according to his/her conception of knowledge, and at the same time, this is the frame from which constraints are constructed. Each teacher constructs an image of him/herself that re-presents the division for the organization of knowledge that is developed outside of the school.

It seems to me that, as Barth (1988) proposes it, the generation of alternative views for the construction of a school in which I would like to work or to which I would like to send my children is a challenge that all school participants will have to negotiate. Costa Rica's educative environment has the potential to improve, and there is an awareness of the need for change. The separation of systems and subsystems and the asystematic approaches followed in the analysis of school problems have led to the construction of a disintegrated system. I think that the construction of a school culture that facilitates social interaction based on communicative action (Habermas, 1982) and that looks for an understanding of the problems has to be based on a clear understanding

of the power and control relationships. It cannot be based on the naive way of thinking, that because our constitution defines the nation as a democracy, democracy will pervade all actions in the country.

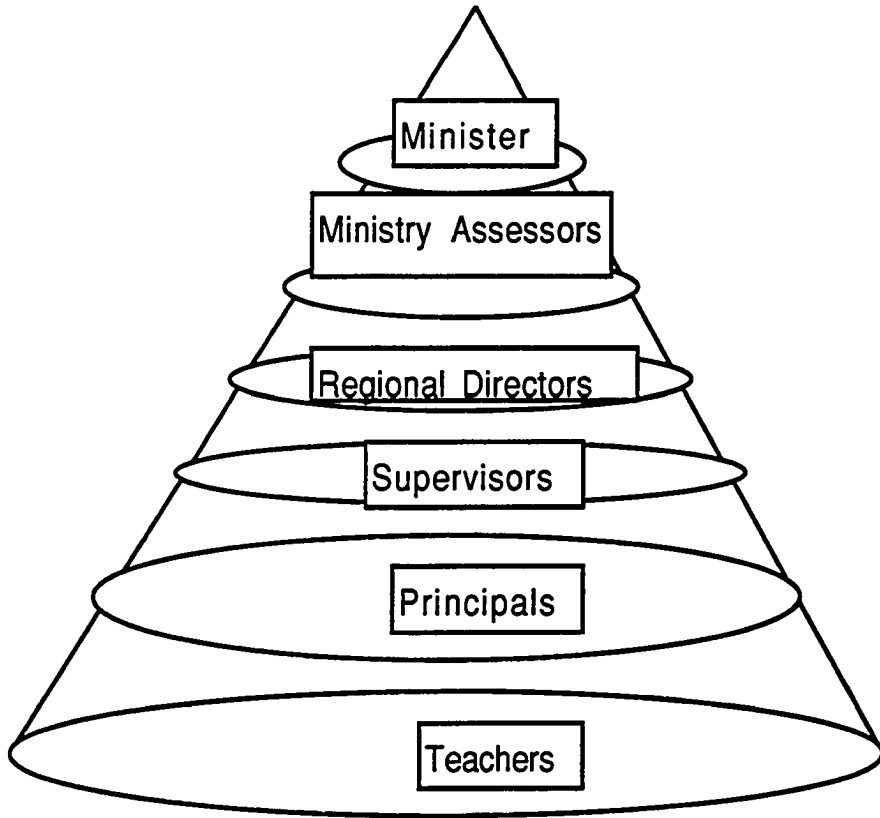
The construction of a school culture that steadily supports teachers' professionalism can be seen as proposed by the model described in Appendix F. There is an expectation that school participants will contribute to the creation and re-creation of such a culture and that from the interactions facilitated by the school culture, participants will constantly learn from their actions. This model becomes an integration of the need for school reform, one that cannot be accomplished by any one of the participants in isolation, but rather by all of them working together. This is consistent with the body of literature that deals with school reform that has been used throughout this dissertation. However, what is salient about the model is that it is my construction based on my research of Costa Rican educators and students. The model emerged from my field research and interpretations. No single person has constructed the model or would use it as a basis for action. Accordingly, my challenge is to present the model to Costa Ricans in such a way that they understand it and make a personal commitment to use the model as a basis for personal action. If this is to occur, widespread educational activities must be planned and implemented throughout the entire community, the purpose being to facilitate the construction of new visions of professionalism. These visions would have to be negotiated and shared throughout the culture that provides a context for education in Costa Rica.

## APPENDIX A



Model of interaction that I expected to find before I started my study.

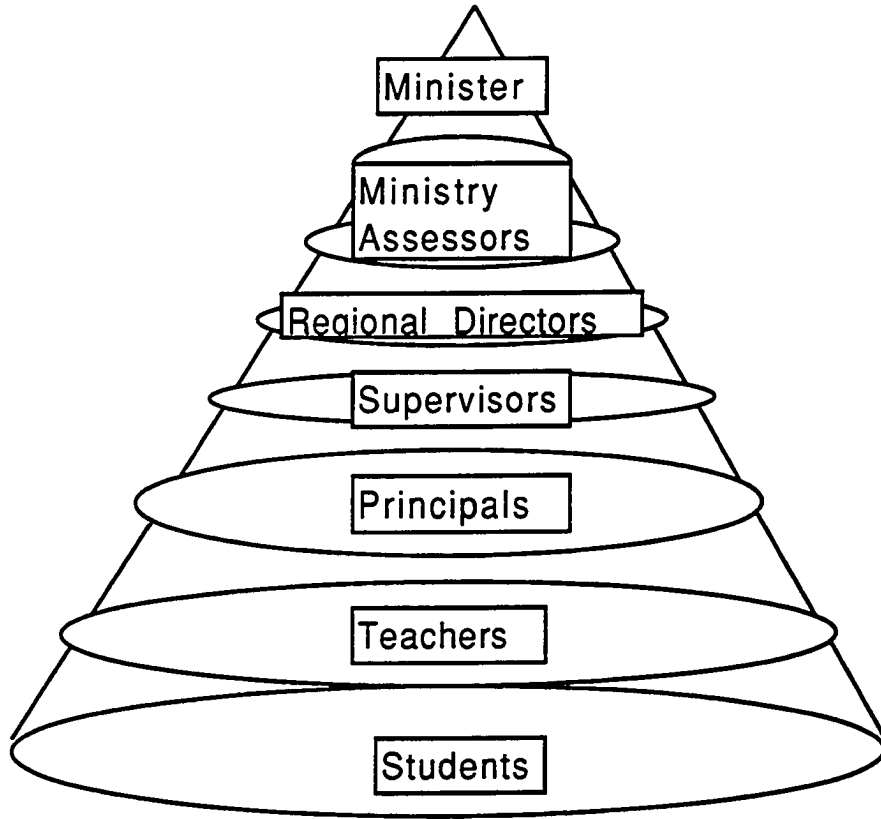
APPENDIX B



Model developed to describe patterns generated from observations, conversations, and interviews with school system participants.

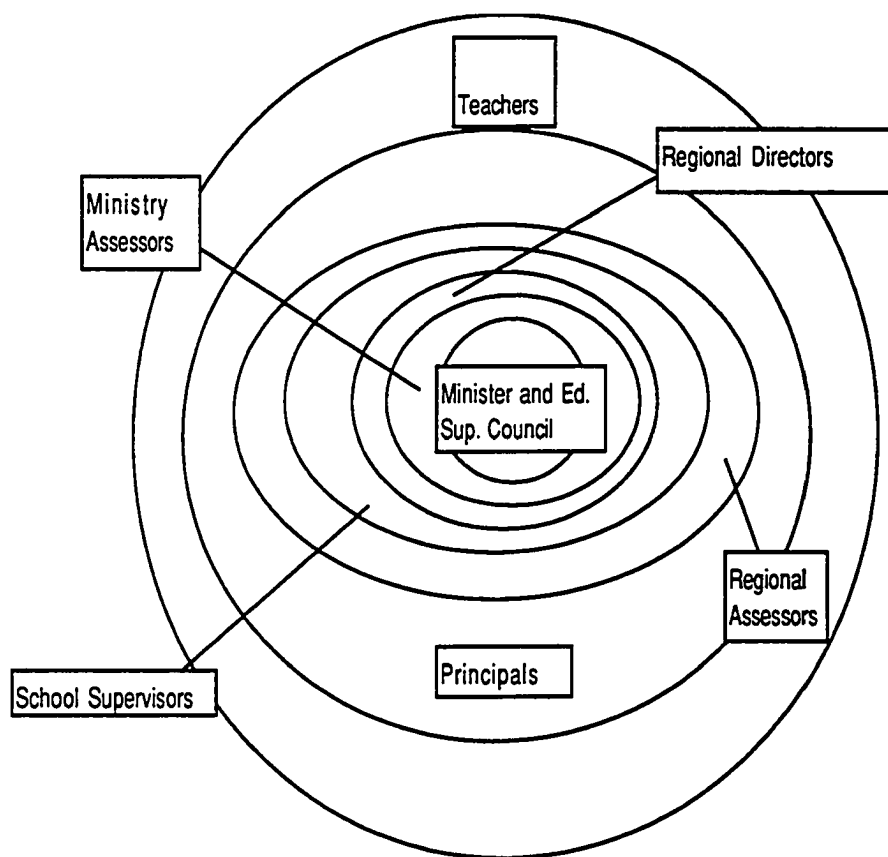


APPENDIX C



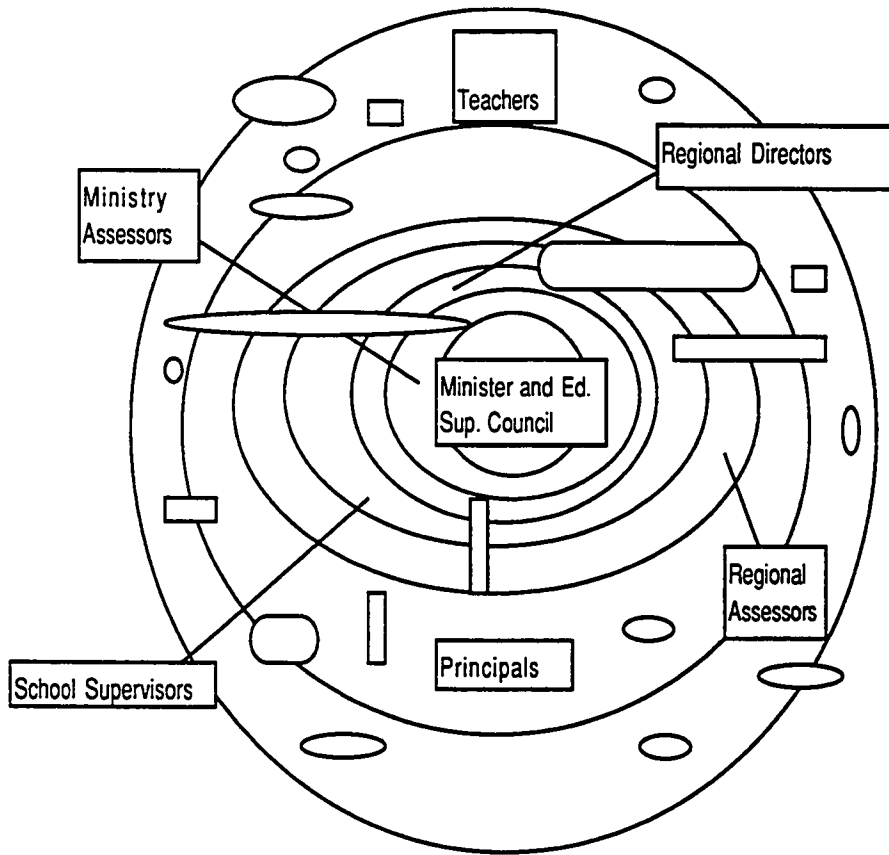
Incorporation of students into the model of the school system,  
according to teachers' suggestions.

APPENDIX D



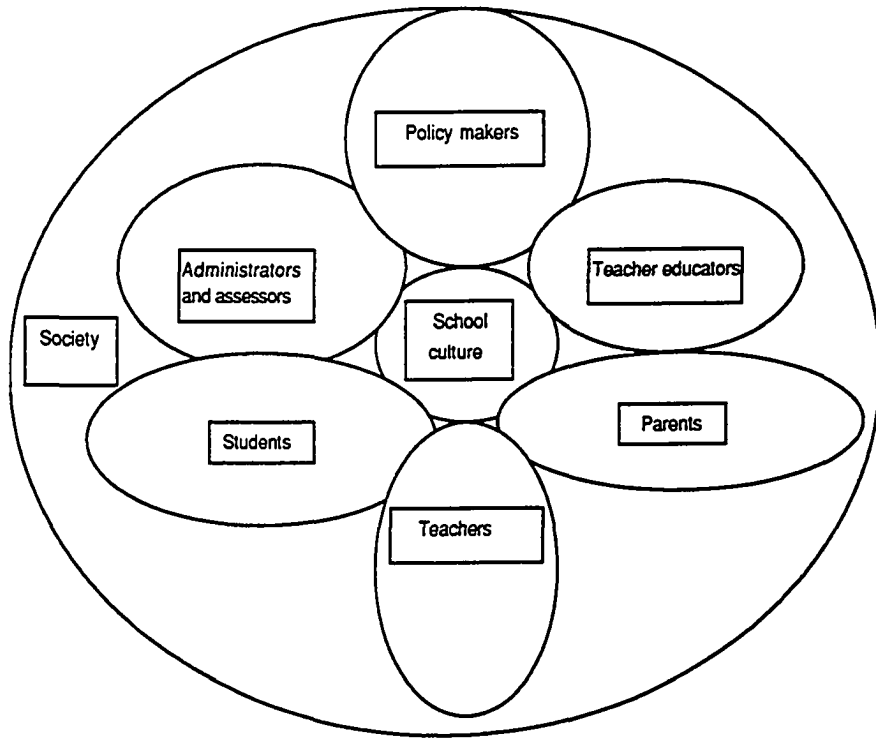
Model suggested by chemistry teachers as the ideal to promote professional relationships among school system participants.

APPENDIX E



The need to establish communication with others, as a way to brake barriers, is suggested by chemistry teachers as an alternative to create a community of learners rather than controllers in the school system.

APPENDIX F



Model of school culture as a product of the contributions of participants from the society.

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## ACADEMIC BIOGRAPHICAL SKETCH

Gilberto Alfaro-Varela was born on January 6, 1954 in Tilarán, Guanacaste, Costa Rica. He attended a small rural school in Cerro San José, Tilarán where he finished his elementary education in 1965. He attended Liceo de Tilarán for secondary education, where he was awarded a High School Baccalaureate degree with emphasis in science in 1970.

His undergraduate studies included a Teaching Certification in the area of Chemistry for Secondary School (1976) from the Universidad de Costa Rica, San José, Costa Rica, a Bachelor's degree in Education with emphasis in Pedagogy of Communication (1982), and a Bachelors' degree in Chemistry Teaching (1984) from the Universidad Nacional, Heredia, Costa Rica.

To continue his education, he received a scholarship to study in the Graduate School of Education at Harvard University, Cambridge, Massachusetts where he received a Master's Degree in Education (1987) with an emphasis in supervision, educational research and curriculum development. Gilberto Alfaro-Varela was graduate student at Florida State University during 1990-1993, where he participated as a research graduate assistant in the program of science education.

In his professional experience, he taught chemistry for 10 years in secondary schools in Costa Rica. He was a faculty member at the Universidad Nacional, Heredia, Costa Rica for eight years. At the university level, Gilberto participated in research, extension and teaching where he implemented a program with in-service teachers to

enhance science and mathematics teaching. Moreover, he developed and implemented programs for the preparation of general science and chemistry teachers. For five years, he was the coordinator of the in-service teachers' program in science and mathematics education at the Universidad Nacional, and for two years he was in charge of the coordination of the chemistry teachers' preparation program in the same university. For two years he taught courses in science education for prospective kindergarten and secondary school teachers at the Universidad de Costa Rica.

Gilberto has experience with the Ministry of Education in Costa Rica as a consultant for the development of curricula in the area of science education at the elementary and secondary school level. He also participated as consultant for private schools in Costa Rica and for the Universidad Pedagógica Francisco Morazán in Honduras. The areas of interest in consulting included teacher preparation, curriculum material development and curriculum assessment.

His academic publications include written curriculum materials for the development of general science and chemistry courses at the secondary school level and a resource book on educational research methodology for undergraduate students. He has also published articles in Costa Rican educational journals related to teaching and curriculum.