

## **CHAPTER II**

### **REVIEW OF LITERATURE**

Teaching has been described as an art, in the sense that it takes imagination to transfer knowledge. It has also been described as a profession, (Steeves,1962), learned through practice under stressful conditions. Teachers work under constantly changing conditions, responding to students' social, emotional, and intellectual challenges daily. Teachers provide opportunities for students to deepen their understanding of the natural and social worlds by building on the students' knowledge and beliefs (Reynolds, 1995). Often the first-year secondary science teachers enters the classroom with idealistic and unrealistic expectations. Cunliffe's 1994 study of how science teachers become professionals explored how teachers developed students' knowledge. Results showed that motivated strategies for discipline and classroom management consumed most of the energies of personal beliefs. To help first-year secondary science teachers adjust, induction programs focused on developing teacher competencies and adaptation skills. These programs also improved teacher retention.

At a time when the educational system was embracing numerous efforts to redesign and restructure schools (Rubba,1993), first-year secondary science teachers were trying to make sense of new paradigms for teaching and learning and thus questioned their ability until they found skills for promoting learning. The leadership and support of other faculty members, building-level administrators, and officials of the larger school system offered developmental help for success and continuous growth (Ginns and Watters, 1996).

#### First-year secondary science teachers

Many of the studies on this subject group, secondary science teachers, are incorporated with other first year teachers. Other studies acknowledged the complexity of science teaching, qualitatively investigating the responsibilities and the roles of first-year secondary science teachers. These more pertinent studies, by Clark & Peterson (1986), explore interactions of variables of planning, interactions in the classroom, acquired behaviors by first-year secondary science teachers, student behaviors, and teacher decisions. The studies considered a number of first-year secondary science teachers of differing skills, mastery of subject matter, and professional knowledge working at various grade levels in elementary, middle and

secondary schools who entered the field of teaching burdened not only with concerns about subject-matter content and organization but also about the general transitional pressures of the first year. Fuller (1969) and Katz (1972) describes as the “survival stage” of teacher development, as new teachers developing along a continuum of skills, knowledge, and abilities well into their third year of teaching. Fuller’s study supported the notion that survival is the primary concern of first year teachers and concluded that class control, status structure, principal-teacher relationships and parent-teacher relationships, are also major concerns. Lederman and Gess-Newsome (1991) found that first-year secondary science teachers faced more perplexities than teacher’s of other subjects because they dealt with extended instructional planning, development of instructional skills requiring hands-on activities and behaviors, and the routines of school structure.

### Perspectives on Change

Society changes constantly and schools must continue to meet new demands and challenges. Like other teachers, first-year secondary science teachers need to understand the processes of change. House (1986) viewed changes of teachers by descriptions of three perspective stages: the technical, the political, and the cultural. Technical and political changes were viewed as

authoritarian descriptions of the reactions of first-year secondary science teachers to specific changes in practice proposed from outside the culture. Richardson (1990) on the other hand, viewed cultural aspect of change for first-year secondary science teachers as their interpretations of behaviors or words and terms which gave meaning to their work. In addition, first-year secondary science teachers continued to reflect on their own practices, beliefs, and ideas of how to transfer knowledge. First-year secondary science teachers frequently reconsidered their beliefs about teaching and learning as they examined the issues, problems and behaviors involved in teaching.

#### First-year secondary science teachers' problems

A general awareness of teaching and an interest in learning more about their profession seem to have been significant areas of inquiry for first-year secondary science teachers. First-year secondary science teachers were concerned with matters dealing with the characteristics, effects and requirements needed to succeed. First-year secondary science teachers analyzed their role in relation to the reward structure of the school and in consideration of potential conflicts with students, other teachers, parents, and administrators (Sturtevant, 1996). They focused attention on the process and accomplishments of teaching and the best ways of transferring information to

students. Issues of efficiency, organizing, managing, scheduling, and time demands were foremost.

First-year secondary science teachers experienced problems involving resources, materials, and instructional assistance. They were in a vulnerable position ( Hoffman, Edward, O'Neal, Barnes & Paulissen, 1985); experienced stress, anxiety, frustration, and isolation (Huffman and Leak, 1986); tried to acquire appropriate professional and personal skills; endured time pressures and extraordinary demands on their energies, and became accustomed to a general sense of powerlessness (Griffin, 1985).

Burner and Felder (1983) concluded that many of the reported problems of first-year secondary science teachers in secondary schools relating to course content and discipline could have been solved if school-based administration had provided mentors, early assessments and appropriate staff development. Adams (1982) reported that first-year secondary science teachers' concerns about administrative and parental issues increased with years of experience, while discipline and motivation strategies for students peaked during the first five years. First-year secondary science teachers expected and were expected to be able to control and manage a classroom effectively and productively.

Another factor contributing problems for the first-year secondary science teacher dealt with the reality shock phenomenon. Reality shock involves environmental difficulties such as assignment of first-year teachers to undesirable classes and specific behavioral problems of students which lowered self-esteem, decreased optimism, and produced negative attitudes toward students (Earp and Tanner, 1975).

First-year secondary teachers in science struggled to balance beliefs about what is desired in teaching, and what they believe is desired behavior within the school structure. The developmental stages of teaching evolves through interactions of past knowledge of students and new behaviors of the students being taught (Sturtevant, 1996). The process begins with the first-year secondary science teacher's belief of teaching being influenced by the college methods course; the instructional belief of teaching becomes specific during student teaching; and finally first-year secondary science teachers' beliefs are influenced by veteran teachers about what works and what did not work. These beliefs lead to personal conflict for first-year secondary science teachers and show inconsistencies with what was previously taught. Cooney (1985) and Zeichner, Tabahnick, and Densmore (1987) added that students' behaviors placed constraints on the first-year secondary science teacher's

professional behavior.

### First year secondary science teachers' issues

Many first-year secondary science teachers underwent hasty transformations from student teacher to teacher. Nemer (1983), Lortie (1975) and Corcoran (1981) labeled teacher's reactions during this brief induction phase as transition shock. First-year secondary science teachers are unable to transfer to the classroom skills they learned during teacher education. They observed that new teachers performed the same job as experienced teachers, but with little support. Lacey (1977) agreed with the general perceptions that primary break into reality occurs between training and actual experience during the first year of teaching.

First-year secondary science teachers were seldom provided complete support for instructional approaches about teaching major concepts (Maeroff, 1988). They complained their preparation contained too much theory and not enough practical emphasis (White and Tisher, 1986). They used class time to plan and were instructed about what to teach, how to teach, and what strategies were used to evaluate materials. Practical usage of these plans and strategies were used only during student teaching. First-year secondary science teachers were limited by their own abilities to present the concepts,

develop alternatives, and assess outcomes.

According to Australian researchers Owen, Johnson & Walsh (1985)

Beginning teachers reported different levels of school support for teaching mathematics and science. In general, Victorian beginning teachers had recourse to a policy and a program for mathematics, but it was far less likely that a science policy or program was available to them. For mathematics, difficulties of beginning teachers were concentrated in the area of teaching and learning, while in science difficulties were far more fundamental and based around deciding what to teach, and how to prepare resources for that teaching. (p.37)

Thus first-year secondary science teachers concentrated on curriculum issues and developing skills needed for successful teaching. Emmer (1987), Hasweh (1986), Leinhardt and Green (1986), and Wilson and Shulman (1987) focused on first-year secondary science teachers who were given teaching assignments outside their areas of expertise. These authors noted (1) the profound difficulty of such assignments and (2) that the instructional skills and performance of such teachers were affected. An additional challenge in making decisions about resources needed was also noted by Sanford (1988).

#### First-year secondary science teachers' classroom management skills

First-year secondary science teachers usually felt unprepared to teach. They seemed unable to develop a sense of confidence about their teaching skills. Most first-year secondary science teachers had to work their way

through an initial survival period during which their main concern was whether they were capable of being a teacher (Fuller, 1969). They were inclined to be insecure and to concern themselves adapting their workday situations to their own needs. Concern with their own performance caused first-year secondary science teachers to fail to attend to critical aspects of teaching and to respond to cues for strategy adjustment for increasing student achievement and classroom control.

First-year secondary science teachers' beliefs about students, classroom interactions, and subjects influenced the way they taught. Attending to the practical realities of working in a public school, they devoted a major share of their attention to the "nuts and bolts" aspects of their work. They were preoccupied with time restraints, numbers of students, availability of materials, noninstructional duties, and the politics and economics of teaching (MacDonald, 1991). They therefore confused school agendas with educational objectives and derived teaching from external factors such as test results, rather than individualizing student learning for increased achievement.

First-year secondary science teachers developed specific competencies for instruction and developing objectives for the content of the subject. These strategies were seen by the first-year secondary science teacher as well-

developed forms of communication and self-expression in the achievement of their students. These strategies helped the teachers learn new concepts and adapt their teaching to the learning styles and needs of their students.

### First-year secondary science teachers' socialization

The socialization of the first-year secondary science teacher provides critical processes and interactions leading to differences of practices and perceptions. First-year secondary science teachers sort and select skills that promote survival. They evolve and adjust to the school culture. Etheridge's (1989) findings suggest that first year teachers strategically adjust their initial, preferred teaching practices as a "response to work environment factors pressuring the teacher to select and use different strategies"(p.32). These responses evolved and become survival tactics, rather than alternative strategies for better teaching. Wildman and Niles (1987) note that society holds the misconception that teaching is quick to learn and easy to do. Regardless of the many transitions, anxieties, issues, and problems facing first-year secondary science teachers, professional growth lead to solutions. Wildman and Niles (1987) list three conditions for professional growth: autonomy--freedom to direct growth; collaboration--conditions for learning; and time--learning to teach. Maeroff (1988) stated "more than many other

occupations, teaching is practiced in isolation--an isolation that is crushing at times. Collegiality is nonexistent for many teachers, unless hurried lunches over plastic trays in lunchrooms are viewed as exercises in colleague ship.”(p. 474)

Porter (1961) adopted Maslow’s hierarchy of needs for his research, eliminating physiological needs from the list. He pointed out five basic needs that apply to first-year secondary science teachers: personal success, professional success, achievement, peak satisfaction, and the opportunity to work at full potential. Self actualization requires participation and investment in accomplishments, social acceptance, and security of job satisfaction. Meeting classes, preparing lesson plans, obtaining satisfactory evaluations, and following school rules and regulations satisfy this need. The first-year secondary science teacher must develop psychological strength to work creatively and humanely in a constantly changing school environment.

Autonomy is the need for authority, control, and influence. The need to self-govern, provide control, and determine the factors for learning display personal adequacy. The ability of the first-year secondary science teacher to stand apart and not depend on students, faculty members, administration, or the system for self-development and continued professional growth, promoted

serenity and happiness.

Esteem is the need for self-respect, respect of others and professional respect. First-year secondary science teachers were highly knowledgeable and capable of transmitting their ideas and know-how directly to students but success often depended on variables (for example, attitudes, behaviors, skill deficiencies and uneven abilities of students) that were difficult for the teacher to control. Teaching tested the emotional stability of first-year secondary science teachers. They were committed to patience, empathy, and understanding human dynamics (Abell & Roth, 1992).

Social interaction is the need for acceptance, belonging, friendship, and membership in formal and informal work groups. First-year secondary science teachers must understand the basic principles of human interaction. The skills and attitudes necessary to develop relationships did not come naturally but were deliberately cultivated and nurtured (Rogers, 1961). First-year secondary science teachers understood that communication skills, which involve the ability to relate sensitively and authentically to students, promote effective personal encounters.

Security is the need for money, benefits, and tenure. One of the benefits for first-year secondary science teachers is the opportunity to

personally grow while actually teaching. Teaching requires continuous employment of emotional and interpersonal resources and subject knowledge. First-year secondary science teacher gain experience that promotes self-confidence, public speaking skills, and interpersonal competencies (Massachusetts Teachers Association, 1991). This self-knowledge renews the emotional and creative energies.

## **Summary**

The existing literature does not fully answer questions of how and when a first-year secondary science teacher reflects upon multi-faceted issues and problems, but it provides background for understanding how first-year secondary science teachers address challenges. The first-year secondary science teacher does more than dispense information and give tests. Adaptation to the pressures of the school organization must not give way to sacrifice of initiative and creativity (Palonsky, 1986).

Developing first-year secondary science teachers require much greater clarification about how students learn and what they need to learn, how to help students, how the system works, and how to sustain successful teaching.