

CERTIFIED SCIENCE AND MATH TEACHERS WHO ARE NOT TEACHING:
REFORMS IN THE CONDITIONS OF TEACHING REQUIRED
TO ENCOURAGE THEM TO RETURN TO OR ENTER TEACHING

by

Thomas Harwood Williams

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APPROVED:

W. Worner, Chairman

T. Teates

R. Salmon

L. Harris

T. McNeel

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Committee Chairman: Wayne Worner

College of Education

(ABSTRACT)

One hundred and twenty-two students at Virginia Tech who had completed teacher certification requirements in science and/or mathematics from 1980 to 1986 were surveyed to determine their current employment status, and if not currently teaching, then what reforms in the conditions of teaching might encourage them to return to or enter teaching. Opinions were solicited from three groups: current teachers, those who had left teaching, and those who had never taught.

Data were reported in four categories: general demographics of all groups, importance of work satisfaction for all groups, modifications in the conditions of teaching necessary to entice those not currently teaching to return to or enter teaching, and opinions of current teachers on how to improve recruitment and retention of qualified science and mathematics teachers.

It was determined that the general demographics of the individuals surveyed conformed to general descriptions of teachers in current literature with the exception that the parents of Virginia Tech graduates were more highly educated and tended to hold professional and semiprofessional positions in higher percentages. No significant differences were determined among current teachers, those who left teaching and those who had never taught in regard to opinions of work satisfaction in teaching.

Lack of administrative support, poor student discipline and low salaries were factors involved with decisions not to teach. Others left teaching to raise a family. Improvements in working conditions that would encourage non-teachers to teach include improvement of student discipline, reduction of class size, removal of incompetent teachers, reduction of teacher isolation, reduction of stress, and the improvement of the physical environment.

Almost 60% of individuals not currently teaching would teach if offered a suitable position. The majority of current teachers believe that raising teachers' salaries would be the most important improvement to increase recruitment and retention of teachers, however, beginning teachers' salaries compared favorably with those of individuals employed outside of education. Almost two out of three current teachers indicated they planned to leave teaching within five or more years.

DEDICATION

To my Mother and Father. And to .

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CHAPTER 1

INTRODUCTION

Educators admonish that shortages of qualified science and math teachers will occur in the late 1980's and early 1990's. Olstad and Beale (1984) asserted that:

The assumption that a reservoir of talent is ready to assume teaching positions in science and mathematics appears to be false. When this is combined with evidence that suggests sizable numbers of science and mathematics teachers will be leaving teaching in the near future, we are more firmly convinced than ever that a critical shortage of qualified science and mathematics teachers will exist at a time when our society is becoming even more technologically complex (p. 104).

Combined with the problem of fewer young, bright individuals entering the teaching profession are large numbers of science and math teachers leaving for other employment opportunities and retirement (Feistritz, 1983; Goodlad, 1984; Lanier, 1986; and Lortie, 1975, 1986). In all, because of fewer individuals entering science and math education and large numbers leaving these occupations, projections for the future in terms of supplies of teachers indicate severe shortages within the next decade.

Olstad and Beale (1984) argued that trained science and math teachers who are not currently teaching do not constitute a viable source of teachers in areas of shortages under current working conditions and at current salary

levels. Therefore, it was the purpose of this research to identify individuals who have trained as science and/or math teachers, but who have left teaching, or chose not to enter teaching in the first place, to learn about their reasons for not teaching, and determine what incentives would be required to convince them to enter or re-enter teaching as a profession. In addition, determining the motivations of teachers who choose to enter teaching and why they decide to leave is essential in recruiting both new teachers and those who have taught in the past, and in reducing attrition rates.

Super (1957) asserted that there are four "major needs for which satisfaction is sought in work: human relations, status, work, and livelihood" (p. 3). (1) Human relations includes recognition as a person, independence, fair treatment, and opportunity for self expression. (2) Status involves the individual's social status compared to other occupations, kindred occupations, and with the public in general. (3) Work includes an interesting work activity and a satisfying work situation. (4) Livelihood deals with current earnings, standard of living and job security.

Studies by Lortie (1975), affirmed by Kottkamp, Provenzo and Cohn (1986), reinforce Super's earlier work by determining similar categories for the rewards of teaching:

1. Extrinsic rewards in which the individual responds

to external factors that act upon the individual as a whole, i.e., salary, prestige, and power.

2. Ancillary rewards which involve responses to factors that are perceived to be of benefit, i.e., a comfortable place to work, economic security, and free time.

3. Psychic rewards involving enjoyment of the work itself, the sense that important work is being accomplished, and that favorable social status is attached to the work.

In offering solutions to the shortage of qualified science and mathematics teachers, experts suggest reform of the teaching profession in the following areas: salary (increases in beginning salaries, opportunity for advancement, experience increments, bonus plans and merit pay); working conditions (class load, clerical duties, physical environment, disruptive students, teacher isolation, and reduction of stressful situations); and social status/professionalization of teaching (increase certification requirements, teachers disciplining their own ranks, and competency testing (Boyer, 1983; Goodlad, 1984; and Lortie, 1975, 1986)).

STATEMENT OF THE PROBLEM

Current research provides little information concerning the similarities and differences, if any, between

individuals who are eligible to be certified as science/math teachers and are currently teaching and those who left teaching or chose not to teach. In addition, little information is available to indicate the conditions under which those not currently teaching would be willing to enter or return to teaching. Although there is much speculation about the causes of and solutions to the current science/math teacher shortages and those projected for the future, there is insufficient research upon which to move that speculation to valid prediction.

Specifically, the problem investigated in this study was to:

1. Determine whether the group of persons prepared to teach science or math who enter teaching are different from those who either do not teach or "drop out", and if so, in what ways.
2. Describe the incentives or conditions (if any) by which qualified, but not currently teaching personnel might be encouraged to teach.

PURPOSE OF THE STUDY

It was the purpose of this study to explore potential solutions to a projected science/math teacher shortage in

secondary schools. A major purpose was to determine whether the group of qualified but "non-teaching graduates" constituted a viable supply which could be tapped. All Virginia Tech graduates who completed requirements for certification as science and/or math teachers in the years 1980-85 were surveyed. Similarities and differences were established between:

1. Individuals who completed requirements for certification but did not enter teaching.

2. Individuals who were recommended for certification as teachers, who entered and remained in teaching.

3. Individuals who were recommended for certification as teachers, who entered teaching and later left.

The first objective of the study was to establish similarities and differences between the groups concerning their perception of work using Super's factors of work satisfaction. A second objective was to determine whether any of those qualified to teach science or math, but not currently teaching, would be willing to teach under present conditions. The third objective was to determine what would be necessary to entice those who had never taught or who had left teaching, to accept employment as teachers.

NEED FOR THE STUDY

Current theory concerning why teachers choose to become teachers does not adequately explain why some science and math teachers choose to leave the teaching profession while others do not. By determining how these groups differ, more effective student recruiting techniques may be developed, administrators may be able to make better choices among teacher applicants, and a lower attrition rate among science/math teachers may be realized.

Little is known about individuals who are eligible to be certified as science/math teachers but who do not teach. Because follow-up research is incomplete and colleges and universities who recommend teachers for certification do not consistently survey their graduates who are not teaching, this rather large group of potential teachers has been ignored. The recruitment of teachers may be enhanced by the availability of knowledge with regard to whether this group constitutes a viable source of additional teachers.

RESEARCH QUESTIONS

1. Of those graduates who completed the requirements for teacher certification in science and/or mathematics at VPI and SU in the years 1980-86, how do the views of individuals

who are currently teaching differ from those who have left teaching or who have never taught in regard to their perceptions of:

a. Human Relations

1. Recognition as a person by employer, peers, and the general public.
2. Freedom of independent decision making.
3. Fair treatment by employers.
4. Opportunity for self expression.

b. Social Status of Teachers

1. With peers.
2. With members of other occupations.
3. With the general public.

c. Work

1. Interesting work activities.
2. Satisfying work situation.

d. Livelihood

1. Ability to earn an acceptable level of living.
2. Job security. (Super, 1957).

2. To what extent are individuals not currently teaching willing to teach given present salaries, working conditions, and social status?

3. Of those who are not willing to return to teaching under present conditions, what modifications in the following

conditions of teaching are necessary to entice them to teach:

- A. Salary Increases
 - 1. Beginning salaries
 - 2. Opportunities for advancement
 - 3. Experience increments
 - 4. Bonus plans for high demand subjects
 - 5. Merit pay
- B. Working Conditions
 - 1. Class load
 - 2. Clerical/supervisory duties
 - 3. Physical environment
 - 4. Disruptive students/discipline
 - 5. Teacher isolation
 - 6. Stressful situations
- C. Social Status/Professionalization of Teaching
 - 1. Certification requirements
 - 2. Teachers discipline their own ranks
 - 3. Competency testing
 - 4. Removal of incompetent teachers
 - 5. Improvement of teacher image

DEFINITIONS

These terms and phrases are defined, for the purpose of

this study:

Certified science/math teacher-any individual recommended for certification by the College of Education at VPI AND SU to teach biology, chemistry, geology, earth/space science, physics, general science and/or mathematics in 7th through 12th grades.

Uncertified science/math teacher-any individual who satisfactorily completed the requirements necessary to be recommended for teacher certification by VPI SU in science or math, but has not sought certification.

Biological science-any course of study dealing with a life science and/or life process taught in the 7th through 12th grades such as biology, anatomy, ecology, or human physiology.

Physical science-any natural science that deals primarily with nonliving materials as physics, chemistry, astronomy or geology as taught in the 7th through 12th grades.

Mathematics-any course of study dealing with numbers and their operations as taught in the 7th through 12th grades.

Teacher Shortage-any situation in which there are fewer certified teachers available than positions available within a discipline.

Currently teaching-any individual who is currently under contract with and working in any school division as a classroom teacher.

Former Teacher-any individual who, in the past, was under contract with and working for any school division as a classroom teacher, but has since terminated that contract and is no longer working as a classroom teacher or is working within the school division in another capacity.

Never taught-any individual who has never been under contract or worked for a school division as a classroom teacher.

LIMITATIONS OF THE STUDY

The population surveyed consisted of graduates of VPI and SU from the years of 1980 to 1985, who had completed all requirements to be recommended for certification as a science or mathematics teacher in the state of Virginia. The results of the study can safely be generalized only to

graduates of VPI and SU. The study was limited to the similarities and differences among those individuals who completed requirements to be certified as science/math teachers whether currently teaching or not. In addition, the study was limited to determining if those certified and eligible science/math teachers who were not currently teaching were viable sources of teachers for recruitment by school administrators.

Outline of the Study

Chapter 1 includes an introduction, statement of the problem, purpose of the study, need for the study, research questions, definitions and limitations of the study. Chapter 2 provides a review of the literature. Chapter 3 describes the methodology used in the study and includes a description of the population, the sample, instrumentation, procedures for the tabulation and analysis of data and research hypotheses. Chapter 4 summarizes the data and Chapter 5 presents conclusions and recommendations.

CHAPTER 2
SURVEY OF THE LITERATURE

OVERVIEW

Educators point to these factors when analyzing the projected science/math teacher shortage: future citizens in our industrialized, technical society will require considerable skills in math and science; there are shortages of qualified science and math teachers in many school districts; teachers are currently being drawn from backgrounds weak in academic tradition; parents, counselors and others in positions of influence tend to advise the most competent students to avoid education as a profession; those teachers presently in the workplace are often poorly prepared to teach science or math; test scores of high school students have declined in science and math in the last decade due, at least in part, to an inadequate supply of competent teachers in those fields; national educators are calling for additional requirements for high school graduation and entrance into college; and, at least moderate increases in student populations will occur in the next decade.

The preceding factors indicate increasing demands for science/math teachers will occur at a time when their ranks

are decreasing. Where will we find qualified, dedicated teachers to fill the void? In order to answer this question, a look at the following topics is in order: demographics of our present teaching force; career choice theory; why people enter teaching; why people stay in teaching; why people leave teaching; and proposals for education reform concerning teacher recruitment and retention.

INTRODUCTION

Educators propose that the nation's science and mathematics students are not receiving the quality education they need to succeed in an industrialized society. Robert H. Koff (1982) stated the problem in this way:

Among the subjects taught in high school, the teaching of science and mathematics are in the most serious state of disrepair. Thirty-four percent of high school sophomores are taking remedial courses in these fields. Twenty-five percent of the mathematics courses in public colleges and universities are remedial (p. ii).

He continued by saying that our schools must be improved in these critical areas, otherwise the impact on our economy will be a "misfortune of catastrophic proportions" (p.ii). Nobel prize winner, Glen Seaborg described the impact of this pressing problem as "unilateral economic disarmament".

Declining Science/Mathematics Test Scores

A recent National Science Board Commission Report, (1983), revealed that from 1973 to 1982, National Assessments of Mathematics mean achievement scores of 17-year-olds declined by 32%. As a reflection of the general state of education in the United States, only 74.5% of our young people graduate from high school as compared to a 90% graduation rate in Japan. (Comparisons of this type are limited in value since many variables are not controlled; i.e. do these figures include all students or just those who entered high school?)

This same report disclosed a decline in the number of science and math courses completed by high school graduates since the 1960's: Algebra I 76% in 1960 down to 64%; Geometry 51%--down to 44%; Algebra II 35%--down to 31%; Biology 80%--down to 77%; Chemistry 34%--down to 32%; and general science 61%--down to 37%.

In business and industry, concern has been expressed in terms of the availability of adequately trained workers:

Industrial leaders have identified the current shortage of trained technicians as a serious barrier to increased productivity. The current and increasing shortage of citizens adequately prepared by their education to take on the tasks needed for the development of our

economy, our culture, and our security is rightly called a crisis by leaders in academe, business and government (National Science Board Commission on Precollege Education in Mathematics, Science and Technology, 1982, p. 2).

Guthrie and Zusman (1982) suggested that if solutions are not found, promptly, the United States runs the risk of becoming a second-rate nation dominated by countries whose educational systems are more effective in educating their youth for the industrial complexities of the future.

Bybee (1979) contended that science is an important institution in American society--for the last hundred years this has been true and will continue to be true in the future. "Thus scientific literacy is an appropriate basic goal for education" (p. 158).

Quality and Quantity of Science/Math Teachers

Tied to the quality of education in the U.S. is the quality and quantity of teachers, particularly in mathematics and the sciences. Reports of poor quality teachers abound in today's literature (Lanier, 1986; Toch, 1983; Gallagher and Yeager, 1981; Solorzano, 1984). In a survey of high school students across the country, Solorzano found that 50% of all students felt that the quality of teaching should be addressed before any other educational issue. Solorzano continued by saying that successful

schools are blessed with strong principals with clearcut objectives and goals, inspired teachers who have deep concern for the success and well being of their students and parents who are willing to provide assistance to the school and their children.

More than half of all science and mathematics teachers hired recently were employed on emergency certificates. Qualified teachers in these disciplines are difficult if not impossible to find in many school districts (Guthrie and Zusman, 1982). Not only are there fewer science and mathematics teachers entering the profession, but the quality of teachers in general is reported by some educators to be on the decline. Feistritz (1983) reported that in 1973, high school seniors planning to enter teaching, scored 27 points below the national average on the verbal segment of the SAT and 32 points below the national average on the mathematics segment. In 1982, high school seniors who indicated that they would enter teacher education in college, scored 32 points below the national overall average and 48 points below the national average in mathematics. "Not only are fewer persons choosing teaching as a career, but the academic caliber of those who do is decreasing" (p. 76). This finding was supported in "Educating Americans in the 21st Century", (National Science Board Commission, 1983).

Darling-Hammond (1984) contended that the new teaching force is less academically prepared than their counterparts who are rapidly reaching retirement age, or in the case of many bright young science and mathematics teachers, who are leaving teaching for more lucrative positions.

The results of the poorly prepared and motivated teacher in the classroom can be disastrous. In the study entitled Today's Problems, (National Science Board, 1982), it was found that poor teachers may "dampen the enthusiasm of good students and fail to recognize and stimulate the development of potential talents in others" (p. 4). The shortage of adequately qualified mathematics and science teachers has been found, according to this study, to be a contributing factor in the declining achievement scores of our science and mathematics students.

Among the findings of Yeager (1981) when he surveyed colleges and universities, secondary science teachers and supervisors, and members of the National Science Foundation, were concerns about poor quality of teacher preparation, lack of communication between teachers and college faculty, and inadequate inservice programs. These findings suggest that the product of teacher education programs is of considerable concern to those individuals surveyed.

The Shortage of Science/Math Teachers

Feistritzer (1986) reported that although there is considerable question concerning the projected shortage of teachers in all subject areas, the shortage of science and mathematics teachers is real. The next decade will produce considerable demand for teachers in these disciplines.

Desruisseaux (1984) reported severe shortages in physics, biology, computer programming, earth science, chemistry and bilingual education. Sousa (1984) discovered difficulties among New Jersey school districts in recruiting certified science teachers. Ninety per cent of all schools surveyed reported that the recruitment of science teachers was "moderate to very difficult". Rural schools, in particular, have been hard pressed to recruit adequate numbers of science and mathematics teachers (Toch, 1983).

Boyd (1986) in a study of 1100 secondary mathematics teachers in West Virginia determined that "The future supply of high quality secondary mathematics teachers is a very black cloud over the future of mathematics instruction in West Virginia" (p. 46). House (1982) termed mathematics teachers "an endangered species". McGeever (1984) contended that a national shortage of mathematics teachers is in our future if present conditions persist. Citing supporting references, Wise (1986) concluded that there will be a

shortage of all teachers.

Olstad and Beale (1981) asserted that the "supply of science majors is insufficient to meet the demand for full-time science teachers" (p. 28). Results of this study indicate a 35 % increase in the demand for teachers of science and a 76% increase in demand for teachers of mathematics in Washington state. Toch (1983) found critical shortages of earth science teachers in Virginia schools with less severe shortages in chemistry, physics, and math. Only in biology and general science was a modest surplus reported.

Buzzard (1984) concluded that schools are in the unenviable position of facing shortages of master teachers who could provide students in science with skills in critical thinking, the use of deductive reasoning and work in laboratory settings, rather than the memorization of facts and the ability to do paperwork.

Increased Graduation Requirements in Secondary Schools

In response to declining student test scores has come the call for more rigid graduation requirements. The National Science Board (1983) called for high schools to require more stringent graduation requirements. Three years of mathematics, which includes at least one year of algebra,

three years of science and technology and one year of computer science were recommended for graduation. The National Commission on Excellence (1983) made similar recommendations. The Florida legislature recently increased requirements for high school graduation from one to three years (Toch, 1983). If additional classes are added to the high school curriculum, additional teachers will be required in areas already exhibiting shortages.

Not only are increased science and mathematics requirements being suggested for high school, but elementary and junior high schools are also being targeted for increases in these areas. A National Science Board Commission Report (1983) recommended at least 60 minutes per day for math and 30 minutes per day for science in elementary schools. An additional, full year of science and math in the 7th and 8th grades was proposed.

The University of Utah has given notice that entrance requirements in 1987 will be increased to at least two years of math beyond algebra, to be taken in the 10th, 11th and 12th grades and two years of a foreign language (Wicker, 1983). Other colleges and universities, citing the high numbers of college entrants requiring remedial courses before entering college level classes, are increasing their entrance requirements. These strengthened entrance requirements will place new pressures on school divisions to

locate and recruit additional science and math teachers in a market already beginning to show signs of depletion.

Student Populations

Although school enrollments have declined within the last decade, (enrollments in K-12 peaked at 51 million in 1971), birthrates began to again turn upward in 1978. The children of the World War II baby boom are now having children.

"Even if they do not have large families, there are so many of them that they will contribute in an upturn in elementary school enrollments starting in 1983. By 1989 the new baby boom will begin to reach the secondary schools" (Guthrie and Zusman, 1982 p. 29).

The swell of students will not be evenly distributed among school districts. Many areas will receive more than their share of students, thereby placing exceptional pressures on teacher reserves in those localities. As many as 75 percent of these new students are projected to be found in the Western and Southern states. Teacher demand for science and math teachers will be greater in these regions than others (Toch, 1983).

TEACHER DEMOGRAPHICS

What type of person decides to become a teacher? What social factors are at work in determining who becomes a teacher? Answers to these questions can be found in a variety of recent studies conducted about teachers.

Socio-Economic Factors

Lanier (1986) reported that "many teachers and teacher educators come from home and family backgrounds whose academic roots are often shallow and which are therefore not likely to engender strong and engrained intellectual propensities" (p. 565). In a recent National Education Association report (1982), it was asserted that 20% of teachers' mothers had not successfully completed high school and 70% had not attended college. Gardner's (1983) research determined that teachers' parents fell into these categories regarding education: completed only elementary school or less (father, 24.5%, mother, 19.5%); some high school but did not graduate (father, 17.8%, mother, 16.3%); high school graduate (father, 28.4%, mother, 37.3%); some college but did not graduate (father, 12.7%, mother, 14.6%); college graduate (father, 8.4%, mother, 7.5%); and, graduate work after college education (father, 8.2%, mother, 4.8%).

Forty percent of teachers' fathers were employed in occupations that required only a high school education for entry and a majority were skilled and unskilled workers. Therefore, "approximately two-thirds of the male teachers and more than half of the female teachers are of blue-collar origin" (Smith and Cox, 1976, p. 112). Gardner (1983) found teachers' fathers employed in these occupations: Farmer (15.3%); unskilled worker (9.3%); skilled or semiskilled worker (29.3%); clerical or sales worker (5.6%); managerial worker or self-employed (22.2%); and, professional or semiprofessional worker (18.2%).

Smith and Cox further asserted that a "majority of male secondary school teachers come from lower-class homes, whereas a large number of female teachers tend to come from a middle- or upper-class background" (pp. 110-111). This indicates that for many beginning male teachers, teaching is a step upward on the social scale, while for beginning female teachers, teaching may mean a horizontal or downward move. Lortie (1975) obtained similar results and contended that teaching, for many, meant a movement upward on the social ladder. Even at that, teaching was envisioned as a middle-class occupation for those who "grew up in blue-collar or lower-class families" (p. 35). Charters (1963) found that teachers are drawn from middle-class families with smaller numbers being drawn from lower-class

and upper-class families. Zeigler (1967) observed that during the 1950's, larger numbers of teachers were drawn from middle-class backgrounds than from other classes.

As Smith and Cox (1976) observed:

It seems evident that teaching as a career is stereotyped as easily accessible, more suitable for women than men, and a potential avenue upward for social mobility for individuals in the lower socio-economic class. The practical effect of this stereotype is the denial to education of a large portion of talented young people who are being directed into other professions by educators and community bias that is transmitted in both formal and informal ways (p. 112).

Personal Characteristics of Teachers

Additionally, Gardner (1982) provided the following statistics concerning today's teacher. A substantial majority (66.9%) of all teachers are female. The male to female ratio is more equal for secondary schools. Eighteen percent of all teachers in 1981 were single, 80% were married, with the remainder widowed, divorced, or separated. (Almost 81% of all male teachers were married while just less than 70% of female teachers were married).

Seventy three percent of all teachers had two children. Over 80% of teachers own their own home and one or more cars. Of married teachers, 72.6% of males have spouses who work outside the home, while 92.3% of female teachers are married to men who work.

In 1981, the vast majority of teachers were white (91.6%) with 7.8% black and the remainder of other races. Black teachers were found in higher percentages in large school systems (20.3%) than in smaller rural schools.

Political Philosophy

Teachers tend to judge themselves to be politically conservative. Just over 70% judged themselves to be either "conservative" or "tend to be conservative." This judgement has not changed appreciatively in the last decade. Forty percent of all teachers are registered Democrats, almost 30% are Republicans, and 30% claim no political affiliation. Less than 4% of teachers reported that they had ever run for political office (Gardner, 1982).

Feistritzer (1983) summarizes the "typical American Teacher" in this manner:

A "typical" American teacher today would be a woman still in her thirties who had taught for 12 years, mostly in her present district. Over those dozen years, she would have returned to her local college or university often enough to acquire enough credits for a master's degree. She would be married and the mother of two children. She would be white and not politically active. Her formal political affiliation, if she had one, would be with the Democratic party. She would teach in a suburban elementary school staffed largely by women, although, in all likelihood, the school principal would be male. She would have about twenty-three pupils in her class. Counting her after-hours responsibilities, she would put in a work week slightly longer than that of the

average blue-collar worker in industry, but bring home a pay check that would be slightly lower (pp. 25-26).

Teacher Quality

Parker (1985) found that a large portion of the public, along with many educators believe that the best students are being discouraged from entering teaching and many of the best educators are leaving teaching for other occupations. Schlechty and Vance (1983) contended that "those who are most likely to select themselves as teachers are drawn from the least academically able college populations" (p. 483). Boyer (1983) supported this observation by determining that teachers consist of members of the lower half of their college classes.

While agreeing that the overall quality of teachers is lower than other occupations, Lanier (1986) contended that teaching does attract students of high ability. Schlechty and Vance found that from 1976 to 1979, 11% of those scoring highest on the SAT entered teaching--a figure comparable to other similar occupations. Of those, 7% of the highest scoring students were employed as teachers. Again, this proportion is comparable to other similar occupations. The difference occurs, however, when it is observed that teaching attracts more than its share of those who score lowest on the SAT. Thirty eight percent of college

graduates who were among the lowest on the SAT were education majors and 28% of them were eventually employed as teachers.

Although recent attention given to teacher quality by the press has led many to believe poorly trained teachers are of current origin, Lanier asserted that it is not a new problem. Teaching has probably always attracted a rather large number of students whose academic ability was lower than that of members of other similar occupations. As Lanier observed, "too many persons with exceedingly low scores on academic measures are allowed into teaching" (p. 539). Lanier also pointed out that huge numbers of teachers are needed, therefore, not all can be "above average."

Teachers' Academic Preparation

On the other side of the coin, teachers tend to continue their educations after earning a Bachelor's degree and entering the teaching force. Gardner (1982) found that almost half of all teachers have earned a Master's degree or have attained 6 years of college education. "Teachers are a relatively experienced and nontransient lot. They also are going to school longer and getting more degrees. Today, almost half (49.3 percent) of the teachers in elementary and secondary schools have earned at least a Master's degree"

(Feistritzer, 1983, p. 26). According to Feistritzer, only about one in four teachers had earned a Master's degree in 1971.

The median number of years of experience of all teachers in Gardner's national survey was found to be 12 years. Male teachers tended to have a slightly higher mean number of years of experience than females--13 years for the former as compared to 11 years. As a reflection of the number of experienced teachers leaving education, the mean age has declined from 41 years in 1961 to 37 years in 1981 for all teachers. Curiously, the mean age for males has increased from 34 years to 38 years while the mean age for females has decreased from 46 years in 1961 to 36 years in 1981.

THEORIES CONCERNING OCCUPATIONAL CHOICE

Rewards for Work

Super (1957) suggested there are needs which workers must satisfy if they are to remain in their present occupation: satisfactory human relations, adequate status levels, interesting and satisfying work activities and situation, and an acceptable level of livelihood. He contended that it is essential that the individual worker be

recognized as a person, be afforded a degree of independence in work activities, be given fair treatment, and have an "opportunity for self expression" (p. 3).

Super also contended that the level of status of the worker influenced the level of satisfaction with the occupation, as compared to other similar occupations and with the public in general. Within the workplace opportunities for self expression were considered important, along with satisfying work situations. Finally, salary, which determines the standard of living of the individual, and job security was considered to be significant.

Super elaborated by stating:

The point is that in a fluid, industrial society occupation is the principle determinant of social status. The work a man does tells more about him that is significant in this culture than any other single item of information (p. 18).

It is important, Super postulated, that the individual not only perceive an acceptable level of social status, but attain acceptance by co-workers and superiors as well. Also, the level of social acceptance a job provides is determined by three factors: A high level of training or education; a high level of general ability or intelligence; and a high salary.

Prestige and income are not the only factors which make for greater satisfaction in the higher occupational levels. The conditions of work are generally more attractive, the working hours are pleasanter, the work is more regular, there is more freedom (p. 269).

It appears that the profession of teaching does not fare well in any of the categories suggested by Super. More than ever before, teachers and the education profession in general, have come under heavy criticism by the general public. The social status of teachers has slipped considerably in the last years and salaries have not kept up with other, similar levels of employment (Chapman and Sigrid, 1982).

Holland and Nichols (1964) presented these reasons for teachers and other workers to undergo career changes: Changes in the personality of the individual; career changes triggered by changes in the individual's life or lifestyle; and changes in the environment (in this case changes in the teaching profession itself).

Richards (1984) suggested that teachers and other workers make trade-offs between "relevance and financial reward, and perhaps between job stability and opportunity for advancement as well" (p. 303). Concerning salary, Richards proposed that "teaching and human service jobs to which many graduates had aspired have either been defunded or funded erratically. Consequently, 'second labor market' characteristics may exist and may even be widespread within high-status as well as low-status occupational classifications" (p. 302).

Keith, Warren and Dilts (1983) asserted that secondary teachers have less desire for opportunities, self expression, interaction with people or diversity than their counterparts in elementary education. However, secondary teachers would be more likely to wish greater opportunities for autonomy, leadership and extrinsic rewards. Apparently, teachers in general "viewed nonacademic employment as a means to secure opportunities for advancement" (pp. 372-373).

Career Patterns

Miller and From (1951) suggested that career patterns can be categorized into four types. The first, stable career patterns, groups workers who have entered their chosen profession directly from school or college and have consistently followed this type of work. In the second type, conventional career pattern, the individual enters an initial career, goes through a trial period where one or more occupations may be explored, and finally reaches stable employment. In the third type, unstable career pattern, the individual goes through a trial period, followed by a stable period, followed by a trial period. In this instance the individual may give up an occupation that may have been a lifetime occupation to try another field in which he may or may not be successful. The multiple-trial career pattern,

the final type, is one in which the individual exhibits a frequent change of occupation and therefore may not establish himself in any occupation.

Many individuals who leave teaching fall into one of the last two types proposed by Miller and From. Teachers may give up employment in education to explore other areas of employment in which they may or may not be successful in establishing themselves. Others who follow the multiple-trial career pattern will probably not remain in teaching even if they are successfully recruited back into the profession.

Individuals leaving teaching highly value job autonomy and indicate that salary is important while those who remain in teaching place greater importance on being given recognition by friends and employers (Chapman and Sigrid, 1984 and Prediger, 1982). Chapman and Sigrid asserted that with the widening gulf between teachers and administration and with declining confidence in teachers on the part of the public, teachers may desert their ranks in larger numbers in the future since it is these very qualities that attracted them to teaching in the first place.

WHY PEOPLE ENTER TEACHING

Social Factors

Sykes (1983a) recognized a variety of social factors that encouraged people to enter teaching: (1) The feeling that teaching is an occupation that does not require special talents or skills; (2) the teaching profession allows for easy entry; (3) the selection of teaching does not eliminate the possibility of entry into other occupations; (4) the perception that teaching can be considered a temporary occupation; (5) family members and special teachers often influence those considering teaching; and (6) teaching is an attractive second choice of occupation. Especially for middle- and lower-class persons, teaching may present some material attraction in the form of salaries that are equal to or better than salaries in the occupations of parents and other acquaintances. Sykes also pointed out that teaching provides job security, the "opportunity for upward mobility into white-collar work" and the attraction of service to others. This theme is supported by research done by Baugh and Stone (1980). Other potent attractions include public subsidization of state teachers colleges, easy college loans, and support from federal programs such as the GI bill.

Smith and Cox (1976) found that lower-class parents often encourage their children to enter teaching as a way of attaining upward mobility. In other instances, children may choose to enter the same professions as their parents: "parents who see teaching as an avenue for expressing service to others are likely to instill the general value and to exemplify a linked occupational choice; family encouragement is a powerful recruitment resource" (Lortie, 1975, p. 44). Some "dutiful" children are expected to become teachers by their parents. Lortie also cites identification with teachers as one reason people enter teaching. In his research, Lortie reported that many of the teachers interviewed were from large families among whom were teachers who exerted considerable influence on younger family members who were making career decisions.

In some instances economic constraints may be in place that prevent college students from pursuing other careers that may be more expensive than teaching (Lortie, 1975). Occupations such as medicine, law, and business often require advanced degrees that are economically beyond the reach of many middle- or lower-class students. In this same massive research, Lortie cites a religious theme for entering teaching:

To Christians, Jesus is 'the great teacher'; teaching has been an honored vocation within the

Roman Catholic church for centuries; the Jewish tradition is steeped in the love of learning. Thus, those who define work as an expression of their religious faith can connect teaching with their beliefs; this gives teaching a resource of considerable potency (p. 28).

Major Attractions to Teaching

Relying on intensive interviews of teachers in five towns in the Boston metropolitan area and NEA surveys, Lortie (1975) proposed that there are five major attractions to teaching. The first was the 'interpersonal theme'. Here he observed that in the NEA surveys, having contact with young people led the list of attractions to teaching. Corresponding to the call of nursing and social work, teaching provides the opportunity to work closely with 'well' children. Teaching was seen, by the individuals interviewed, as an "art requiring special sensitivity and personal creativity" (p. 27).

The second is the 'service theme'. Teachers are seen as performing a "special mission in our society" (p.28). Teachers have the unique opportunity in our society to render a valuable service to young people and therefore to mankind. Teachers render a "valuable service of special moral worth" (p. 28).

The third is the 'continuation theme'. Some individuals like school and wish to continue in that

occupation for that reason. In some instances teachers find an opportunity to express an interest that has been blocked. For example, a teacher of science may have had aspirations to become a research scientist, but for some reason has not been successful in that pursuit. Teaching provides an outlet for those interests. In other cases, Lortie found that some teachers were interested in the subject matter itself and found a convenient outlet for their interests in teaching.

The fourth is the 'material benefits theme.' Women who enter teaching may find the salaries of teachers to be greater than alternative occupations available to them. "The usual alternatives considered by women teachers normally offer no greater income and may, in fact, offer less" (p.30). Because many men who enter teaching arise from low-income families, teaching salaries may represent an acceptable if not desirable income level not otherwise enjoyed. "A significant proportion of men who teach come from homes marked by economic insecurity and low social status" (p. 30). "Although muted, material benefits play their part in drawing persons into the occupation" (p. 33).

The final theme is that of 'time compatibility.' Workdays that are finished in the early afternoon, generous allotments of holidays, and extensive summer vacations are attractive to individuals who are making career choices. For many people an occupation with vacation time that parallels

that of their children is attractive. Women, in particular, may be attracted to a work schedule that allows attention to school age children at times when they are not in school.

In a survey of 1,350 teachers, including 337 junior high and 479 senior high teachers, Goodlad (1984) determined that 57% cited the "nature of teaching" as a primary reason for entering teaching. Almost one in four (22%) indicated a "desire to teach" as reason for selecting teaching as a profession. Eighteen percent indicated that "teaching as a good and worthy profession" was a factor in selecting teaching. A "desire to be of service to others" elicited a response of 17%.

Similarly, Shalock (1979) found that among those who entered teaching, these reasons were given for making that selection: working with people was desirable; an important service could be rendered; contact with children was a major facet of work; and teaching provided an opportunity to transmit information and knowledge.

Sykes (1983a) found similar responses among respondents: "When asked, teachers say they chose this profession because they enjoy working with other people. In a variety of surveys given over the years, this item consistently ranks first among teachers' reasons for joining. Closely coupled with this motive is a desire to serve, to perform a special mission" (p. 108).

Additionally, Sykes proposes these powerful attractions to teaching:

1. Time compatibility with children.
2. More time for household duties.
3. Opportunities for additional study.
4. Pursuit of second jobs.
5. Time for recreational activities.

From September to May, the number of vacation days is about the same for other workers as for teachers. Goodlad (1984) suggested, however, that the summer months of unemployment for teachers is inaccurately called vacation. During those months, teachers are often employed by the educational system or find employment outside of it. "They prefer paid work to unpaid leisure" (p. 169).

Teaching as a Second Choice

When individuals realize they may not attain their educational objectives, they find that they can enter education by using much of the college coursework previously taken. "Teaching is somewhat special in that those who enter it as a second choice possess above-average educational qualifications. In that sense, teaching has an enviable competitive position; its accessibility fosters the entrance of people who might never have gone to college to become teachers" (Lortie, 1975, p. 49). In speaking of the tendency of those who fail to enter their first choice of occupation to enter teaching, Lortie concluded that teaching serves "as a stratification safety net which allows people to land without severe damage to their status aspirations" (p. 50).

Lanier (1986) postulated that women, who in the past constituted a majority of teachers, may begin to enter teaching in smaller numbers. Occupations that were once closed to women now are within their grasp. Women are now gaining access to once male dominated occupations, while at the same time teaching affords less power, monetary benefit, and status. The recruitment of qualified female teachers will continue to become more difficult.

WHY PEOPLE STAY IN TEACHING

Rewards of Teaching

Lortie (1975) suggested that there are three types of rewards for work: Extrinsic rewards are exemplified by the level of earnings (money, income); the level of prestige; and power over others. Ancillary rewards are those perceived as beneficial, such as a clean work place, free time, and economic security. Psychic rewards are characterized by subjective valuations made in the work and are exemplified by such items as enjoyment of work, sense of accomplishment and importance of work.

In a recent study of 6500 Dade County, Florida teachers, Kottkamp, Provenzo and Cohn (1986) categorized the results of their study according to Lortie's types of rewards. Teachers were asked what extrinsic rewards, found in teaching, they felt were most satisfying. "The salary I earn in my profession" was selected by only 14.2% of the respondents as being satisfying, while 26.3% indicated that the respect they receive from others was satisfying. Over 31% cited an opportunity to wield some influence as being important.

Ancillary rewards recognized as being satisfying to Dade County teachers were: security of position and

income--16.1%; schedule permits travel, family activities--35.4%; and special appropriateness of teaching--28.6%

Overwhelmingly the intrinsic reward that was found to be most satisfying to Dade County teachers was "the times I have 'reached' a student or group of students and they have learned"--86.7%. Surprisingly, a chance to associate with children was selected by only 7.6% of teachers surveyed.

Goodlad's (1984) research reinforces, to some extent, the Dade County findings:

It comes as no surprise that the teachers in our group who entered teaching because of the professional values inherent in it, an interest in or desire to teach a subject, or liking for children said most frequently that their expectations had been fulfilled and that they would be likely to select teaching again. Those who chose teaching because they were influenced by others or for economic reasons were the least likely to report fulfillment of career expectations (p. 171).

Satisfaction With Teaching

In a survey of 1490 teachers nationwide, Gardner (1983) asked teachers to rate their degree of satisfaction with teaching from 1 to 10, with 10 being the highest. Eighty three percent indicated a high degree of satisfaction in personal fulfillment from teaching by selecting a score from 6 to 10. Sixty-eight percent indicated satisfaction in time

spent supervising outside the class, 61% reflected satisfaction in support received from parents and students, and 55% were satisfied with fringe benefits.

Gallup (1985) determined that teachers consider teaching to be the highest profession in contribution to society, among twelve professions which included doctors, lawyers, dentists, clergy and other professionals. They felt that their status was lowest of those professions listed. However, the general public rates teachers higher in status than the teachers do themselves.

In a recent study of Former Teachers in America (Harris, 1985) teachers were asked to name "job aspects in which teaching is rated better than other occupations". Those responses mentioned most often were: job security; vacation benefits; and health/insurance benefits. On the other hand, these job aspects of other occupations rated better: salary; professional prestige; control over one's work, equipment one has to work with; and fewer hours per week.

Lortie (1975) summarizes the benefits of remaining in teaching by saying "Teaching is special in at least two respects: few occupations can offer similar opportunities for protracted contact with normal children, and few can provide such compatible work schedules" (p. 32).

For the most part, teachers remain in teaching because

of the intrinsic rewards they gain from teaching. Those who entered teaching because of the nature of teaching itself, and because they liked to teach, tend to remain in teaching. Those who entered teaching for monetary reasons and/or for social status tend to leave.

WHY TEACHERS LEAVE

Factors that Cause Teachers to Leave

In the Metropolitan Life survey of Former Teachers in America (Harris, 1985) "Low salaries, poor working conditions, lack of occupational prestige, and a limited voice in school decisions" were cited as causes of dissatisfaction among teachers which resulted in teachers leaving. Frustrations resulting from being hindered in meeting expectations set before entering teaching often leads to teachers seeking other opportunities for employment (Goodlad, 1984). In reference to poor working conditions Goodlad contended that:

"We must give attention, then, to the workplace. The circumstances of teaching must provide optimum opportunity for teaching, and learning to proceed. When teachers find themselves restrained and inhibited by problems of the workplace that appear to them not to be within their control, it is reasonable to expect frustration and dissatisfaction to set in (p. 180).

The longer teachers teach, the greater the possibility of their dissatisfaction with the conditions of teaching (Lanier, 1986 and Lortie, 1975). According to Lanier, teachers are "weary from the excessive demands of the occupation, dulled from their routinized work with children, and frustrated by the lack of opportunity for intellectual, purposeful exchange with adults" (p. 554). Until changes are made concerning job demands, "talented persons will continue to escape after only a modest period of service" (p. 554).

The "teachers' diminishing returns" were summarized by Sykes (1983a, 1983b, 1984) in this fashion: (1) Enjoyment of working with young people is reduced as they become less responsive and appreciative; (2) the public is less inclined to view teaching as an important public service; (3) both men and women are less able to make upward and/or lateral movement in employment within the educational system; (4) material benefits have been eroded considerably within the last few years; (5) student achievement is less regular, thus reducing psychic rewards; and (6) "teaching environments that all too often are disruptive, dangerous, and bureaucratic to the point of frustration" create dissatisfaction.

Sizer (1984) contended that it would be necessary to improve the conditions of teaching and that new technology,

teaching methods, certification requirements and/or curriculum revision would not suffice in retaining good teachers. In his study, Sizer found poorly maintained schools, bureaucratic methods that were discouraging to teachers, and poor dispersal of funds. Goodlad (1984) suggested that remedying conditions of work that are irritants to workers will increase their satisfaction and productivity. Teachers interviewed in Lortie's (1975) study complained of: clerical duties; classroom interruptions; pressures to complete work on time; duties other than within the classroom; student discipline; disagreements with administrative superordinates; disputes with parents; conflicts with fellow teachers.

Teachers leave the profession for a variety of reasons. Chapman and Sigrid (1982) found that:

Those who left and those who did not leave teaching differed significantly in their self-rated skills and abilities. Further, they differed significantly in the importance they assigned to selected criteria of success (p. 103).

Chapman and Sigrid (1984) also observed that "those leaving teaching are apt to assign greater value to autonomy; those remaining in teaching are apt to think autonomy is less important" (p. 95). Additionally, these researchers found that teachers tended to exhibit the ability to organize time wisely, while those who leave teaching do not. The researchers were careful to point out that correlation does

not imply causality.

The Workplace

Teachers are dissatisfied with other aspects of their work and working conditions. Not being allowed to conduct uninterrupted classes was a frequent complaint among teachers in Sizer's study. He suggested that frequent classroom interruptions for administrative and other purposes "are a symbol of misplaced priorities of schools that fail to value conditions for serious intellectual activity" (p. 174). Additionally, schools that lack adequate facilities, teaching materials, and libraries can weaken teacher resolve to remain in teaching (Sizer 1984, Lortie, 1975, and Eddy, 1969). Eddy interviewed teachers who worked in schools that were described in the following terms: half-century old; medieval castles; dusty, gray buildings; and in some cases simply termed "dingy". Although many strides have been made in the quality of school plants today, many have simply gotten older and less comfortable since his study. Thus, in many cases teachers are forced to work in dirty, depressing surroundings.

Boyer (1983) affirmed Eddy's findings and stated:

Teachers frequently have no permanent classroom or even a desk of their own. They usually have no pleasant place to take a break or have lunch with colleagues, let alone with friends

from outside the school. In some schools, floors are dirty, windows are grimy, and restroom facilities less than satisfactory (p. 158).

One recurring complaint among teachers was the lack of a free lunch break. In many occupations, the noon hour may serve as a refreshing break from the workplace. This is not so in most of the nation's classrooms where teachers are expected to remain on duty while eating their lunches. The failure of schools to provide a relaxed, and refreshing break at lunchtime eliminates the possibility of teachers establishing personal relationships with each other, let alone with other professionals outside the school. (Goodlad, 1984). Teachers, it seems, are afforded little opportunity to spend time in the presence of other adults (Boyer, 1983).

Teachers have shown a tendency to become discouraged with administrative paperwork. Boyer (1983) found that teachers may be required to complete as much as 3 or 4 hours of paperwork per week for administrative purposes. They reported additional work in reference to student discipline, lesson plans, attendance records, notifying parents of student absences, and others. With pupil-counselor ratios of 319 to 1, teachers, of necessity, assume some of the duties of the counselor, including the resulting paperwork. According to Boyer, teachers view these duties as "babysitting", or duties outside their area of responsibility and contend that they reduce the teachers'

image.

Another disappointment among teachers is the teacher/student ratio. Although the Nationwide Teacher Poll (1980) reported a national mean class size of 24, it is not unusual for classroom sizes to swell well above that number. Forty-four percent of teachers in this poll indicated that they were dissatisfied with their class size. Each day, many teachers face class after class with as many as 35 students (Goodlad, 1984). In an interview conducted by Goodlad during his research, one teacher said: "It is the sheer emotional drain of interacting with 173 students each day that wears me down" (p. 194).

In addition to facing large classes, teachers also must meet with and instruct excessive numbers of classes. Boyer (1983) reported that teachers meet with 5 to 6 classes each day, often with 3 or more preparations. The average number of minutes spent per day in classroom preparation was 54 minutes. Teachers were often expected to prepare for and teach 3 levels of a single course. After teaching all day, the teacher often is faced with the preparation of lesson plans for the next day, grading papers, writing tests, making out report cards, reviewing subject matter, counseling students, assuming evening duties such as chaperoning dances, athletic events, etc., and other assorted duties. While on duty during the day, Boyer

reported that teachers are assigned menial tasks such as the supervision of lunchrooms, policing hallways, and chaperoning student activities.

Teachers have traditionally believed that they were responsible for determining what was taught in their classrooms and that the school was effective in establishing an academic climate. However, what some observers believe to be autonomy in the classroom, in reality is isolation from other professionals with similar interests and responsibilities. "The combination of the self-contained classroom and a heavy teaching schedule gives teachers few opportunities to share common problems or sustain an intellectual life" (Boyer, 1983, p. 158). Jackson (1968) saw great rigidity and formality in reference to autonomy.

Goodlad (1984) observed that the classroom cell was symbolic of the isolation and lack of communication that teachers endure. He noted that communication between teachers for the purpose of sharing ideas and teaching techniques were "weak or non-existent" and that this problem was more prevalent in high school settings than in elementary. "Most teachers taught alone in a classroom" (p. 188). Goodlad contended that:

We must remember, too, that apart from their lunch hours teachers are walled off from one another for most of the day. Teaching may be a more lonely and socially circumscribing vocation than we realize. What effects this may have on teachers' behavior, self-renewal, and relations

with students are difficult to estimate (p. 171).

In addition to discouraging working conditions, teachers in many schools face the threat of physical violence. It was documented in the Nationwide Teachers Poll (1980) that 113,000 teachers were attacked physically by students or others. Over 5% of the teachers in the sample were physically attacked. Two percent of those surveyed reported that they had suffered serious physical injury. Thirty-eight percent of those attacked reported no serious injury, but indicated that considerable emotional trauma resulted. In another study, Gardner (1983) reported that 4% of those surveyed had been attacked in the preceding twelve month period. In addition to physical attacks, teachers are often the victims of thieves. Twenty-two percent of the teachers in the Nationwide Teachers Poll reported that they had personal property stolen in the preceding twelve months. Boyer (1983) also reported physical violence and threat of physical violence in the nation's schools. "In sum, the teachers' world is often frustrating, frequently demeaning, and sometimes dangerous. The result for many teachers is a sense of alienation, apathy, and what is fashionably called 'teacher burnout'" (p. 159).

Boyer (1983) summarized the problems of teachers concerning their workplace by saying:

Improving working conditions is, we believe,
at the center of our effort to improve teaching.

We cannot expect teachers to exhibit a high degree of professional competence when they are accorded such a low degree of professional treatment in their workaday world. Nor can we expect to attract the best and brightest into teaching when they have had twelve years of opportunity to observe first hand the daily frustrations and petty humiliations that many teachers must endure (p. 161).

Stress

Harris and Associates (1985) found that frequent job stress was one of the "signs of teachers most likely to leave" (p. 6). They found that the degree of stress experienced by the teacher is one of the major determinants affecting those who leave the profession. Fifty-seven percent of former teachers recall great stress for several days each week, while only 22% of former teachers report great stress in their new jobs.

Lortie (1975) in a study of 94 teachers found that clerical duties, interruptions, time pressures, and student discipline were major sources of stress in teaching. Caspari (1976) maintains that "the exhaustion felt by most teachers at the end of term is more closely linked to the demands made on the skills and personality of a teacher in keeping discipline over the children he teaches than any other aspect of his work" (p. 29).

The extent to which the demands made upon a teacher results in teacher stress depends on numerous factors. Examples of such factors which

may be important are (1) the degree of role conflict or role ambiguity involved, (2) the degree to which the teacher perceives that he is unable to meet demands made upon him, (3) the degree to which the teacher's ability to meet the demands is impaired by poor working conditions, (4) the degree to which the demands are new or unfamiliar, and (5) the degree to which the teacher is already experiencing stress resulting from sources outside his role as a teacher (Kyriacou and Sutcliffe, 1977; p. 299).

Kyriacou and Sutcliffe (1977) maintained in a survey of research on stress that little is known about the sources of teacher stress and their effects on the individual. These researchers concluded that research based on interviews or surveys may not get at the root of the problem, but rather, called for data collection based upon physiological responses to classroom situations.

In a study of almost 5,000 teachers employed by the Chicago Board of Education, Cichon and Koff (1980) concluded that teachers experience stress when they are disciplining children, when they are threatened with physical violence or subjected to abusive language from students, when there are tensions between the teacher and administration (for example, notices of unsatisfactory performance heads the list of management-related stress), and when they fail to do what the teacher perceives as a "good job". "Maintaining self-control when angry and being an effective teacher, especially with children who are below average in achievement, are important professional responsibilities

which are perceived to be at least moderately stressful" (p. 100). It must be noted that this study was conducted in the nation's third largest school district and that the findings are not safely generalized to less populous areas.

Salaries

Educators suggest that one major reason for classroom teachers leaving the occupation is poor salaries. The National Education Association (1986) in "Estimates of School Statistics", a compilation of school statistics provided by state departments of education, reported that the classroom teacher's national average salary was \$25,257 in school year 1985-86.

Compared to salaries of occupations into which former teachers might go, the teacher's salary is less attractive. A variety of occupations and their salaries are provided below for comparison as reported by Northwest University Endicott Report (1986)

Beginning Salaries--How Teachers Compare in 1985-86

Teacher	\$15,400
Accountant	\$19,980
Biologist	\$16,824
Business	\$19,656
Chemist	\$23,280
Civil Engineer	\$22,764
Computer Technican	\$24,552
Economist	\$20,040
Electrical Engineer	\$26,556
Engineering Technican	\$24,936
Financial Analyst	\$21,040
Health Services	\$18,912
Physical Scientist	\$22,800
Sales/Marketing	\$20,040
Statistician	\$22,140
Telecommunications Analyst	\$23,140

Timothy W. Weaver (1984) suggests that a variety of factors causes talent to leave the classroom, but salary is

among those determined as being extremely important." "Severe shortages in certain fields now provide a new rationale which has prompted boards of education in Houston, Oklahoma City, and Richmond to offer salary supplements to some teachers" (Williams, 1983; p. 50).

Those who choose to leave teaching fare better than their counterparts who remain in teaching. Thirty-five percent of former teachers who have chosen another occupation earn over \$30,000, while only 12% of current teachers earn more than that amount. This constitutes a net median increase in income of \$4,000 for each person who leaves teaching in favor of other employment, according to the NEA study. "Even in a tight job market, those who prepared for teaching are finding ways to use their skills well, often in jobs with brighter advancement prospects and higher salaries than teaching" (Stark, Austin, Lowther, Chapman and Hutcheson, (1981).

In a recent Gallup poll (1984), 90% of the current teachers contacted said that teachers' salaries were too low. Nine in ten teachers indicated in that poll that low salaries were the cause of teachers leaving the profession. These findings were supported by a poll by Lou Harris and Associates (1985). This research, involving over 2000 current and former teachers, determined that low salaries along with poor working conditions, were at fault in causing

many teachers to leave. When former teachers were asked why they left teaching, 60% cited low salaries as their first choice of cause. Among current teachers, 62% said low salaries were at cause. Among those who were determined to be "likely leavers" 65% indicted that low salaries would be a primary determinant in their decision to leave teaching.

Heylin (1982) discovered that teachers in the sciences, particularly in the physical sciences, are leaving teaching to accept more lucrative positions in industry and business. Their replacements are often unqualified teachers.

As stated by Guthrie and Zusman (1982):

In many states, classroom teachers of math and science are being drawn to high-technology industries like iron filings to an electromagnet. Some estimates suggest that as many as 25,000 teachers are leaving the classroom each year (p. 29).

In reference to the low salaries offered to teachers, Feistritzer (1983) suggested "the worst news, however, is how the gap widens as the years go by--about \$25,000 after 15 years for the teacher, \$40,000 to \$50,000 for, say, an accountant who started at \$16,000" (p. 112). In 1982, the National Center for Education Statistics reported that the purchasing power of teachers was 15% below their 1970-71 level.

Van Meter (1984) proposed that supply and demand will soften the impact of the teacher shortage. He suggested

that educators must follow the example set by industry and offer teachers, particularly in science and mathematics, "incentives they just can't refuse" (p. 27). In this report, Van Meter suggested offering one-time bonuses to new teachers, release-time during the year, and bonuses for completing the school year.

Winborne and Steinback (1984) found that administrators in King William County Schools, Virginia, offered a differential pay plan including \$2,000 salary supplements for teachers in areas of shortages along with rewards for meritorious accomplishments. Similarly, Houston public school administrators have rejected the idea that "financial rewards are unnecessary to attract qualified people to the teaching profession" (Miller and Say, 1982, p. 24). The result is a program entitled the "Second Mile Plan" in which student test scores increased, the number of teacher vacancies decreased, vacancies in critical shortage areas decreased, and teacher absences decreased. In addition, this program produced a mean salary increase of 6.4%, and decreased the median turnover rate.

In the Second Mile Plan, stipends are granted in six categories: high priority location, critical staff shortage, outstanding teacher attendance, professional growth, outstanding educational progress and unique campus assignment. Bonuses range from \$400 per year for

professional growth to \$800 per year for critical staff shortages.

Brickell (1984) described an incentive plan instituted in the Virginia Beach, Virginia, public schools by saying:

Here in Virginia Beach, we believe excellence in education rests primarily on recruiting and retaining the very best classroom teachers; we believe, too, the best education can be achieved only when the learning environment includes high expectations for students, teachers, and administration--with commensurate rewards for meeting those expectations.

Brickell described the Virginia Beach salary increment program as having three steps: probational level in which new teachers remain for three years; beginning teacher in which continuing contracts are awarded; and career teacher. Each step includes a pay increase, yet the teacher is not automatically transferred from one level to another. Under this program 19% of the 3,000 teachers employed receive an incentive salary increase. This school system, after nine years of experience with the program, indicated that "the financial bonus attached to the career-schedule salary has been useful not only in retaining our best teachers, but also in recruiting the most competent new teachers available" (p.31).

Social Status

In an earlier poll conducted by Harris (1984) it was found that morale was lower in those individuals who were employed as teachers than other workers in general: 81% of current teachers said they were "somewhat satisfied"; 40% were "very satisfied". Eighty-seven percent of the working public reported that they were "somewhat satisfied" and 52% reported being "very satisfied". Although 97% of current teachers indicated that they loved to teach, 73% say they have too much administrative paperwork, 63% say that they do not earn enough money, 53% are disappointed with society's lack of respect for the teaching profession, and 53% said they would not recommend teaching as a profession for young people.

The Gallup study (1985) determined that teachers rate their contribution to society as the highest of twelve professional occupations suggested, including physicians, clergy, business executives and lawyers. The study also found that teachers felt their status was the lowest of all these professions. The public rated teachers lower on the scale of twelve professions, but indicated that teacher status was higher than the teachers had rated themselves. "The prestige that teachers feel they have in their own communities appears to be a sensitive subject. Only 1% of

teachers give their profession the highest rating for its status in the community" (p.325).

Lortie (1986) in reflecting on the pressures exerted on teachers and their attitudes toward teacher status, asks "Will teachers who have soured on their work serve as attractive models for the young people who are now choosing occupations? (p. 571). In response to declines in teacher satisfaction with their jobs over the last two decades, Lortie postulated that:

There is increasing tension between the qualifications and self-images of teachers in large school districts, their position in the formal system of governance, and their ability to make firm decisions in matters related to their own classrooms and students. In addition to external sources of status disruption, increased dissatisfaction, where it occurs, can be attributed to what sociologists call 'structural strain'" (p. 571).

Who Leaves Teaching?

Many teachers admit that they are ready to leave the classroom if an opportunity is presented. More than 40% of current teachers contend that they expect to leave teaching in the near future (Book, Byers, and Freeman, 1983). The Nationwide Teacher Poll (1980), found that 9% of those surveyed indicated that they would leave teaching as soon as possible with another 21% undecided about their futures as

teachers. When asked if they would again enter teaching if they could go back to college and start over, 12% said they would definitely choose another occupation and 29% indicated that they probably would choose another line of work. Half of this number plan to take time out to raise a family and may return to teaching in the future, but the remainder are intent on leaving teaching in favor of another occupation.

Many men enter teaching with little intent of staying more than a few years. They view teaching as a temporary step to other types of work. "To advance, men move into administration or leave the profession altogether" (p. 110). Women exhibit a tendency to enter and leave teaching as demands are made upon their time by their families (Sykes, 1983). Lortie (1975) suggested that "most men reject teaching as an ultimate goal; they see teaching as a means toward another end--as an interim employment" (p. 86).

Of those leaving in favor of other occupations, as many as 85% are among those scoring highest on the NTE while approximately 62% of those scoring the lowest choose to leave (Schlechty and Vance, 1981). Other studies have tended to refute this finding and indicate that no difference in teacher quality can be discerned among those who leave (Former Teachers in America, 1985).

Teachers tend to be successful in their new occupations when they leave teaching. Beard and McGahey

(1983) proposed that the teaching profession requires many skills and talents that are useful in occupations other than teaching. Generally, teachers exhibit verbal, analytic and thinking skills; they are mature, conscientious, dependable, imaginative, independent and perceptive; they possess interpersonal relation skills, and have the ability to motivate, counsel, coordinate, discipline, manage and consult. These skills are requirements in almost any occupation a teacher may choose.

In addition, teachers who leave tend to exhibit a higher degree of job satisfaction with their new career. Ninety-six percent of former teachers surveyed indicated that they were satisfied with their new occupations in comparison to 47% of former teachers who said they were satisfied with teaching. Seventy-nine percent of current teachers reported satisfaction with teaching (Harris, 1985). This tends to indicate that former teachers may not be a viable source of teachers for the future unless conditions that cause dissatisfaction can be rectified.

A number of indicators were established among those who left teaching: Younger teachers leave teaching in the largest numbers; moonlighting is one of the strongest indicators that a teacher may leave; teachers who undergo frequent stress in the workplace are likely to leave; those who leave are likely to assert that other occupations offer

more intellectual stimulation; men are much more apt to leave teaching than women; and, secondary education suffers higher rates of teacher turnover than elementary education. Among those who left teaching, only 17% admitted an inclination to return (Harris, 1985).

Where do Former Teachers Go?

Chapman and Sigrid (1982) made two observations concerning those who left teaching: Many of those who left teaching tended to remain in the education field in one capacity or another; those who left entered a broad range of occupations that were not easily categorized. Science and math teachers were not identified separately from other teachers.

In a report by the National Center for Education Statistics (1982) 38% of those leaving education, were reported as entering managerial or a wide range of professional occupations. The report indicated that 7.1% were not employed.

Of those college graduates who are certified to teach, as high as 23% do not apply for a teaching position. Ninety percent of those who did not apply for positions upon graduation indicated, simply, that they did not want to teach. The remaining 10% indicated that teaching positions

were difficult to attain or that they simply did not apply. Of those who did apply for a position upon graduation, 20% did not teach the following year according to The National Center for Educational Statistics, (1982).

Lou Harris and Associates (1985) determined that former teachers' satisfaction with their jobs rises sharply after leaving teaching. Ninety-six percent of former teachers are satisfied with their new job while only 79% of current teachers report being satisfied with their jobs. Forty-seven percent of former teachers indicated that they were satisfied with their job when they were teaching. When asked what aspect of teaching proved most disappointing, 64% of those surveyed indicated that the lack of professional prestige was of concern. Fifty-four percent indicated that the number of students with special needs who were not being helped was of concern. Other areas of dissatisfaction included: the degree of administrative support (54%); the level of salary and benefits (47%); and the number of hours of work per week (45%).

The literature shows that individuals may enter teaching in order to move from a lower-class background to middle-class. Salaries earned in teaching may be more attractive than the salaries of lower-class occupations. Many individuals enter teacher education after attempting

another area of training in college. Entry requirements into teacher education at many colleges are easily met and the total cost of education is more affordable than for other, more prestigious and lucrative occupations. There may be considerable encouragement from family members and friends for individuals to enter teaching since it is viewed as a secure, respectable occupation. Many individuals are attracted to teaching because of the "service" theme and because of the attraction that teaching others holds. Time compatibility with the schedules of the teacher's children and spouse, and generous amounts of time off are also attractants.

SOLUTIONS

What can be done to increase the number of teachers entering and remaining in science and mathematics education? A variety of solutions have been proposed by individuals within the education profession as well as a host of individuals outside of education. Presented here are the most common proposals.

To remedy the problems mentioned above, Boyer makes these suggestions:

1. Teachers should teach a maximum of 4 classes per day.

2. Sixty minutes per day should be allowed for class preparation.

3. Teachers should be exempt from routine duties such as hall monitoring and lunchroom duty.

4. The intellectual climate of schools should be improved.

5. Small improvements could be accomplished in the following ways: make lounge areas more attractive; provide adequate supplies; provide teachers with a Xerox that works; reduce teacher isolation by encouraging teachers to meet and discuss professional topics; promote conditions that provide for teacher safety from attack; improve discipline; remove disruptive students from classrooms; recognize teachers who are exceptional by a reward system; and improve teacher salaries.

Goodlad (1984) recommended a similar list of improvements:

1. Reduce instructional time to 15 hours per week.

2. Reduce teaching load.

3. Provide teachers with time to address curriculum deficiencies and problems, and provide a method of contact between teachers and subject matter specialists.

4. Provide for meaningful staff development.

5. Utilize resources in the community.

A list of recommendations generated through a review of

current literature by Wise (1986) includes:

1. Forgivable loans to students.
2. Differential pay for areas of shortages.
3. Bonuses to begin teaching in areas of shortage.
4. Use part time teachers from other professions.
5. Provide competitive salaries.
6. Entice teachers who have left to return.
7. Provide a more appealing teaching environment.

Lortie (1975) made these recommendations for the improvement of teachers' working conditions: Reduce class size; reduce clerical duties and other duties outside the classroom; provide teachers and students with better facilities; and provide incentives for teachers to remain in the classroom by upgrading salaries and establishing lines of promotion. The last two items, salaries and promotion, were at the top of the list among complaints by teachers.

Miller and Say (1982) summarized the problem of science/math attrition in this way:

The days are long gone when the public could assume teachers would work for low wages because of the inherent 'joys of teaching.' Business and industry continue to lure many of our most talented teachers away from the classroom with the promise of higher pay and less aggravation.

Chapman and Sigrid (1982) contend that professions other than teaching provide opportunity for salary advancement independent of seniority and training. Primarily, industry can offer financial benefits in

recognition of outstanding performance. In a recent study of over 2000 teachers, including those who were no longer teaching, Harris and Associates (1985) suggested that recent former teachers must overcome the obvious political, professional, and financial obstacles in entering industry. Increasing job satisfaction will be a difficult problem to solve since this problem is a result of the way society views teachers and education.

In the past, education has drawn heavily from women in the workforce. This is no longer a viable solution to the teacher shortage. The numbers of women entering the teaching profession has begun to decline in recent years. In an address to the Utah Educational Seminar, Governor Scott M. Matheson explained the 50% decline in numbers of teachers trained in that state in the preceeding year by saying that "the truth is that bright, capable women have been the mainstay of public schools for years. We have simply escaped paying them what their talents might have been worth because few other professions were open to them" (From "Educating Americans for the 21st Century", National Science Board, 1983). Now, many new avenues of employment are opening up for women. We can no longer depend on this source of teachers as heavily as we have in the past.

Jackson (1984) proposed that industry provide summer employment for science and mathematics teachers in order to

supplement their incomes. This proposal would make it possible for teachers to remain in the classroom during the remainder of the year.

Darling-Hammond (1984) postulated that another solution to the teacher shortage would be to professionalize teaching. Other professions exhibit these characteristics: "Rigorous entry requirements; supervised induction; autonomous performance, peer-defined standards of practice; and increased responsibility with increased competence" (p. 17). Teaching, then, in order to become a true profession would require salaries that are competitive with other similar occupations, incentives to enter the occupation, a "more intellectually rigorous" probationary period before tenure, improved working conditions, and a career ladder that would allow advancement without leaving the classroom.

Guthrie and Zusman (1982) proposed that workers from private industry enter the classroom, on a loan basis for a few hours each day, to teach science and mathematics classes. Community colleges have long used adjunct instruction in areas where full time faculty were not available. These individuals would have to be available during the day while secondary school classes were in session. An added bonus is that these individuals would be excellent role models for students and teachers alike, giving credibility to technical classes that has been

sometimes lacking. In addition, this nexus between the school system and industry could prove invaluable to teachers seeking meaningful summer employment. An arrangement of this type could prove to be beneficial to industry and education alike.

Lindeman and Bachm (1980) asserted that retired persons could be used to relieve the science and mathematics shortage. These persons from industry and other technical occupations could earn a supplemental income and at the same time render invaluable wisdom and experience to the classroom setting.

Spector (1984) claimed that "to increase the number of qualified teachers, it is necessary to first retrain those people we now have teaching science" (p. 155). The retraining of surplus teachers has been reported by Guthrie and Zusman (1982) where Houston schools encourage teachers in disciplines with surpluses, particularly elementary grades, to move up to secondary science and mathematics classrooms by re-certifying in areas of shortages.

Guthrie and Zusman (1982) contended that:

The problem should not be misconstrued as one of not having bodies to staff math and science classrooms. Even at the height of the teacher shortage of the 1950's school administrators were able to staff these classrooms. However, their solutions were far from desirable" (p. 30).

CONCLUSION

Although many individuals within and outside the field of education have proposed solutions to the science/mathematics shortage projected for the future, one rather large body of potential teachers has been neglected. As many as 25% of those individuals eligible to teach these subjects are not employed as teachers. Williams (1981) reported that "only about half of the qualified graduates teach mathematics the year after graduation" (p. 691). However, research by Olstad and Beale (1984) suggests that of those who are eligible but not teaching, less than 20% are willing to enter teaching under present conditions. Based upon suggestions for the improvement of teaching conditions by Boyer (1983), Goodlad (1984), Lortie (1985) and others, it is the purpose of this study to determine what modifications of teaching conditions, if any, would encourage members of this group of potential educators to enter teaching.

CHAPTER 3

METHODOLOGY

INTRODUCTION

Included in this chapter is a description of the population surveyed and an explanation of the methods used in conducting the survey. Instrumentation is outlined in terms of the survey instrument used, pilot surveys, and methods of dispersing and collecting the survey instrument. Procedures for the tabulation and analysis of data are outlined. Research hypotheses are given. A summary section concludes the chapter.

POPULATION

The population was defined as all graduates of Virginia Tech from 1980 through 1986 who fulfilled certification requirements to teach science or mathematics, grades 7-12, whether as a major or minor field. Virginia Tech is somewhat unique as an institution that trains and recommends for certification science and math teachers, since many technical undergraduate degrees are also offered. Undergraduate degree programs are offered by these academic colleges: College of Agriculture and Life Sciences;

College of Architecture and Urban Studies; College of Arts and Sciences; The R.B. Pamplin College of Business; College of Education; College of Engineering; and the College of Human Resources. Many academic areas offer programs that require mathematics and science courses which may also be used toward teacher certification. A number of individuals who enter technical degree programs also enter teacher education and become eligible to be recommended for teacher certification in addition to completing graduation requirements toward a technical degree. These individuals may or may not have a primary interest in entering the teaching profession.

Virginia Tech, a land grant university, is situated at Blacksburg in the foothills of the Appalachian Mountains in western Virginia. The total student enrollment for both graduate and undergraduate programs is approximately 23,000. "The campus lies on a plane between the Blue Ridge and Allegheny mountains, 2,100 feet above sea level. The area is noted for its natural beauty, healthy atmosphere, and outdoor recreational opportunities" (Virginia Tech General Catalog, 1987-88; p. 10).

SAMPLE

The population sampled consisted of all graduates of Virginia Tech from the year 1980 to 1986 who were eligible

to be certified to teach mathematics or science in the state of Virginia. Because the total number of graduates in these fields of study was small (142 individuals), the entire population constituted the sample. Every effort was made to contact each member of the population. For those individuals who did not respond to the first mailing of the survey instrument, follow-up mailings were conducted after a period of two weeks from the first mailing date. For those who still did not respond, certified letters were mailed with replacement survey forms enclosed.

INSTRUMENTATION

The survey instrument consisted of a series of questions designed to collect data that allowed answers to be generalized for the following questions:

A. What are the major differences between those individuals who are currently teaching and those who are not, pertaining to (1) human relations, (2) socio-economic status, (3) the workplace, and (4) salaries? According to current studies, it is within these areas that teachers are most dissatisfied with the occupation of teaching (Lortie, 1975; Goodlad, 1984; Lanier, 1986; and, Sizer, 1984).

B. Under what conditions would former teachers (or others who were not currently teaching) be willing to return

to or enter teaching?

A pilot test of the survey instrument and methodology was conducted using a population of teachers who were known to be presently employed as teachers and of individuals who were known to have left teaching for other employment opportunities. None of the individuals selected for the pilot study were members of the VPI population. Survey instruments were mailed on December 15, 1986 to the 22 individuals who constituted the pilot sample. Twenty-one survey instruments were returned. Data were collected, analyzed and tabulated in the same manner as for the actual study. In instances where data were not compatible with charts and data analyses procedures, new charts and procedures were written. The purpose of the pilot study was to determine if questions on the the survey form were clear and to determine if tabulation techniques were workable.

Individuals selected for the pilot test were given the task of criticizing the survey form. In instances where instructions and questions were unclear, the individual was asked to mark the item and state why he/she was confused. Other suggestions for the clarification and improvement of the survey form were solicited. The survey instrument was revised based upon the results of the pilot study.

The survey instrument was then submitted to a panel of experts for their comments and suggestions for improvement.

This panel consisted of the following individuals:

Dr. Suzanne Gardner Edgar
NEA Research
1201 16th st. N.W.
Washington, D.C. 20036

Dr. Emily Feistritzer
NCEI, Suite 707
1901 Pennsylvania Ave. N.W.
Washington, D.C. 20006

Dr. Roger G. Olstad
201 Miller DQ-12
University of Washington
Seattle, Washington 98195

Dr. Kenneth Sirotnik
College of Education DQ-12
University of Washington
Seattle, Washington 98195

Dr. Verne Stadtman
Carnegie Institute for the Advancement of Teaching
5 Ivy Lane
Princeton, NJ 08540

Selection of panel members was made based upon their area of expertise. Dr. Edgar, with NEA Research, and Dr. Feistritzer, a member of NCEI, were chosen in view of their experience in reporting teacher opinion surveys. Dr. Sirotnik at the University of Washington and Dr. Stadtman at the Carnegie Institute for the Advancement of Teaching were selected based upon their research expertise in the area of teacher education. In particular, the suggestions and comments of Dr. Olstad, also at the University of Washington, were sought because of his experience in follow-up research on science and mathematics education graduates at that institution.

The survey instrument (Appendix A), was divided into three sections: Questions 1-29 were answered by all respondents; questions 30-56 were answered only by those individuals who were not teaching; and the remainder of the questions, 57-61, were answered by those individuals who were teaching.

Questions 1-9 sampled the respondent's opinion in regard to work and conditions of work, and were drawn from

research by Super (1957). Questions 10-23 were primarily demographic in nature and reflected research done by Lanier (1986), Gardner (1983), Smith and Cox (1976), Boyer (1983), Lortie (1975) and others. Questions 24-29 were designed to reinforce questions 1-9. Questions 30-61 tested the respondent's opinion in regard to the conditions of teaching and were based upon work by Boyer (1983), Goodlad (1984), Wise (1986), Lortie (1975) and others.

The names of individuals who had completed certification requirements in science and/or mathematics from 1980 to 1986 were supplied by the College of Education at Virginia Tech. Mailing addresses were obtained from the Virginia Tech Alumni Directory (1986). Each survey instrument was assigned a code number for identification, making it possible to determine who had returned the survey instrument. Follow-up letters were mailed to those who had not responded to the first mailing campaign.

The survey instrument was mailed in legal size envelopes with stamps attached. Each envelope was addressed by means of mailing labels. Official Virginia Tech stationary was used for each cover letter and the cover letter was co-signed by Dr. Wayne Worner, major professor of the dissertation committee, and the author of the study. Names and addresses and personal salutations using first names were utilized for each cover letter. The survey

instrument was professionally printed on 11 inch by 15 inch bond paper and folded into booklet form. The resulting product was an 7 1/2 inch by 11 inch, four page booklet with printing on all sides. Off-white 20 pound paper was used to increase visibility of the survey if placed with other letters or papers. A stamped, self-addressed envelope was enclosed for the return of the survey.

The following mailing schedule was followed:

1. First mailing March 3, 1987 (See Appendix B for cover letter).
2. Follow-up post card with "thank you for responding" message mailed on March 10, 1987 (Appendix C).
3. Follow-up survey instrument and new cover letter (Appendix D), to nonrespondents mailed on March 17, 1987.
4. Certified letter (Appendix E) including a survey instrument was mailed to the remaining nonrespondents on April 7, 1987 (Dillman, 1972; 1974; 1978).

TABULATION AND ANALYSIS OF DATA

Most data were tabulated and reported in the form of percentages or means, while survey questions relating to human relations, status, work, and livelihood were reported into charts and graphs to illustrate the similarities and differences between certified science/math teachers who were

currently employed as teachers and those who were not. Chi square analysis of survey questions 1-8 was completed to determine if significant differences existed between current teachers, those who had left teaching and those who had never taught in regard to factors related to work satisfaction. In addition, Chi square analysis was completed for questions 9 (social status), and 19 (undergraduate GPA), 24-27 (job satisfaction). Additionally, data were tabulated concerning demographics and the conditions under which individuals would enter or re-enter teaching. Tables and graphs illustrating the frequency of responses were constructed.

RESEARCH HYPOTHESES

Research hypotheses, stated in null form, are presented below:

1. There will be no differences between those individuals who are eligible for certification as science or math teachers and who are teaching, and those who left teaching or never taught, concerning their attitudes toward teaching in these areas: human relations; social status of teachers; the work situation; and the level of livelihood provided by teaching.

2. Individuals who are eligible to be certified as

science or mathematics teachers, and who are currently employed in occupations other than teaching, will not be willing to leave their present employment to accept teaching positions.

3. Individuals who are eligible to be certified as science or math teachers and who are not teaching, decided not to teach for reasons other than those centering around salaries, working conditions and social status of teachers.

SUMMARY

This chapter addressed the methods used to survey the population of science and mathematics teachers who were graduated from VPI and SU between the years of 1980 and 1986. A description of the survey instrument was given along with methods of dispersing and collecting the instrument. Procedures for the tabulation and analysis of data were given. Research hypotheses were stated.

CHAPTER 4

ANALYSIS OF DATA

Introduction

In this chapter, statistical analyses of data are presented. Charts and/or graphs are presented depicting the participants' opinions of the working conditions of teachers. Three sub-groups were established: current teachers; those who had left teaching; and those who had never taught. The responses to survey questions are reported in four categories: (1) general demographics of all respondents; (2) comparison of the three sub-groups in terms of attitudes toward the conditions of work; (3) comparison of those who have left teaching and those who have never taught in terms of the importance of working conditions as incentives to teach; and (4) opinions of current teachers regarding the conditions of teaching. Included also are the results of chi square tests on the comparison of teachers' and non-teachers' attitudes toward work satisfaction and the working conditions of teachers. A general summary concludes the chapter.

General Demographics of Participants

Survey questionnaires were mailed to all individuals who had completed certification requirements at Virginia Tech to be recommended for licensure in the state of Virginia in science and/or mathematics education. One hundred and forty-two (142) individuals who had completed certification requirements from 1980 to 1986 comprised the population. One hundred twenty-two completed surveys were returned which constituted a 85.9% return rate.

Of the 122 participants, 73 (59.84%) indicated that they were currently employed as classroom teachers: 62 full time and 11 part time. Individuals who were working as substitute teachers were considered to be part time. Twenty-six participants (21.31%) indicated that they had taught in the past, but were no longer employed in that capacity. None of the individuals who had left the classroom had moved into administrative positions or into other posts within public education. Twenty-three participants (18.85%) indicated that they had never taught within the public school system (Table 1).

Of the total sample, the majority of participants were female (65.57%). Females constituted a higher percentage of the group who had left teaching (73.08%) than the group currently teaching (63.01%) or those who had never taught

TABLE 1

Current Employment Status

Current Status	Number	%
Currently Employed as a Teacher	73	(59.84)
Full Time	[62]	--
Part Time	[11]	--
Worked as a Teacher in Past	26	(21.31)
Have Never Taught	23	(18.85)
Totals	122	(100.00)

(65.22%) (Table 2). Just over 89% of the individuals surveyed were between 21 and 30 years of age, with 9.02% between 31 and 40 years and 2 individuals between the ages of 41 and 50 years (1.64%) (Table 3). In analyzing the three sub-groups, 19.23% of those individuals who had left teaching were over the age of 31, while only 9.59% of current teachers and 4.35% of those who had never taught were over 31 years of age.

In regard to marital status within the total sample, married and unmarried participants were divided almost equally: 51.64% and 43.44% respectively. Single individuals occurred in somewhat larger proportions among current teachers (50.68%) of 73 respondents than among either those who had left teaching (30.76% of 36 participants) or those who had never taught (34.78% of 23 participants). Most individuals who were married had working spouses: current teachers, 81.82%; individuals who had left teaching, 93.75%; and those who had never taught, 92.86%. Two individuals of the total sample were separated from their spouses and 4 individuals were divorced (Table 4).

Over 83% of all individuals surveyed indicated that their major fields of study at Virginia Tech fell within three categories: science education, mathematics education, and biology. The remaining individuals fell within a

TABLE 2

Distribution by Sex

Sex	Currently Teaching	%	Employment Status		Totals	%		
			Left Teaching	Never Taught				
Male	27	(36.99)	7	(26.92)	8	(34.78)	42	(34.43)
Female	46	(63.01)	19	(73.08)	15	(65.22)	80	(65.57)
Totals	73	(100.00)	26	(100.00)	23	(100.00)	122	(100.00)

TABLE 3
Ages of Sub-groups

Ages	Currently Teaching	%	Employment Status		Totals	%		
			Left Teaching	Never Taught				
21-30	66	(90.41)	21	(80.77)	22	(95.65)	109	(89.34)
31-40	7	(9.59)	3	(11.54)	1	(4.35)	11	(9.02)
41-50	0	(0.00)	2	(7.69)	0	(0.00)	2	(1.64)
Totals	73	(100.00)	26	(100.00)	23	(100.00)	122	(100.00)

TABLE 4
Marital Status

Status	Employment Status			
	Currently Teaching %	Left Teaching %	Never Taught %	Totals %
Married	33 (45.21)	16 (61.54)	14 (60.87)	63 (51.64)
Married and has working spouse	[27] [81.82]	[15] [93.75]	[13] [92.86]	--
Separated	1 (1.37)	1 (3.85)	0 (0.00)	2 (1.64)
Divorced	2 (2.74)	1 (3.85)	1 (4.35)	4 (3.28)
Widowed	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)
Single	37 (50.68)	8 (30.76)	8 (34.78)	53 (43.44)
Totals	73 (100.00)	26 (100.00)	23 (100.00)	122 (100.00)

variety of subject areas, most of which were science/math related (see Table 5). Of science education majors, 76.92% were currently teaching, 15.38% had left teaching, and 7.70% had never taught. Math education majors were distributed into these categories as follows: current teachers, 60.87%; those who left teaching, 17.39%; and those who had never taught, 21.74%. Only half of the 30 biology majors who certified to teach were current teachers (50.00%), with 36.67% who had left teaching and 13.33% who had never taught.

The fathers of participants within the total sample were found to be employed in these occupational categories: farmer (1.64%); skilled or semiskilled (22.13%); clerical or sales (7.38%); managerial or self-employed (20.48%); professional and semiprofessional (40.99%). Nonresponse/deceased/retired constituted the remaining 7.38%. Fathers of individuals who had left teaching were employed in the professional and semi-professional categories in slightly higher numbers (46.15%) than for those who had never taught (43.47%) and those who were currently teaching (38.37%). Other occupational categories tended to be distributed similarly for all three sub-groups (see Table 6).

Mothers of individuals within the total sample were employed in these occupation categories: homemaker

TABLE 5

Major Field of Study at VPI

Major	Employment Status			Totals
	Currently Teaching	Left Teaching	Never Taught	
Science Education	20	4	2	26
Math Education	28	8	10	46
Biology	15	11	4	30
Earth Science	0	0	1	1
Animal Science	1	0	0	1
VoTech Education	0	1	0	1
Elem Education	1	0	1	2
Geology/Physics	2	1	0	3
Forestry	3	0	1	4
History/Social Science	0	0	1	1
Chemistry	1	0	1	2
Mathematics	0	0	2	2
Ag. Education	1	0	0	1
Engineering	1	0	0	1
No Answer	0	1	0	1
Totals	73	26	23	122

TABLE 6

Father's Occupation

Occupation	Currently Teaching	%	Employment Status		Totals	%		
			Left Teaching	Never Taught				
Farmer	1	(1.37)	1	(3.85)	0	(0.00)	2	(1.64)
Unskilled	0	(0.00)	0	(0.00)	0	(0.00)	0	(0.00)
Skilled or Semiskilled	15	(20.55)	6	(23.08)	6	(26.09)	27	(22.13)
Clerical or Sales	7	(9.58)	1	(3.85)	1	(4.35)	9	(7.38)
Managerial or Self Employed	16	(21.91)	4	(15.38)	5	(21.74)	25	(20.48)
Professional and Semiprofessional	28	(38.37)	12	(46.15)	10	(43.47)	50	(40.99)
No Response/Deceased/Retired	6	(8.22)	2	(7.69)	1	(4.35)	9	(7.38)
Totals	73	(100.00)	26	(100.00)	23	(100.00)	122	(100.00)

(28.69%); skilled or semiskilled (9.02%); clerical or sales (19.67%); managerial or self-employed (8.20%); professional or semiprofessional (28.68%); and no response/deceased/retired (5.74%). The majority of the mothers of 73 current teachers were homemakers (24.66%); in clerical or sales (19.18%); or, professional or semiprofessional (31.51%). Among the mothers of 26 participants who had left teaching, 42.31% were homemakers, 19.23% were in clerical or sales, and 15.38% were professional or semiprofessional. Mothers of 23 individuals who had never taught fell into these categories: homemakers (26.09%); clerical or sales (21.74%); and professional or semiprofessional (34.78%). The remaining individuals were dispersed among the occupational categories (see Table 7).

The parents of participants of the total sample were distributed into the following categories of highest educational level: completed sixth grade or less (father 1.64%, mother 0.0%); attended high school but did not graduate (father 5.74%, mother 4.92%); high school graduate (father 16.39%, mother 27.05%); attended college but did not graduate (father 16.39%, mother 22.13%); college graduate (father 26.23%, mother 34.43%); holds graduate degree (father 33.61%, mother 10.66%); and, no response (father 0.0%; mother 0.81%). Almost 60% of all the fathers of participants had completed a college degree with 45.08% of

TABLE 7

Mothers' Occupation

Occupation	Employment Status				Totals	%
	Currently Teaching	Left Teaching	Never Taught			
Homemaker	18 (24.66)	11 (42.31)	6 (26.09)	35	(28.69)	
Farmer	0 (0.00)	0 (0.00)	0 (0.00)	0	(0.00)	
Unskilled	0 (0.00)	0 (0.00)	0 (0.00)	0	(0.00)	
Skilled or Semiskilled	7 (9.59)	1 (3.85)	3 (13.04)	11	(9.02)	
Clerical or Sale	14 (19.18)	5 (19.23)	5 (21.74)	24	(19.67)	
Managerial or Self-employed	7 (9.59)	3 (11.54)	0 (0.00)	10	(8.20)	
Professional or semiprofessional	23 (31.51)	4 (15.38)	8 (34.78)	35	(28.68)	
No Response/Dece/Retired	4 (5.47)	2 (7.69)	1 (4.35)	7	(5.74)	
Totals	73 (100.00)	26 (100.00)	23 (100.00)	122	(100.00)	

the participants' mothers holding a college degree (Tables 8 and 9).

Of the 73 individuals who were currently teaching, 32.79% had earned credits toward a Master's degree while 26.92% of 26 participants who had left teaching and 43.48% of 23 participants who had never taught had begun work on a Master's degree. Of individuals currently teaching 4.11% have completed Master's degrees, none of the individuals who have left teaching, and 4.35% of participants who have never taught have completed masters degrees. Almost 8% of those who left teaching have completed credits beyond a master's degree: 1.37% of current teachers and none of those who had never taught. (Table 10).

Participants were asked to estimate their undergraduate grade average at the time of graduation. The percentage of individuals who estimated their GPA at 3.00 or lower among 73 current teachers was 57.54% while the percentages for 26 individuals who left teaching and 23 individuals who had never taught were somewhat less: 50.00% and 47.83% respectively. The converse was true for estimations of GPA of 3.01 and higher: 50.00% of individuals who had left teaching estimated their GPA as being higher than 3.01 and 53.17% of those who never taught were above 3.01. The percentage of current teachers who scored above 3.01 dropped to 42.46% (Table 11).

TABLE 8

Fathers' Highest Educational Level

Educational Level	Employment Status				Totals	%
	Currently Teaching	Left Teaching	Never Taught	Totals		
Sixth grade or less	0 (0.00)	2 (7.70)	0 (0.00)	2	(1.64)	
Attended High School did not graduate	3 (4.10)	1 (3.85)	3 (13.04)	7	(5.74)	
High School Graduate	13 (17.81)	5 (19.23)	2 (8.70)	20	(16.39)	
Attended College but did not graduate	13 (17.81)	3 (11.54)	4 (17.39)	20	(16.39)	
College Graduate	22 (30.14)	4 (15.37)	6 (26.09)	32	(26.23)	
Holds Graduate Degree	22 (30.14)	11 (42.31)	8 (34.78)	41	(33.61)	
Totals	73 (100.00)	26 (100.00)	23 (100.00)	122	(100.00)	

TABLE 9
 Mother's Highest Educational Level

Educational Level	Employment Status				Totals	%
	Currently Teaching	Left Teaching	Never Taught			
Sixth grade or less	0 (0.00)	0 (0.00)	0 (0.00)	0	0	(0.00)
Attended High School did not Graduate	3 (4.11)	2 (7.70)	1 (4.34)	6	6	(4.92)
High School Graduate	20 (27.40)	8 (30.77)	5 (21.74)	33	33	(27.05)
Attended College but did not Graduate	19 (26.03)	4 (15.37)	4 (17.39)	27	27	(22.13)
College Graduate	22 (30.14)	9 (34.62)	11 (47.83)	42	42	(34.43)
Holds Graduate Degree	8 (10.96)	3 (11.54)	2 (8.70)	13	13	(10.66)
No Response/Deceased/Retired	1 (1.36)	0 (0.00)	0 (0.00)	1	1	(0.81)
Totals	73 (100.00)	26 (100.00)	23 (100.00)	122	122	(100.00)

TABLE 10
Highest Level of Education Of Participant

Level of Education	Currently Teaching	Employment Status		Totals	
		% Teaching	Never Taught %		
Bachelor's Degree	46	(63.01)	17 (65.38)	12 (52.17)	75 (61.48)
Bachelor's Degree credits toward M A	23	(31.51)	7 (26.92)	10 (43.48)	40 (32.79)
Master's Degree	3	(4.11)	0 (0.00)	1 (4.35)	4 (3.28)
Master's Degree plus credits beyond	1	(1.37)	2 (7.70)	0 (0.00)	3 (2.45)
Totals	73	(100.00)	26 (100.00)	23 (100.00)	122 (100.00)

TABLE 11
Undergraduate GPA

GPA	Employment Status			
	Currently Teaching %	Left Teaching %	Never Taught %	Totals %
2.00 to 2.50	16 (21.92)	5 (19.23)	3 (13.05)	24 (19.67)
2.51 to 3.00	26 (35.62)	8 (30.77)	8 (34.78)	42 (34.43)
3.01 to 3.50	24 (32.87)	8 (30.77)	9 (39.13)	41 (33.61)
3.51 to 4.00	7 (9.59)	5 (19.23)	3 (13.04)	15 (12.29)
Totals	73 (100.00)	26 (100.00)	23 (100.00)	122 (100.00)

Many respondents indicated that they had close relatives who were teachers (57.38% of the total sample). Just over 60% of 73 current teachers indicated they had close relatives who were teachers: of 26 individuals who left teaching, 46.15% and of 23 individuals who had never taught, 60.87% (Table 12).

Many respondents indicated that teaching was not their first choice of occupation. Just over 72% indicated that they were interested in entering another occupation but had later decided upon teaching. (See Table 15 for reasons students switched programs). Within the three sub-groups, the following breakdown was determined for those who had first entered another program and then transferred into teacher education: 71.23% of 73 current teachers, 80.77% of 26 individuals who had left teaching, and 65.22% of 23 individuals who had never taught (Table 13). Among those occupations indicated by all groups as their first choice, engineering, veterinary medicine/animal science, and biology/wildlife topped the list (see Table 14). The data indicated a constant increase in the numbers of individuals certifying to teach science and mathematics within the last decade. For dates of graduation and first dates of employment see Tables 16 and 17.

TABLE 12
 Respondents With Relatives Who Teach

Relatives Who teach	Currently Teaching	Employment Status			Totals	%
		Left Teaching	Never Taught	%		
Yes	44 (60.27)	12 (46.15)	14 (60.87)	70	(57.38)	
No	29 (39.73)	13 (50.00)	9 (39.13)	51	(41.80)	
No Response	0 (0.00)	1 (3.85)	0 (0.00)	1	(0.82)	
Totals	73 (100.00)	26 (100.00)	23 (100.00)	122	(100.00)	

TABLE 13
Teaching as First Choice of Occupation for All Groups

Teaching 1st Choice	Currently Teaching %	Employment Status			Totals %
		Left Teaching %	Never Taught %		
Yes	21 (28.77)	5 (19.23)	8 (34.78)	34 (27.87)	
No	52 (71.23)	21 (80.77)	15 (65.22)	88 (72.13)	
Totals	73 (100.00)	26 (100.00)	23 (100.00)	122 (100.00)	

TABLE 14
First Choice of Occupation of All Groups

Occupation Category	Employment Status			Totals
	Currently Teaching	Left Teaching	Never Taught	
Engineering	13	0	5	18
Vet Med/Animal Sci	6	2	1	9
Biol/Wildlife	10	2	3	15
Med. Tech	2	1	0	3
Psychology	1	2	0	3
Geology	2	0	0	2
Medicine	2	2	0	4
Armed Forces	1	0	0	1
Computer Science	4	1	0	5
Research	2	0	1	3
Accounting/Business	1	2	0	3
Science/Math	1	2	1	4
Law	1	0	0	1
Physical Therapy	1	0	1	2
Pharmacy	1	0	0	1
Nursing	1	0	0	1
Urban Planning	1	0	0	1
Aviation	0	0	1	1
Architecture	0	0	1	1
Writing	0	1	0	1
Undecided	2	4	1	7
No Response	0	2	0	2
Totals	52	21	15	88

TABLE 15

*Reasons Individuals Enrolled
in Teacher Certification Program
(Nonteachers)

Reasons for Enrolling	Employment Status		Totals
	Left Teaching	Never Taught	
Like Teaching	14	15	29
Mix Science/math and Teaching	0	2	2
Broaden Job Opportunities	6	2	8
Like School Environment	0	1	1
Good Job Opportunities	3	3	6
Job Security	2	1	3
Inspired by Good Teachers	1	0	1
Favorable Work Schedule	3	1	4
Unknown	0	1	1
Totals	29	26	55

*Note: More than one response possible per respondent.

TABLE 16

Importance of the Conditions of Work

Work Condition	Rank by importance														
	1	2	3	4	1	2	3	4							
Human Relations	11	41	14	5	2	15	7	1	4	12	6	0	(M=2.18)	(M=2.28)	(M=2.09)
Social Status	1	2	21	48	0	0	3	22	0	0	4	18	(M=3.61)	(M=3.88)	(M=3.82)
Interesting and Pers Rewarding Work	56	9	6	1	21	3	1	0	18	3	1	0	(M=1.33)	(M=1.20)	(M=1.23)
Ability to Earn Money	3	20	31	16	1	8	15	1	0	7	12	4	(M=2.86)	(M=2.64)	(M=2.87)
No Answer	1	1	1	1	1	1	1	1	1	1	1	1			

1=Most Important, 4=Least Important

Attitudes Toward the Conditions of Work

Participants were asked to rank Super's (1957) conditions of work satisfaction (interesting and personally rewarding, human relations, ability to earn money, and social status) from most important to least important. There was agreement among all three groups as to priority among the four choices. Where a rating of one indicated "most important" and four indicated "least important", participants indicated that work should be interesting and personally rewarding first (current teachers reported a mean of 1.33; those who left teaching, 1.20; and, those who never taught 1.23). Second most important was the consideration of human relations (current teachers, 2.18; those who left teaching, 2.28; and those who never taught, 2.09). The ability to earn money was ranked third among the four items (current teachers, 2.86; those who left teaching, 2.64; and those who never taught, 2.87). The social status of teachers was ranked as being of least importance among the four choices (current teachers, 3.61; those who left teaching, 3.88; and those who never taught, 3.82). (See Table 16).

When participants were asked to rank the social status of teachers on a scale of 1 to 10, with 1 as lowest and 10 the highest, the mean ranking by current teachers was 6.45,

by those who had left teaching 6.35, and by those who had never taught 6.27. When participants were asked to estimate how the general public rated teachers' social status, the following means were calculated: current teachers 4.77, those who had left teaching 4.46, and those who had never taught 5.41. Therefore, those who had certified to teach rated teachers' social status higher than they felt the general public had rated them (Tables 17 and 18).

When all three sub-groups were asked to rate teaching in terms of Super's factors of work satisfaction, there were no significant differences in the attitudes of the groups (see Appendix F for Chi square analysis of data). Means were calculated for responses on a scale of 1 to 4 where 1 = strongly disagree and 4 = strongly agree. Among all 122 participants, there was general agreement that "teaching is interesting work" (current teachers, 3.39; those who left teaching, 3.42; and those who never taught, 3.19), "teaching is satisfying work" (current teachers, 3.06; those who left teaching, 2.92; and those who never taught, 2.86), and, "teachers have opportunity for self expression" (current teachers, 2.94; those who left teaching, 3.31; and those who never taught, 3.05). There was also general agreement among the three sub-groups that "Teaching provides an adequate income" was ranked lowest of all choices: (current teachers, 2.03; those who left teaching, 2.04; and those who

TABLE 17

*Estimation of Teachers' Social
Status by All Groups

Employment Status	Social Status										Mean
	Low 1	2	3	4	5	6	7	8	9	High 10	
Currently Teaching	0	1	3	8	1	17	12	19	3	0	6.45
Left Teaching	0	0	1	5	2	5	4	7	2	0	6.35
Never Taught	0	0	1	3	3	4	6	4	0	1	6.27

*Note: Some respondents did not answer all questions.

TABLE 18

*Estimation of the Public's Opinion of Teachers'
Social Status by All Groups

Employment	Social Status										Mean
	Low 1	2	3	4	5	6	7	8	9	High 10	
Currently Teaching	1	5	7	23	13	12	2	8	0	0	4.77
Left Teaching	0	3	5	8	4	2	2	1	1	0	4.46
Never Taught	0	0	4	3	7	1	3	3	1	0	5.41

*Note: Some respondents did not answer all questions.

never taught, 2.05). (See table 19 for complete data).

Participants were asked to determine how important human relations, social status, interesting and personally rewarding work, and ability to earn money, were in selecting an occupation. Their choices were: extremely (4), very (3), somewhat (2), and not at all (1). Means were calculated for all responses within each sub-group. Interesting and personally rewarding work was determined by all three sub-groups to be the most important of the four items (current teachers, 3.67; those who left teaching, 3.67; and those who never taught, 3.83). The second highest was human relations (current teachers, 3.29; those who left teaching, 3.33; and those who never taught, 3.43). The third highest item was ability to earn money (of 73 current teachers, 2.53; of 26 who left teaching, 2.71; and of 23 who never taught, 2.65). Of least importance among the four items was social status (current teachers, 2.16; those who left teaching, 2.13; and those who never taught, 2.35) (Table 20). Chi square analysis determined that there was no significant difference in opinion among the three sub-groups (See Appendix F).

The Importance of Working Conditions as Incentives to Teach

The two sub-groups of nonteachers were asked why they

TABLE 19

***Teacher's and Non-teachers' Attitudes
Toward Work Satisfaction**

Factors related to work satisfaction	Currently Teaching				Left Teaching				Never Taught			
	SA	A	D	SD	SA	A	D	SD	SA	A	D	SD
Teachers are recognized as individuals	4	56	9	4	4	17	4	0	2	17	1	1
	(M=2.82)				(M=3.00)				(M=2.95)			
Teachers are independent of action	5	35	29	2	4	8	10	3	0	14	6	2
	(M=2.61)				(M=2.52)				(M=2.55)			
Teachers receive fair treatment from employers	1	55	12	4	4	14	5	2	1	16	4	0
	(M=2.74)				(M=2.80)				(M=2.86)			
Teachers have opportunity for self expression	10	48	14	0	7	14	5	0	2	18	1	0
	(M=2.94)				(M=3.31)				(M=3.05)			
Teaching is interesting work	34	33	4	1	11	15	0	0	5	15	1	0
	(M=3.39)				(M=3.42)				(M=3.19)			
Teaching is satisfying work	23	33	13	3	4	16	4	1	5	11	4	2
	(M=3.06)				(M=2.92)				(M=2.86)			
Teaching provides an adequate income	1	16	37	16	1	7	10	8	0	5	12	4
	(M=2.03)				(M=2.04)				(M=2.05)			
Teaching provides job security	6	45	16	6	3	14	7	2	3	14	4	0
	(M=2.70)				(M=2.69)				(M=2.95)			

SA = Strongly Agree (4), A = Agree (3), D = Disagree (2), SD = Strongly Disagree (1)

*Note: Some respondents did not answer all questions.

Table 20
 *Response of All Sub-groups to General
 Questions of Job Satisfaction.

In selecting an occupation how important is:	Employment Status												
	Currently Teaching		Left Teaching		Never Taught								
	E	V	S	N	E	V	S	N					
Human Relations	32	31	9	1	9	14	1	0	12	9	2	0	(M=3.43)
	(M=3.29)												(M=3.33)
Social Status	1	18	46	8	1	4	15	3	2	7	11	3	(M=2.35)
	(M=2.16)												(M=2.13)
Personally rewarding work	50	22	1	0	16	8	0	0	19	4	0	0	(M=3.83)
	(M=3.67)												(M=3.67)
Ability to earn money	7	27	37	2	3	11	10	0	1	13	9	0	(M=2.65)
	(M=2.53)												(M=2.71)

E=Extremely (4), V=Very (3), S=Somewhat (2), N=Not at All (1)

*Note: Some respondents did not answer all questions.

had chosen to meet certification requirements as teachers. Forty-eight percent of 26 individuals who had left teaching and 57.69% of 23 individuals who had never taught responded by saying that they felt that they would enjoy teaching. Others responded by citing these reasons: broaden job opportunities; mix science or mathematics with teaching; teaching provides good job opportunities; teaching provides job security; and teaching provides a favorable work schedule (refer back to Table 15). Some examples of individual responses follow: "Job opportunities were numerous after graduation." "Became interested while tutoring." "Learned I enjoyed working with young people." "I thought teaching would be a challenging, enjoyable occupation. Also liked the 9 month work year." "To have an alternative if I couldn't find other employment." "As a backup to my biology degree." "I've always wanted to teach."

Nonteachers found employment in a wide variety of occupations. Almost 1 in 5 (19.23%) of 26 participants who had left teaching and 1 in 3 (39.12%) of 23 participants who had never taught were employed in a professional or semiprofessional field. Larger numbers of those who had left teaching were homemakers (23.08%) than those who had never taught (4.35%). Those who had left teaching found employment in the following occupational groupings:

unskilled 0.00; skilled or semiskilled 11.54%; clerical or sales 7.69%; managerial/self employed 11.54%; and unemployed 7.69%. Those who had never taught were employed in these categories: skilled or semiskilled 21.74%; clerical or sales 4.35%; managerial/self employed 0.00%; and unemployed 8.70% (see Table 21 for a complete listing).

For 49 individuals who were not currently teaching, entry salaries fell into these categories: not employed 24.49%; under \$15,000 24.49%, \$15,001 to \$20,000 34.70%; \$20,001 to \$25,000 10.20%; \$25,001 to \$30,000 4.08%; one individual reported a salary between \$50,001 and \$55,000. Few individuals reported moving from one income bracket to the next higher in the years they had been employed. (Some individuals had just begun employment in the fall of 1986) (Table 22).

When asked to suggest an acceptable beginning salary for teachers, 63.26% of 29 nonteachers indicated that beginning salary was not at issue in their consideration of teaching as an occupation. The percentage of the respondents (nonteachers) suggesting a beginning salary between \$15,001 and \$20,000 was 6.12 and 14.29% recommended salaries between \$20,001 and \$25,000. Only one individual (2.04%) suggested a beginning salary between \$30,001 and \$35,000. No response was received from 14.29% of the sample (Table 22).

TABLE 21

Present Occupations of Non-teachers

Names of Occupations	Employment status			Total %
	Left Teaching %	Never Taught %		
Homemaker	6 (23.08)	1 (4.35)	7 (14.29)	
Student	2 (7.69)	3 (13.04)	5 (10.21)	
Farmer	1 (3.85)	0 (0.00)	1 (2.04)	
Unskilled	0 (0.00)	2 (8.70)	2 (4.08)	
Skilled or Semiskilled	3 (11.54)	5 (21.74)	8 (16.33)	
Clerical or Sales	2 (7.69)	1 (4.35)	3 (6.12)	
Managerial/Self Employed	3 (11.54)	0 (0.00)	3 (6.12)	
Professional/Semipro.	5 (19.23)	9 (39.12)	14 (28.57)	
Unemployed	2 (7.69)	2 (8.70)	4 (8.16)	
No Response	2 (7.69)	0 (0.00)	2 (4.08)	
Totals	26	23	49	

TABLE 22
Salary Data For All Individuals Not Currently Teaching

Salary Range	Salary Status		
	Entry salary	Current Salary	Minimum Salary to Teach
	%	%	%
Not currently employed	12 (24.49)	12 (24.49)	0 (0.00)
Under \$15,000	12 (24.49)	10 (20.41)	0 (0.00)
\$15,001 to 20,000	17 (34.70)	12 (24.49)	3 (6.12)
\$20,001 to 25,000	5 (10.20)	8 (16.33)	7 (14.29)
\$25,001 to 30,000	2 (4.08)	4 (8.16)	0 (0.00)
\$30,001 to 35,000	0 (0.00)	1 (2.04)	1 (2.04)
\$35,001 to 40,000	0 (0.00)	0 (0.00)	0 (0.00)
\$40,001 to 45,000	0 (0.00)	0 (0.00)	0 (0.00)
\$45,001 to 50,000	0 (0.00)	0 (0.00)	0 (0.00)
\$50,001 to 55,000	0 (0.00)	1 (2.04)	0 (0.00)
Salary not an Issue	--	--	31 (63.26)
No Response	1 (2.04)	1 (2.04)	7 (14.29)
Totals	49 (100.00)	49 (100.00)	49 (100.00)

Nonteachers were asked to indicate how important incentives other than salary might be in convincing them to teach. Opinions were ranked in this manner: Extremely Important (4), Very Important (3), Somewhat Important (2) and Not At All Important (1). Means were calculated for all items. Individuals who had left teaching ranked the top items in order of importance of improving working conditions in this fashion: (1) improve discipline, 3.36; (2) reduce class size, 3.08 and remove incompetent teachers, 3.08; (3) reduce teacher isolation, 3.04; and (4) reduce stress, 3.00 and improve schools' physical environment, 3.00 (Table 23). Those who had never taught selected these items as their first five choices: (1) remove incompetent teachers, 3.14; (2) improve discipline, 3.09; (3) provide higher salary ceilings, 3.05; (4) reduce teacher isolation, 2.96; and (5) reduce class size, 2.83. Individuals who had left teaching ranked these items lowest: control and regulate access to teaching; remove lock-step pay increments; improve teachers' social status; reduce teaching load to 15-20 hours per week; and provide salary increases by means of merit pay. Those who had never taught felt these items were of least importance: control and regulate access to teaching; provide salary increases by means of merit pay; increase certification requirements; control access to teaching through competency examinations; and reduce teaching load to

TABLE 23

*Importance of Working Conditions as Incentives to Teach
for Individuals Who Left Teaching

Improvement	Employment Status Left Teaching				Means	Rank
	E	V	S	N		
Provide opportunities for advancement within teaching	7	10	7	1	2.95	7
Remove lock-step pay increments	1	6	10	8	2.00	19
Provide higher salary ceilings	6	6	12	1	2.68	9.5
Recruit teachers through bonus plans	7	6	9	3	2.68	9.5
Provide salary increases by means of merit pay	2	9	10	4	2.36	15
Reduce teaching load to 15-20 hours per week	0	12	6	5	2.30	16
Reduce class size	7	14	1	2	3.08	2.5
Reduce amount of paperwork	1	8	10	0	2.53	13
Reduce responsibilities outside classroom	6	9	8	2	2.76	8
Improve physical environment	7	12	5	1	3.00	5.5
Improve discipline	13	8	4	0	3.36	1
Reduce teacher isolation	6	14	5	0	3.04	4
Reduce stress	8	11	4	2	3.00	5.5
Improve teachers' social status	3	5	13	4	2.28	17
Increase certification requirements	3	6	14	2	2.40	14
Control and regulate access to teaching	1	6	10	7	2.04	18
Control access to teaching through competency exams.	4	8	11	2	2.56	11.5
Remove incompetent teachers	8	13	2	2	3.08	2.5
Improve teacher image	6	6	9	4	2.56	11.5

E = Extremely Important (4), V = Very Important (3), S = Somewhat Important (2), N = Not at All Important (1).

*Note: Not all individuals answered all questions.

15-20 hours per week (See Table 24).

In an open-ended question, 49 nonteachers were surveyed as to the single most important factor in their decision not to teach or to leave teaching. Among those who had left teaching, two items were of most concern: lack of administrative support and poor student discipline. In both cases, almost 20% of respondents indicated concern in these areas. In other areas, 12.90% complained of low salary, 12.90% said they wanted to raise a family, and 9.68% indicated that they had not been offered a job. Among those who had never taught, almost 20% indicated that they had made previous plans concerning their occupation. Other responses were recorded in these percentages for those who had never taught: poor student discipline 12.50%; no offer of employment 12.50%; lack of administrative support 4.17%; poor advancement prospects 8.33%; wanted to raise a family 8.33%; didn't want to teach 8.33%; and, return to school 4.17% (see Table 25).

Forty-nine nonteaching respondents were asked, in an open-ended question, to list the single most important factor which would encourage them to enter teaching. Many individuals, in answering the question, listed more than one factor. Among those who had left teaching, only 10.34% of the responses given listed salary increases as being important. Within this sub-group, most factors centered

TABLE 24

*Importance of Working Conditions as Incentives to Teach
for Those Who Have Never Taught

Improvement	Employment Status Never Taught				Means	Rank
	E	V	S	N		
Provide opportunities for advancement within teaching	2	14	5	2	2.70	10.5
Remove lock-step pay increments	3	7	9	2	2.52	13.5
Provide higher salary ceilings	5	10	4	0	3.05	3
Recruit teachers through bonus plans	6	5	10	1	2.73	8.5
Provide salary increases by means of merit pay	2	6	13	4	2.24	18
Reduce teaching load to 15-20 hours per week	4	6	9	3	2.50	15
Reduce class size	6	10	4	3	2.83	5
Reduce amount of paperwork	4	10	7	2	2.70	10.5
Reduce responsibilities outside classroom	5	7	9	1	2.73	8.5
Improve physical environment	4	7	11	1	2.61	12
Improve discipline	9	7	7	0	3.09	2
Reduce teacher isolation	6	12	5	1	2.96	4
Reduce stress	6	7	9	1	2.78	6.5
Improve teachers' social status	5	6	8	4	2.52	13.5
Increase certification requirements	1	9	8	4	2.32	17
Control and regulate access to teaching	2	6	7	7	2.14	19
Control access to teaching through competency exams.	3	7	9	4	2.39	16
Remove incompetent teachers	9	7	4	1	3.14	1
Improve teacher image	7	7	6	3	2.78	6.5

E = Extremely Important (4), V = Very Important (3), S = Somewhat Important (2), N = Not at All Important (1).

*Note: Not all individuals answered all questions.

TABLE 25

*Most Important Factor in Non-teachers' Decision
Not to Teach

Factors	Employment Status				Total %	
	Left Teaching %	%	Never Taught %	%		
Lack of Administrative Support	6	(19.35)	1	(4.17)	7	(12.73)
Forced to Take Extra-curricular Duties	1	(3.23)	0	(0.00)	1	(1.82)
Poor Advancement Prospects	1	(3.23)	2	(8.33)	3	(5.45)
Poor Student Discipline	6	(19.35)	3	(12.50)	9	(16.35)
Return To School	2	(6.45)	1	(4.17)	3	(5.45)
Salary	4	(12.90)	4	(16.67)	8	(14.55)
Large Classes/Class Load	1	(3.23)	0	(0.00)	1	(1.82)
Raise Family	4	(12.90)	2	(8.33)	6	(10.91)
Didn't Want To Teach	0	(0.00)	2	(8.33)	2	(3.64)
Too Much Prep Time at Home	2	(6.45)	0	(0.00)	2	(3.64)
No Offer of Employment	3	(9.68)	3	(12.50)	6	(10.91)
Previous Plans	1	(3.23)	5	(20.83)	6	(10.91)
No Response	0	(0.00)	1	(4.17)	1	(1.82)
Totals	31	(100.00)	24	(100.00)	55	(100.00)

*More than one answer possible per respondent.

around the improvement of working conditions: improve administration 17.24%; improve student discipline 20.69%; receive support from colleagues and parents 10.34%; and, the availability of a suitable position 10.34%. Other suggestions included the reduction of class size, the reduction of extra-curricular duties and provision of a pleasant work situation. Those who had never taught indicated that salaries were of somewhat more importance with 18.52% of the responses listing that item. Support from colleagues, provision of a pleasant work situation, and the availability of a suitable position all were listed in 11.11% of responses (Table 26).

The following question was asked of 49 respondents who were not currently teaching: "Even if there were no changes in current salaries, status, working conditions or human relations of employment in public schools, would you accept a teaching position if you were offered a contract?" Of 26 individuals who had left teaching, 14 (53.85%) indicated that they would be willing to return to teaching. Fourteen of 23 individuals (60.87%) who had never taught indicated a willingness to enter teaching. Therefore, of 49 individuals within the sample who are not currently teaching, 28 individuals (57.14%) appear to be willing to enter the teaching ranks (Table 27).

TABLE 26

*Most Important Factor to Encourage Non-teachers
to Teach

Factors	Employment Status					
	Left Teaching	%	Never Taught	%	Total	%
Improve Administration	5	(17.24)	1	(3.70)	6	(10.71)
Improve Student Discipline	6	(20.69)	1	(3.70)	7	(12.50)
Increase Salaries	3	(10.34)	5	(18.52)	8	(14.29)
Reduce Extra-curricular Duties	2	(6.90)	0	(0.00)	2	(3.57)
Publicize Good Work Schedule	1	(3.45)	1	(3.70)	2	(3.57)
Support from Colleagues and Parents	3	(10.34)	3	(11.12)	6	(10.71)
Pleasant Work Situation Work with Children	2	(6.90)	3	(11.12)	5	(8.93)
Available Position	3	(10.34)	3	(11.12)	6	(10.71)
Will Not Return	1	(3.45)	2	(7.41)	3	(5.36)
Reduce Class Size	2	(6.90)	1	(3.70)	3	(5.36)
Adequate Funds for Supplies	1	(3.45)	1	(3.70)	2	(3.57)
Provide Daycare Facilities	0	(0.00)	1	(3.70)	1	(1.79)
Unsure	0	(0.00)	1	(3.70)	1	(1.79)
No Response	0	(0.00)	4	(14.81)	4	(7.14)
Totals	29	(100.00)	27	(100.00)	56	(100.00)

*More than one answer possible per respondent.

TABLE 27
 Non-teachers Who Would Accept Teaching Positions
 Under Present Teaching Conditions

If Offered a Teaching Position	Employment Status		
	Left Teaching %	Never Taught %	Total %
Would Accept	14 (53.85)	14 (60.87)	28 (57.14)
Would Not Accept	12 (46.15)	9 (39.13)	21 (42.86)
Totals	26 (100.00)	23 (100.00)	49 (100.00)

Opinions of Current Teachers Regarding
the Conditions of Teaching

In response to questions concerning their intent to remain in teaching, only 36.99% of seventy-three current teachers indicated that they planned to remain in teaching indefinitely. More than half of the 73 current teachers stated their intention to leave teaching: 32.88% plan to leave within the next 5 years and an additional 24.65% of respondents indicated that they had plans to leave teaching after 5 years or more. No answer was received from 5.48% of respondents (Table 28).

Those who expressed plans to leave teaching were queried as to reasons for their intention to leave. About 1 in 8 stated that inadequate salary was the issue (12.97%). Poor student attitude/discipline was cited in one sixth of the responses. Over 10% of responses included plans to leave teaching to raise a family. Uncooperative and/or abusive administrators were cited in nearly 10% of responses as contributing to their decision to leave teaching in the near future. Other reasons for leaving teaching included a return to school, poor public attitude toward teachers, large classes, and, non-teaching duties (see Table 29 for specific data).

Improvements that current teachers believe would

TABLE 28
Career Plans of Current Teachers

Career Plans	Current Teachers Number	%
Plan to teach indefinitely	27	(36.99)
Plan to leave teaching within 5 years	24	(32.88)
Plan to leave teaching after 5 years or more	18	(24.65)
No Response	4	(5.48)
Totals	73	(100.00)

TABLE 29

Reasons Teachers Plan to Leave

Why teachers plan to leave	Current Teachers Number	% ()
Return To School	3	(5.56)
Poor Student Attitude/discipline	9	(16.67)
Public Attitude Toward Teachers	3	(5.56)
Raise Family	6	(11.11)
Marriage	1	(1.85)
Classes Too Large	2	(3.70)
Uncooperative/abusive Administration	5	(9.26)
Inadequate Salary	7	(12.97)
Social Status	1	(1.85)
Non-Teaching Duties	2	(3.70)
Work in Subject Area	1	(1.85)
Education Administration	1	(1.85)
Other	5	(9.26)
No Response	8	(14.81)
Totals	54	(100.00)

increase recruitment and retention of teachers include increases in salary (60.00%), improvement in student attitudes (6.25%), improved backing by administrators and parents (7.50%), provision of adequate supplies and resources (3.75%), and improvement of administrative support (3.75%). Other suggestions included a reduction of paperwork, establishment of a mentor program, and the improvement of teacher image (see Table 30 for complete data).

When 73 current teachers were asked why they became teachers, over half indicated one or more of these reasons: enjoy teaching (37.94%); wanted to work with children (22.99%) and love science/math (10.34%). Only 8.05% indicated they had entered teaching as a job to fall back on. Just over 3% of respondents indicated that they had entered teaching because the job market was good. Others were inspired by good teachers, found an opportunity to coach, wanted to help others/become caring role model, or liked the work schedule of teachers (see Table 31 for complete data).

Current teachers were asked to select from among these conditions of work the factor that would be most likely to prompt them to leave teaching: human relations; social status of teachers; working conditions; level of livelihood provided by teachers; and would not leave under present

TABLE 30

Improvements Current Teachers Believe Would Increase
Recruitment and Retention of Teachers

Suggested Improvements	Current Teachers Number	Teachers %
Increase Salary	48	(60.00)
Improve Student Attitudes	5	(6.25)
Provide Adequate Resources	3	(3.75)
Backing by Adm. and Parents	6	(7.50)
Improve Teacher Image	1	(1.25)
Reduce Class Size	2	(2.50)
Provide Support Personnel	1	(1.25)
Improve Administration	3	(3.75)
Establish Mentor Program	1	(1.25)
Summer Employment in Industry	1	(1.25)
Reduce Paperwork	2	(2.50)
Increase Fringe Benefits	1	(1.25)
Other	2	(2.50)
No Response	4	(5.00)
Totals	80	(100.00)

TABLE 31
 *Reasons Current Teachers Decided to Teach

Reasons	Current Teachers Responses	%
Work With Children	20	(22.99)
Love Science/math	9	(10.34)
Enjoy Teaching	33	(37.94)
Job to Fall Back On	7	(8.05)
Good Work Schedule	1	(1.15)
Opportunity to Coach	3	(3.44)
Become Caring Role Model	2	(2.30)
Help Others	1	(1.15)
Wanted to Make Contribution to Society	1	(1.15)
Good Job Market	3	(3.44)
Inspired by Good Teacher	2	(2.30)
What God Had Her Do	1	(1.15)
No Response	4	(4.60)
Totals	87	(100.00)

*More than one response possible by respondents.

conditions. Only 6.41% indicated that they would not leave under present conditons. Over 39% of the respondents selected working conditions and 26.93% selected level of livelihood provided by teaching as possible reasons for leaving teaching. Human relations was selected by 5.13% of respondents and social status was selected by only 2.56% (Table 32).

In regard to current salaries of teachers, only 12.33% of respondents were earning under \$15,000 per year (this figure includes part-time and substitute teachers). Just over 69% of respondents were earning between \$15,001 and \$20,000, and 10.96% earned between \$20,001 and \$25,000 per year. None of the individuals surveyed indicated their salary was over \$25,000 per year. No responses were recorded in 6.85% of the questionnaires (Table 33).

Summary

Data were presented in this chapter from responses by current teachers, those who left teaching, and those who had never taught, in regard to general demographics, attitudes toward work, attitudes toward the conditions of work by all three sub-groups, the importance of working conditions as perceived by nonteachers, and the opinions of current teachers regarding the conditions of teaching. In the

TABLE 32

*Factors That Would be Most Likely to Prompt
Current Teachers to Leave Teaching

Factors that would prompt teachers to leave	Current Teachers Responses	%
Human Relations	4	(5.13)
Social Status of Teachers	2	(2.56)
Working Conditions	31	(39.75)
Level of Livelihood Provided by Teaching	21	(26.92)
Would not Leave Under Present Conditions	5	(6.41)
Other	10	(12.82)
No Response	5	(6.41)
Totals	78	(100.00)

*More than one answer possible per respondent.

TABLE 33
Current Salary of Teachers

Salary Range	Current Teachers *Responses	%
Under \$15,000	9	(12.33)
\$15,001 to 20,000	51	(69.86)
\$20,001 to 25,000	8	(10.96)
\$25,001 to 30,000	0	(0.00)
\$30,001 to 35,000	0	(0.00)
Over 35,000	0	(0.00)
No Response	5	(6.85)
Totals	73	(100.00)

*Includes substitute and part-time teachers.

following chapter data are analyzed, conclusions are drawn and recommendations are presented.

CHAPTER 5

CONCLUSIONS AND RECOMMENDATIONS

Introduction

Some educators predict that there will be a shortage of qualified science and mathematics teachers within the next decade. Increased high school graduation requirements in science and mathematics, increasing student populations in many areas, an aging teaching force nearing retirement, reductions in the number of college students entering science and mathematics education, increasing demands within industry for competent scientists and mathematicians, low salaries, and poor working conditions within teaching, have been suggested as contributors to the shortage.

The purpose of this study was to determine under what conditions individuals who had met certification requirements in science and/or mathematics at Virginia Tech and were not teaching, could be encouraged to enter or return to teaching. In addition, it was also the purpose of this study to determine if those who were currently teaching differed in their attitudes toward work satisfaction within teaching as compared to those who were not teaching.

Questionnaires were mailed to 142 individuals who had

met certification requirements in science and/or mathematics at Virginia Tech from 1980 to 1986. Comparisons were made between three sub-groups: current teachers, those who had left teaching, and those who had never taught. One hundred twenty-two questionnaires were returned: 73 from individuals who were currently teaching, 26 from those who had left teaching, and 23 from those who had never taught.

General Demographics

Findings:

The findings concerning the general demographics of the participants are as follows:

1. The majority of individuals within the sample were female (65.57%). This percentage compares favorably with research by Gardner (1982) who found 66.9% of all teachers to be female. There were larger percentages of females among those who left teaching than either of the other two groups. Some left teaching in order to raise a family; others returned to school. In this light, some examples of reasons for leaving teaching were "I became a mother," "Have parent at home with my own young children," "To raise my children," "Pregnant," "I have a 3-year old child," and "Return to school."

2. The vast majority of individuals were between the ages of 21 and 30 years. As a reflection of this age group, the ratio of married to single individuals was almost equal and the separation/divorce rate was very low (less than 5%).

3. Science education majors were employed as teachers in larger percentages than those in math education. Only half of individuals who had first majored in biology and then met certification requirements, were currently teaching.

4. The parents of the participants were well educated: 59.84% of fathers and 45.09% of mothers were college graduates. Gardner (1983) found teachers' parents to be college graduates in these percentages: 8.4% for fathers and 7.5% for mothers. Many parents were employed in professional or semiprofessional occupations (40.98% of fathers, and 28.69% of mothers.)

5. The majority of individuals had not yet earned a Master's degree but many had earned credits beyond the Bachelor's degree.

6. A larger percentage of current teachers indicated that their overall grade point average was lower than 3.00 (between 2.00 and 3.00) than either those who had left teaching or those who had never taught, based upon the individual's own estimation of GPA.

7. More than half of current teachers and those who

had never taught had relatives who were teachers; however, fewer than half of individuals who had left teaching had relatives who taught.

8. The vast majority of all three sub-groups indicated that teaching was not their first choice of occupation. Somewhat smaller percentages of individuals who had never taught had selected teaching as their second choice of occupation. Engineering was first choice among those who had pursued another area of study before entering teaching.

Synthesis:

The "typical" individual who completed certification requirements in science and/or mathematics education at Virginia Tech could be described as female, between the ages of 21 and 30 years, equally likely to be married or single, if married, then the spouse worked outside the home. If not a science or math education major, then the individual majored in biology. This individual was the child of professional or semiprofessional parents who likely had earned a college degree. The participant had completed a Bachelor's degree and some additional work. The individual was currently teaching science and had undergraduate grades somewhat below those who had left teaching or who had never taught. The individual had close relatives who were also

teachers. Teaching was not the individual's first choice of occupation.

Females left teaching in larger numbers than males and tended to do so in order to raise families and may have been more likely to pursue personal interests than their male counterparts. Almost twice as many of those who left teaching had mothers who were homemakers as the two other groups. Females may be influenced by their mothers to remain at home in place of working.

Although the members of this sample appear to parallel general descriptions of teachers found in current literature in terms of sex ratio, first choice of occupation, grade point average, educational background, and other factors, considerable variation is apparent in their parents' economic status and educational training.

Attitudes Concerning Work Satisfaction

Findings:

Current teachers, those who left teaching, and those who had never taught, agreed that the most important aspect of work was that it should be interesting and personally rewarding. General agreement was reached that social status was of least importance.

Human relations (how well workers get along together) was rated as being an important component of satisfying work. The ability to earn money was ranked third among four choices.

Individuals who were current teachers, those who had left teaching and those who had never taught, agreed that teachers were not highly ranked in terms of social status. In their estimate of how the general public felt about teachers' social status, current teachers and those who had left teaching agreed that the public's estimate was lower than their own estimates. Those who had never taught estimated the public's opinion of the social status of teachers to be somewhat higher than had the other two sub-groups (5.41). Although estimates of social status of teachers ranged from low to moderate, there was general agreement that teachers do not have high social standing. However, other data indicated that social standing was not a factor in their decision to enter or leave teaching.

Chi square analysis of the three groups' attitudes toward work satisfaction in the teaching occupation revealed no significant differences.

Synthesis :

The general implication is that modifications in the

conditions of work in regard to social status would provide little incentive in recruiting and retaining qualified science/mathematics teachers. Emphasis should be placed on teaching as work that is interesting and can be personally rewarding. Although there was general consensus that teachers were underpaid, salary was not ranked as the first priority in work satisfaction. It appears that salary is an important consideration in work satisfaction but moderate increases in salaries alone will not reduce attrition from teaching. Emphasis in the personal rewards, the interesting nature of teaching and the development of meaningful human relationships within the occupation are as important as, or perhaps more important than, salary increases according to the respondents. While it is unlikely that sweeping reform will occur in the amount of money teachers earn, modifications in the workplace (by humanizing working conditions) may be less costly and could produce significant reductions in the loss of qualified teachers.

Participants indicated that an occupation must be interesting and personally rewarding and provide pleasant human relationships in order to have high work satisfaction. They seem to enter teaching believing these conditions to be present, but become discouraged and leave when they encounter poor working conditions, poor relationships with principals and supervisors, and discipline problems.

The Importance of Working Conditions as Incentives
to Teach Among Individuals Not Currently Teaching

Findings:

Individuals who had completed the teacher certification program were motivated to do so by an interest in teaching. Typically the respondents indicated that they had entered the certification process because they thought that they would like teaching. Others entered teaching in order to broaden their job opportunities, because of the desirable work schedule or because of good employment prospects.

Individuals, who were not currently teaching, found employment in a wide variety of occupations. Like their parents, a relatively high percentage of them were employed within the professional or semi-professional ranks. Others found jobs as skilled or semiskilled laborers, in clerical or sales, management or self-employment, and a smaller number returned to school. Fewer than one in ten were unemployed. (Contradictory data were given in regard to employment status. When asked for the name of their current occupation, fewer than 10% responded that they were unemployed. However, when asked for specific salary information, over 24% indicated that they were unemployed.)

Among those who left teaching, higher percentages were homemakers than among those who had never taught.

Over 24% of those individuals who were not currently teaching were employed in occupations where starting salaries were less than \$15,000. In comparison, among current teachers, only 12% of respondents were at this level. (The figure for current teachers includes individuals employed part-time and as substitute teachers.) The majority of individuals in all sub-groups were earning salaries between \$15,001 and \$20,000. Just over 10% of current teachers and non-teachers earned between \$20,001 and \$25,000. A small number of non-teachers but no current teachers earned over \$25,001. In terms of beginning salary, non-teachers tended to fare less well than current teachers. This challenges the theory that trained teachers are opting for more job offers in business and industry. As Feistritzer (1983) suggested, beginning salaries for teachers are competitive with other occupations. The difference is in the manner that the gap widens as teachers accumulate years of experience. The potential for greater earnings later in their careers may be better for non-teachers than teachers.

There was little indication in the data that non-teachers were advancing in salary more rapidly than current teachers. However, because of the relative youth of

the sample, little time was available to advance in terms of salary.

Over 65% of non-teachers indicated that salary was not at issue in their decision not to teach or to leave teaching. Of the remaining 35%, responses concerning suggestions for appropriate salary ranges for beginning teachers ranged from between \$20,001 and \$25,000 (12%) and \$25,001 and \$30,000 (8%). Repeatedly, both current teachers and non-teachers contended that salary was not at issue in their decision to teach (or to not teach); however, of those who had not taught, slightly more expressed interest in salaries than those who had left teaching. Fewer than 15% of non-teachers cited low salary as a reason for leaving or failing to enter teaching. Among current teachers who planned to leave, fewer than 1 in 6 cited low salaries as being the cause. In contrast, when asked to suggest improvements in the conditions of teaching that might encourage more qualified individuals to enter and remain in the teaching profession, responses from 60% of current teachers mentioned salary increases.

Non-teachers suggested these improvements in teaching conditions as ones that would encourage them to enter or re-enter teaching: (1) increase salary ceilings, (2) provide pleasant environment in which to work, (3) reduce class size, (4) provide opportunity for teachers to

communicate with other professionals, (5) reduce job related stress, and (6) remove incompetent teachers. Individuals who had never taught were especially interested in the removal of incompetent teachers and rated this item as being of highest priority among a list of nineteen items. Of interest to the fewest respondents were merit pay systems, improvement of social status, restriction of admission into teaching, and the improvement of teacher image.

The two most commonly mentioned factors involved in non-teachers' decisions not to teach were lack of administrative support and poor student discipline. Those who had never taught had little concern for lack of administrative support but were concerned with the lack of student discipline. Individuals without teaching experience appear to be influenced by publicity concerning poor discipline. Following in close order was lack of support from parents and lack of interest among students. The correction of the above mentioned problems was cited as being helpful in encouraging them to return to or enter teaching. One in ten respondents indicated that they had not been offered a position in teaching.

Over half of those individuals who were not currently teaching indicated that they would accept a teaching position even if there were no changes in the current salaries, status, working conditions or human relations of

employment in public schools. Therefore, of 49 individuals within the sample, 28 were willing to enter or re-enter the ranks of teachers without changes.

Synthesis:

Many participants entered the teacher certification program because of a love of children or an interest in teaching itself. Others indicated that teaching was a backup to their first choice of occupation. For many, teaching was a second choice of occupation and for some, an occupation to be entered only if first choice plans failed. College recruiters may be successful in recruiting individuals into science and mathematics education who are undecided about their choice of careers.

Individuals who had left teaching for other occupations or who had never taught were not earning the large salaries suggested by many educators and others interested in this issue. Almost 1 in 4 reported that they were not employed. One conclusion is that many who are not teaching have chosen to remain unemployed or enter other occupations for reasons other than those based upon entry salary alone.

Improvements in the conditions of work appear to be of somewhat more importance in recruiting and retaining science

and mathematics teachers than moderate salary increases. In general, the participants in this survey indicate that neither poor working conditions nor low salary alone would determine if they were to teach, but both together would cause serious consideration to be given to non-teaching occupational opportunities.

When improvements are made in the conditions of work in order to enhance recruitment and retention of teachers, primary consideration should be given to improvement of administrative support to teachers and improvement of student discipline. Lines of communication with parents should be fostered and parental support solicited. Teachers should be given assistance in motivating and developing student interest.

There are, among those individuals who are not teaching, a considerable number of available, potential teachers. For almost half of those not currently teaching, these findings indicate all that is necessary to encourage them to teach is the offer of a suitable position.

Opinions of Current Teachers in Regard
to The Conditions of Teaching

Findings:

Fewer than 37% of current teachers professed their intention to remain indefinitely in teaching. More than six out of ten individuals indicated they plan to leave teaching in favor of other occupations. When asked why they planned to leave, these reasons were given: inadequate salary, poor student attitude/discipline, plans to raise a family, uncooperative and/or abusive administration. Other, less frequently mentioned reasons for abandoning teaching included a return to school, poor public attitude toward teachers, large classes, and excessive amounts of non-teaching duties.

When asked to select from among four factors involved with work satisfaction (Super, 1957) those that might be significant in deciding not to remain in teaching, current teachers indicated that working conditions were of first priority, low salaries next, with human relations and social status being of much less significance.

In an open-ended question, current teachers were asked to suggest improvements that they believed would increase recruitment and retention of individuals into teaching.

Overwhelmingly, increases in salary were recommended, but a variety of other suggestions indicated that current teachers believed that improvement of working conditions was also of importance to them. Some suggestions, quoted from respondents, included: "Better pay, better communication with the administration." "Better working atmosphere." "Better teaching conditions (i.e. more time to prep. labs, smaller number of different classes to teach." "Better payment for work - especially high demand subjects." "Guarantee all new teachers at least one 'academic' course." "Good equipment and proper facilities to keep up with what's going on in science. Help is also needed for the low ability student in science. It's disastrous!" "A mentor program to help 1st year teachers." (The preceding quote was from a first year teacher.) "More qualified individuals in administrative positions to better organize school systems - to bring school setting up to meet the increasing demands and standards of today's quality of technology." "Education must become a priority of our society: increased salaries, reduced class size, and provision of sufficient support personnel." "Better pay and more support from parents. Reduce class size." "Reduce workload. Smaller classes. No duties. More freedom. More support from parents."

Synthesis:

These findings suggest that many current teachers will probably leave the classroom if other suitable employment is available. With significant numbers indicating that they plan to leave teaching in the future, teachers may view the profession as a first step in their climb toward more desirable and profitable occupations. Some have indicated that upon graduation from college, becoming a science or mathematics teacher was the easiest job to find at a salary competitive with other beginning positions. In effect, although all participants chose to become certified to teach, some did so with little intent to teach, but may have entered teaching by default when another job failed to materialize.

Overwhelmingly, participants who are currently teaching believe that significant increases in salary would be the strongest incentive for others to enter and remain in teaching. Significant increases in salary could serve to compensate for the daily discouragements experienced by teachers in school systems with poor working conditions.

Teachers entered the profession because they felt they would like teaching and enjoyed children. Others indicated that teaching was an opportunity to combine the opportunity to work with children and still be involved in an occupation

they loved; however, low salaries and poor working conditions together are strong incentives to consider other employment.

Conclusions Concerning Research Questions

Findings:

1. In regard to Super's (1957) major needs for satisfaction in work, current teachers, those who left teaching and those who had never taught, were not significantly different in their views concerning teaching in these areas:

a. Teachers are recognized as individuals by their employers.

b. Teachers have independence of action.

c. Teachers receive fair treatment from their employers.

d. Teachers have an opportunity for self expression.

e. Teaching is an interesting work activity.

f. Teaching is satisfying work.

g. Teaching provides an adequate level of income.

h. Teaching provides job security.

The participant's opinions concerning Super's needs for work satisfaction, as they pertain to teaching, was not

significant in their decision to teach, leave teaching or to not enter teaching in the first place.

2. At least half of those individuals who are not currently teaching are willing to enter or return to teaching under present salaries, working conditions, and social status. Therefore, many individuals who are qualified to teach science and/or mathematics, but who are not currently teaching, constitute a pool of individuals who are available to at least partially meet the needs of school systems that are experiencing teacher shortages.

3. Of those who are not willing to return to teaching under present conditions, these modifications in the conditions of teaching, listed in order of importance, would be most likely to encourage them to return to or enter teaching: increased salaries; improved student discipline; improved administration; removal of incompetent teachers; increased support from colleagues and parents; a pleasant work situation; reduced class size.

Synthesis :

If teachers and non-teachers view work satisfaction in regard to teaching in similar ways, then other factors must

be more important in causing some teachers to leave: i.e., motivation to actively seek other employment, job availability, employability of individuals, financial need. (Chi square analysis of these factors did not reveal how the participants view work satisfaction--only that they tend to view it in the same way).

At least half of the individuals surveyed are willing to return to or enter teaching. School districts should actively pursue individuals not currently teaching to fill vacancies. If employers have larger numbers of candidates from which to choose, a higher quality of teacher may be the reward.

Many of the recommendations for the improvement of the conditions of teaching by the participants could be implemented at low cost: improved student discipline, improved relations between teacher and administration, improved support from colleagues and parents.

Recommendations

In regard to the improvement of working conditions, recruitment and retention of qualified teachers, the following recommendations are presented:

1. Provide salaries commensurate with training and experience. In particular increase the maximum salary

ceiling and reduce the time it takes to reach maximum salary.

2. Provide support to teachers in dealing with discipline problems within the classroom. In particular, first year teachers could benefit from assistance from carefully selected veteran teachers. Provide adequate time and remuneration for consultations to take place. Caring supervision and support from immediate supervisors is essential.

3. Humanize the relationship between direct supervisors and the teacher. Individuals who instruct new (and veteran) teachers must do so in a supportive, constructive fashion. New teachers need not be given the most difficult classes and least desirable schedules in which to begin their teaching careers. Provide all teachers with effective evaluation, suggestions for improvement, and adequate time to make improvements.

4. Establish support groups among colleagues in similar disciplines. Provide adequate time and resources for the development of effective teaching techniques. Involve parents in the development of curricula.

5. Provide a pleasant work situation. Provide adequately lit and cheerfully decorated classrooms and work areas, and supply materials and supplies necessary for the effective operation of classrooms. Provide teachers with

adequate time for class preparation. Allow teachers some of the "perks" that are enjoyed by other employees, i.e., an hour-long duty free lunch with the opportunity to leave school grounds. Provide office space and time to work with other faculty members, especially within similar disciplines.

6. Reduce class loads and the number of classes taught. Provide time for class preparation, professional development, and time for "out of class" consultation with students.

7. Recruiters from colleges and universities should emphasize that teaching is interesting work that can be personally rewarding, that within science/math education, the job prospects are good in many areas, and that entering teaching may broaden job opportunities.

8. Recruiters from school systems that aggressively address problems of salary, discipline, administration/supervision, that encourages support from colleagues and parents, that provide a pleasant work situation and reasonable class sizes, should emphasize these qualities in their recruitment activities and may therefore enjoy a decided advantage in the recruitment and retention of young, qualified science/math teachers.

9. Additional research is needed in these areas within the public schools: the restructuring of

administration/supervision; how to reduce class size, class load and provide additional work time for teachers; paraprofessionals in the schools to reduce teacher paperwork and out of class duties; and the integration of teachers into the development of curriculum and planning.

Recommendations for Future Studies

This study was limited to individuals at Virginia Tech who had met certification requirements in science and/or mathematics from 1980 to 1986; therefore, the population was relatively young in comparison to teachers in general within public schools. Similar studies should be attempted among a more representative sample of teachers in terms of their attitudes toward the conditions of teaching.

Although this study focused on the conditions of teaching and recommendations of both current teachers and non-teachers as to what is required to improve recruitment and retention of qualified teachers, methods for the improvement of those conditions were not central to the purpose of the study. Future studies might focus on the implementation of reforms in the conditions of teaching.

Methods could be explored to improve follow-up studies of graduates in all disciplines. Placement services provided by colleges could be enhanced by better knowledge

of follow-up methodology for graduates. School systems could benefit from active recruitment from non-teaching ranks.

Commentary
In Retrospect

As is true with most projects of this nature, it becomes obvious, after the fact, that improvements could have been made in the study. Here are some of the "Why didn't I ..." suggestions that came to mind as the research was concluded.

1. Broaden the population to include individuals who have been teaching for a longer period of time.
2. Include questions in the questionnaire concerning number of children, and the mobility of the individual in seeking a teaching position.
3. Explore attitudes toward salary. Do teachers feel that they are not paid enough, or have they been unduly influenced by the media and others?
4. Explore teachers' motivation to seek other work--why do some actively seek other employment while others, who indicate a willingness to leave, do not?

References

- Alumni Directory. edited by Thomas C. Tillar, Jr.,
Virginia Tech Alumni Association, Virginia
Polytechnic Institute and State University,
1986.
- Baugh, W. H. and Stone, J. A. "Mobility and Wage
Equilibration in the Educator Labor Market."
Unpublished manuscript, Center for Educational
Policy and Management, Eugene, Oregon, 1980.
- Beard, Marna L., and McGahey, Michael J. Alternate Careers
For Teachers. New York, Arco Publishing Company, 1983.
- Book, C., Byers, J., and Freeman, W. "Student Expectations
and Teacher Education Traditions With Which We Can and
Cannot Live," Journal of Teacher Education.
January/February, 1983.
- Boyd, Holtan. "West Virginia Secondary Mathematics Teachers:
1964, 1974, and 1984." West Virginia University.
Morgantown, West Virginia, 1986.
- Boyer, Ernest L. High School: A Report on Secondary
Education in America, The Carnegie Foundation for
the Advancement of Teaching. New York: Harper and Row,
1983.
- Brickell, E. E. "Our Career Program Combines Merit Pay and
Master Teacher Plans." The American School Board Journal.
February, 1984.
- Buzzard, Gene P. "How Can Science survive in the High
School?." Journal of Chemical Education. October,
1984.
- Bybee, Rodger W. "Science Education Policies for an
Ecological Society: Aims and Goals." Science
Education. 1979
- Caspari, I. E. Troublesome Children in Class. Landon,
Routledge and Kegan Paul, 1976.
- Chapman, David W, and Sigrid, M. Hutcheson. "Attrition
from Teaching Careers: A Discriminant Analysis."
American Education Research Journal. Spring, 1982.
- Cichon, Donald J., and Koff, Robert H. "Stress and
Teaching." NASSP Bulletin. March, 1980.

Charter, W. W., Jr. "The Social Background of Teaching." In Handbook of Research on Teaching. Edited by N. L. Gage, Rand McNally, 1963.

The Condition of Teaching. Washington, D.C. United States Department of Education, 1983.

Darling-Hammond, Linda. "Beyond the Commission Reports." Rand Publication Series, July, 1984.

Desruisseaux, Paul. "Boyer Asserts Colleges Share in Blame for Shortage of Teachers." The Chronicle of Higher Education, August 29, 1984.

Dillman, Don. Mail and Telephone Surveys. New York: John Wiley and Sons, 1978.

Dillman, Don, and Frey, James. "Contribution of Personalization to Mail Questionnaire Response as an Element of a Previously Tested Method." Journal of Applied Psychology, 59, no. 3, 1974.

Dillman, Don. "Increasing Mail Questionnaire Response in Large Samples of the General Public." Public Opinion Quarterly, 36, 1972.

Eddy, Elizabeth M. Becoming a Teacher. Teachers College Press, Teachers College, Columbia University, 1969.

Feistritzer, Emily. The Condition of Teaching. Princeton, N. J: Foundation for the Advancement of Teaching, 1983.

Feistritzer, Emily. Interview by phone. November, 1986.

Gallagher, James Joseph, and Yeager, Robert E. "Science Educators' Perceptions of Problems Facing Science Education: A Report of Five Surveys." Journal of Research in Science Teaching, 8, No. 6, 1981.

Gallup, Alec. "The Gallup Poll of Teachers' Attitudes Toward the Public Schools." Phi Delta Kappan, October, 1984.

Gallup, Alec. "The Gallup Poll of Teachers' Attitudes Toward the Public Schools, Part 2." Phi Delta Kappan, January, 1985.

- Gardner, Suzanne, Status of the American Public School Teacher, 1980-81. National Education Association, 1982.
- Gardner, Suzanne. "Nationwide Teacher Opinion Poll." Washington: National Education Association Research, 1983.
- Goodlad, John I. A Place Called School. New York: McGraw-Hill, 1984.
- Guthrie, James W., and Zusman, Ami. "Teacher Supply and Demand in Mathematics and Science." Phi Delta Kappan, September, 1982.
- Harris, Louis, and Associates. The Metropolitan Life Survey of Former Teachers in America. Conducted for The Metropolitan Life Insurance Company, 1985.
- Harris, L., Libresco, J. D., and Parker, R. P. The American Teacher. Metropolitan Life Insurance Company Poll, June, 1984.
- Heylin, M. "High School Science Problems Gain Spotlight." Chemical and Engineering News, 60, (21), 1982.
- Holland, J. I., and Nichols, R. C. "Explorations of a Theory of Vocational Choice III. A Longitudinal Study of Change in Major Fields of Study." Personnel and Guidance Journal, 43, 1964.
- House, Peggy. "Mathematics Teachers: An Endangered Species." Mathematics Education Information Report, ERIC, Clearinghouse for Science, Mathematics and Environmental Education, Columbus, Ohio: The Ohio State University, 1982.
- Jackson, Philip W. "The Reform of Science Education." The Education Digest, March, 1984.
- Jackson, Philip W. Life in Classrooms. New York: Holt, Rinehart and Winston, Inc., 1968.

- Keith, Pat M., Warren, Richard D., and Dilts, Harold E. "Teacher Education Graduates, Sex, Career Plans, and Preferences for Job Factors." Urban Education, October, 1983.
- Koff, Robert H. "Proceedings of the Symposium on the Effects on Technology of a Vanishing Species: Mathematics and Science Teachers." State University of New York at Albany, 1982.
- Kottkamp, Robert B., Provenzo, Eugene F., Jr., and Cohn, Marilyn M. "Stability and Change in a Profession: Two Decades of Teacher Attitudes, 1964-1984." Phi Delta Kappan, April, 1986.
- Kyriacou, Chris, and Sutcliffe, John. "Teacher Stress: a Review." Educational Review, November, 1977.
- Lanier, Judith E. "Research on Teacher Education." In Handbook of Research on Teaching, 3rd ed. Merlin C. Wittrock, ed. New York: Macmillan Publishing Co., 1986.
- Lindeman, Benjamin and Bachm, Thomas. "Study of Secondary Mathematics Teachers by States." New York: Bureau of Science Education, State Department of Education, 1980.
- Lortie, Dan C. Schoolteacher. Chicago: The University of Chicago Press, 1975.
- Lortie, Dan C. "Teacher Status in Dade County: A Case of Structural Strain?." Phi Delta Kappan, April, 1986.
- McGeever, James M. "State and Local Initiatives to Alleviate Teacher Shortages in Mathematics and Science." Occasional Paper Series, Appalachia Educational Laboratory, Charleston, West Virginia, 1984.
- Miller, D. C., and From, W. H. Industrial Sociology. New York: Harper, 1951.
- Miller, Leslie, and Say, Elaine. "This Bold Incentive Pay Plan Pits Capitalism Against Teacher Shortages." American School Board Journal, September, 1982.

- National Center for Education Statistics, The Condition of Teaching. Washington: U. S. Government Printing Office, 1982.
- National Commission of Excellence in Education, "A Nation at Risk: The Imperative for Educational Reform." Washington: Department of Education, 1983.
- National Education Association. "Estimates of School Statistics." Professional and Organizational Development/Research Division, 1986.
- National Education Association. "Status of the American Public School Teacher: 1981-82". Washington, D.C., NEA, 1982.
- "National Science Board Commission Presents a Plan to Improve the Nation's Elementary and Secondary Math and Science Education." National Science Foundation News, September 13, 1983.
- National Science Board Commission on Precollege Education in Mathematics, Science and Technology. "Educating Americans for the 21st Century." Washington, D. C., 1983.
- National Science Board Commission on Precollege Education in Mathematics, Science and Technology. "Today's Problems. Tomorrow's Crises." Washington, D. C., 1982.
- "National Teacher Opinion Poll." National Education Association, Washington, D.C., 1980.
- Northwest University Endicott Report. "Trends in the Employment of College and University Graduates in Business and Industry," Placement Center, Northwestern University, Evanston, Ill., 1986.
- Olstad, Roger G., and Beal, Jack L. "The Search for Teachers." The Science Teacher, April, 1981.
- Olstad, Roger G., and Beale, Jack L. "The Science and Mathematics Teacher Shortage: A Study of Recent Graduates." Science Education, 1984.

- Parker, James C. Career Ladder/Master Teacher Programs. The National Association of Secondary School Principals, Reston, Virginia, 1985.
- Prediger, Dale J. "Dimensions Underlying Holland's Hexagon: Missing Link Between Interests and Occupations?." Journal of Vocational Behavior, 21, 1982.
- Richards, Ellen W. "Undergraduate Preparation and Early Career Outcomes: A Study of Recent College Graduates." Journal of Vocational Behavior, 24, 1984.
- Schalock, D. "Research on Teacher Selection." In, Review of Research in Education, D. C. Berliner, ed, American Educational Research Association, 1979.
- Schlechty, Phillip C., and Vance, Victor S. "Recruitment, Selection, and Retention: The Shape of the Teaching Force." The Elementary School Journal, March, 1983.
- Sizer, Theodore R. Horace's Compromise: The Dilemma of the American High School. Boston: Houghton Mifflin Co., 1984
- Smith, F. R., and Cox, C. B. Secondary Schools in a Changing Society. New York: Holt, Rinehart and Winston, 1976.
- Soloranzo, Lucia. "What Makes Great Schools Great." U.S. News and World Report, August 27, 1984.
- Sousa, David. "Recent Trends in Secondary Science Education in New Jersey." Journal of Research in Science Teaching, 21, (3), 1984.
- Spector, Barbara S. "Incentives to Increase the Number of Qualified Science Teachers in Precollege Institutions." Science Education, 68 (2), 1984.
- Stark, Joan S., Austin, Ann E., Dowther, Malcolm A, Chapman, David W., and Sigrid, M. Hutcheson. "Teacher Certification Recipients at the University of Michigan 1946 through 1976: A 1980 Follow-up Study." Innovator, March 30, 1981.

- Super, D. E. The Psychology of Careers, New York: Harper and Rowe, 1957.
- Sykes, Gary. "Teaching as Work and Profession." In Handbook of Teaching and Policy, L. Shulman and Sykes, G. eds., New York, 1983a.
- Sykes, G. "Contradictions, Ironies, and Promises Unfulfilled: A Contemporary Account of the Status of Teaching." Phi Delta Kappan, 1983b.
- Sykes, Gary. "Public Policy and the Problem of Teacher Quality: The Need for Screens and Magnets." In, Handbook of Teaching and Policy, L. Shulman and Sykes, eds., New York, 1983c.
- Sykes, Gary. "The Deal." The Wilson Quarterly, January, 1984.
- Toch, Thomas. "200,000 Reasons for Concern: A Profile of Those who Teach Science." Education Week, July 27, 1983.
- Virginia Tech General Catalog 1987-88. Virginia Tech Bulletin, 79, (4), October, 1986.
- Van Meter, Eddy J. "Eight Ways to Recruit the Teachers You Want for the Jobs You've Got." American School Board Journal, February, 1984.
- Weaver, W. Timothy. "Solving the Problem of Teacher Quality, Part 1." Phi Delta Kappan, October 1984.
- Wicker, Tom. New York Times. New York: March 25, 1983.
- Winborne, Clairborne R., and Stainback, George H. "Our Salary Supplement Program Gives Teachers an Incentive They Can Bank On." American School Board Journal, February, 1984.
- Williams, Robert T. "Beneath the Surface of the Mathematics Teacher Shortage." Mathematics Teacher, December 1981.
- Williams, Robert T. "Teacher Shortages--Some Proposed Solutions." American Education, April, 1983.

- Wise, Arthur E. "Three Scenarios for the Future of Teaching." Phi Delta Kappan, 67 (9), 1986.
- Yeager, Robert E. "Science Educators' Perceptions of Problems Facing Science Education: A Report of Five Surveys." Journal of Research in Science Teaching, 18 (6), 1981.
- Yeager, R. E. "A Survey of Perceptions of Major Professional Problems and Recommendations for Their Solution by Science Educators Representing Major Centers in the U.S." Technical Report #18, Science Education Center, Iowa City, University of Iowa, 1979.
- Zeigler, H. The Political Life of American Teachers. Englewood Cliffs, NJ: Prentice-Hall, 1967.

APPENDIX A

SURVEY QUESTIONS

INSTRUCTIONS: Based upon your experiences, compare teaching to other occupations by responding to the questions below. Please answer by placing a circle around your choice of answers: Strongly Agree (1); Agree (2); Disagree (3); or Strongly Disagree (4). This is a confidential survey. Your response will not be identified individually. Code numbers have been attached for followup purposes only.

	SA	A	D	SD						
1. Teachers are recognized as individuals by their employers.	1	2	3	4						
2. Teachers have independence of action.	1	2	3	4						
3. Teachers receive fair treatment from their employers.	1	2	3	4						
4. Teachers have an opportunity for self expression.	1	2	3	4						
5. Teaching is an interesting work activity.	1	2	3	4						
6. Teaching is satisfying work.	1	2	3	4						
7. Teaching provides an adequate level of income.	1	2	3	4						
8. Teaching provides job security.	1	2	3	4						
9. In your opinion, what is the social status of teachers as rated by:										
		Low		High						
Teachers themselves	1	2	3	4	5	6	7	8	9	10
The general public	1	2	3	4	5	6	7	8	9	10

PLEASE RESPOND TO THE FOLLOWING QUESTIONS:

10. Check the statement that most closely describes your current employment status:
- ____ Currently employed as a classroom teacher.
 Full-time _____ Part-time _____
- ____ Worked as a classroom teacher in the past, but not currently teaching (Includes those still in education--i.e. counselors, principals, administrators).
- ____ Have never taught.
- ____ Other Please specify _____
11. Sex: Male _____
 Female _____
12. What was your major at VPI? _____

13. What is your age? 21-30 _____
 31-40 _____
 41-50 _____
 51-60 _____
 61-70 _____
14. Father's Occupation _____
15. Mother's Occupation _____
16. Father's Highest Educational Level
 _____ Sixth grade or less
 _____ Attended high school but did not graduate
 _____ High school graduate
 _____ Attended college but did not graduate
 _____ College graduate
 _____ Holds graduate degree
17. Mother's Highest Educational Level
 _____ Sixth grade or less
 _____ Attended high school but did not graduate
 _____ High school graduate
 _____ Attended college but did not graduate
 _____ College graduate
 _____ Holds graduate degree
18. What is your marital status?
 _____ Married
 If married, does your spouse work? Yes _____ No _____
 _____ Separated
 _____ Divorced
 _____ Widowed
 _____ Single
19. What is your highest level of education?
 _____ Bachelor's Degree
 _____ Bachelor's Degree plus credits toward Master's Degree
 _____ Master's Degree
 _____ Master's Degree plus credits beyond
20. What was your undergraduate grade point average? (Please estimate if necessary).
 _____ 2.00 to 2.50
 _____ 2.51 to 3.00
 _____ 3.01 to 3.50
 _____ 3.51 to 4.00

21. Do you have close relatives who are teachers? Yes ____ No ____
If yes, check the relationship(s):
 Mother
 Father
 Aunt
 Uncle
 Cousin
 Child
 Spouse
 Brother/Sister
 Other
22. In what year did you graduate from VPI and SU?
 1980
 1981
 1982
 1983
 1984
 1985
 1986
 1987
23. In what year did you first begin full time employment following graduation?
 Prior to 1980
 1980
 1981
 1982
 1983
 1984
 1985
 1986
 1987
 Not employed
 Other--Please explain _____
24. How important are considerations of human relations in your choice of an occupation? (For example, how well workers get along together).
 Extremely
 Very
 Somewhat
 Not at all
25. How important is social status in your choice of occupation?
 Extremely
 Very
 Somewhat
 Not at all

26. In selecting an occupation, how important is work that is interesting and personally rewarding?

- Extremely
 Very
 Somewhat
 Not at all

27. How important is the ability to earn money in your selection of an occupation?

- Extremely
 Very
 Somewhat
 Not at all

28. In the following question, rank the importance of the conditions of work by assigning 1 to the most important, 2 to the next most important, 3 to the next, and 4 to the least important.

- Human Relations (For example, how well workers get along together).
 Social Status
 Interesting and Personally Rewarding Work
 Ability to Earn Money

29. Was teaching your first choice of occupation upon entering college?

- Yes
 No Specify 1st. choice _____

ANSWER QUESTIONS 30-56 ONLY IF YOU ARE NOT CURRENTLY TEACHING. (Skip to question 57 if you ARE CURRENTLY TEACHING.)

PLEASE RESPOND TO THE FOLLOWING QUESTIONS IF YOU ARE NOT CURRENTLY TEACHING.

30. Why did you decide to enroll in the teacher certification sequence?

31. What is your present occupation?

32. In your present position, what was the entry salary? (This is a confidential survey. Your response will not be identified individually.)

_____ Am not currently employed

_____ \$15,000 or less

_____ \$15,001 to 20,000

_____ \$20,001 to 25,000

_____ \$25,001 to 30,000

_____ \$30,001 to 35,000

_____ \$35,001 to 40,000

_____ \$40,001 to 45,000

_____ Other, please specify \$ _____

33. What is your current yearly salary?

_____ I am not currently employed

_____ \$15,000 or less

_____ \$15,001 to 20,000

_____ \$20,001 to 25,000

_____ \$25,001 to 30,000

_____ \$30,001 to 35,000

_____ \$35,001 to 40,000

_____ \$40,001 to 45,000

_____ \$50,001 to 55,000

_____ Other, please specify \$ _____

34. If inadequate salary was a factor in your decision not to teach, at what minimum salary do you feel you would have been more likely to enter teaching?

_____ Minimum salary was not an issue.

_____ Minimum annual salary

MANY OBSERVERS OF PUBLIC EDUCATION CLAIM THAT SALARY AND BENEFITS ARE INADEQUATE TO RECRUIT AND RETAIN HIGH QUALITY TEACHERS TO PUBLIC SCHOOLS. IN THE FOLLOWING QUESTIONS INDICATE HOW IMPORTANT OTHER INCENTIVES MIGHT BE IN CONVINCING YOU TO TEACH.

(Circle your answer please)	Extremely	Very	Somewhat	Not at All
35. Provide opportunities for advancement without leaving the classroom	E	V	S	N
36. Establish merit pay system	E	V	S	N
37. Increase salaries to at least twice entry level within 5 years	E	V	S	N
38. Provide higher salary in high demand subject areas	E	V	S	N
39. Establish teacher's salary based upon their teaching skills	E	V	S	N
40. Teach maximum of 20 hours per week with remaining time for professional development	E	V	S	N
41. Reduce class size	E	V	S	N
42. Reduce clerical work and paperwork	E	V	S	N
43. Reduce duties outside the classroom	E	V	S	N
44. Provide pleasant physical environment in which to work	E	V	S	N
45. Improve student discipline	E	V	S	N
46. Provide opportunity for teachers to communicate with other professionals	E	V	S	N
47. Reduce job related stress	E	V	S	N
48. Improve the teacher's social status	E	V	S	N
49. Make certification requirements more rigid	E	V	S	N
50. Restrict admissions into the teaching profession	E	V	S	N
51. Require competency testing for teachers	E	V	S	N

52. Remove incompetent teachers from the profession E V S N

53. Improve teacher image E V S N

54. In the space below, list the single most important factor in your decision not to teach or leave teaching.

55. In the space below, list the single most important factor which would encourage you to enter teaching.

56. Even if there were no changes in the current salaries, status, working conditions or human relations of employment in public schools, would you accept a teaching position if you were offered a contract?

_____ Yes

_____ No

PLEASE ANSWER QUESTIONS 57-61 ONLY IF YOU ARE CURRENTLY TEACHING.

57. What are your career plans concerning teaching?

- I plan to teach indefinitely.
 I plan to leave teaching within 5 years.
 I plan to leave teaching after 5 years or more.

If you plan to leave teaching in the foreseeable future, please explain why:

58. In the space below, list the single most important factor, in your estimation, which would improve recruitment and retention of qualified science and math teachers.

59. Why did you decide to become certified as a teacher?

60. If you were to decide to leave teaching, which of these factors would be most significant in that decision?

- Human relations
 Social status of teachers
 Working conditions
 Level of livelihood provided by teaching
 Would not leave under current conditions
 Other Explain: _____

61. What is your current teaching salary? This is a confidential survey. Your response will not be identified individually.

- \$15,000 or less
 \$15,001 to 20,000
 \$20,001 to 25,000
 \$25,001 to 30,000
 \$30,001 to 35,000
 Over \$35,000

APPENDIX B

Cover Letter Mailed With First Survey Instrument

Student Name and Address

Dear

Educators project that there will be a severe shortage of science and/or mathematics teachers in public schools in the next decade. We are engaged in research to determine if recent graduates of VPI who are eligible for certification in science or mathematics are currently teaching and if not, what is required to entice them to do so. We need your help. Please assist us by taking ten or fifteen minutes to complete and return the survey enclosed.

The following areas are explored: attitudes toward work; socio-economic background; and attitudes toward teaching conditions. The survey is divided into three parts:

1. Questions 1 - 29 are to be answered by all participants
2. Questions 30 - 56 are to be answered only by those individuals who are not currently classroom teachers.
3. Questions 57 - 61 are to be answered only by those individuals who are currently classroom teachers.

Please complete the survey and return it in the stamped envelope provided as soon as possible. You will not be identified individually, however, the forms are numbered to allow follow-up on those who do not respond. Your assistance is of great importance to the success of our work.

Sincerely,

Dr. Wayne Worner
Professor, Education
Administration
VPI AND SU
Blacksburg, VA

Tom Williams
Director of Student Services
Greenbrier Community College
Lewisburg, WV

APPENDIX C

***Postcard Follow-up Sent One Week After Original Mailing**

Last week a questionnaire seeking your opinion about improvements in the conditions of teaching was mailed to you. Your name was selected because you have completed certification requirements in science or mathematics at Virginia Tech.

If you have already completed and returned it to us please accept our sincere thanks. If not, please do so today. Because it has been sent to only a small, but representative, sample of Virginia Tech graduates, it is extremely important that yours also be included in the study if the results are to accurately represent the opinions of those qualified to teach science or mathematics.

If by some chance you did not receive the questionnaire, or it got misplaced, please call me tonight, collect (304-645-3951) and I will get another one in the mail to you today.

Sincerely,

Tom Williams
Project Director

*Taken from Dillman (1978, p.184)

APPENDIX D

First Follow-up Letter

March 24, 1987

Student Name and Address

Dear

On March 3 we wrote to you requesting your opinions concerning the conditions of teaching. As of this date we have not received your completed questionnaire.

We feel the study is important not only in locating qualified teachers who might be available to teach, but also to determine what modifications in the teaching profession are necessary to entice nonteachers to enter the classroom.

We are writing to you again because of the significance of each individual in this study. Because such a small number of individuals has graduated from Virginia Tech in science and mathematics in the last five years, your response is essential to the success of our work. As you know, the larger the sample, the more reliable and generalizable the results. As mentioned in our last letter, only ten or fifteen minutes are required to complete the questionnaire. Just in case the first questionnaire has been misplaced, a replacement has been enclosed.

We sincerely appreciate your help in completing this difficult task.

Cordially,

Dr. Wayne Worner
Professor
College of Education
Virginia Tech
Blacksburg, VA 24061

Tom Williams
Director of Student Services
Greenbrier Community College
Center
Lewisburg, WV 24901

APPENDIX E

Second Follow-up Letter to Non-respondents
(Certified Mail)

Student Name and Address

Dear

We are writing to you about our study of Virginia Tech graduates who are eligible for certification as teachers of science and/or math. We have not yet received your questionnaire.

We are encouraged by the number of individuals who have returned their questionnaires, but whether we are able to accurately describe the opinions of the individuals in the study depends on you. We are concerned that those who have not yet answered may have differing opinions from those who have. Therefore, your response is important to the success of the study.

This is the first follow-up study of Virginia Tech graduates who are eligible to teach science and/or math. The results are of particular importance in helping us to determine what modifications in the conditions of teaching would be of help in recruiting and retaining qualified teachers.

It is for this reason that we are sending this by certified mail in the event that our previous correspondence has not reached you. Another questionnaire is enclosed. May we encourage you to complete the questionnaire and return it to us as soon as possible.

Your contribution to the success of this study is greatly appreciated.

Cordially,

Dr. Wayne Worner
Professor
College of Education
Virginia Tech
Blacksburg, VA 24061

Tom Williams
Director of Student Services
Greenbrier Community College
Center
Lewisburg, WV 24901

APPENDIX F

TEACHERS ARE RECOGNIZED AS INDIVIDUALS BY THEIR EMPLOYERS

Employment Status	Responses				ROW TOTAL
	Strongly Agree 1	Agree 2	Disagree 3	Strongly Disagree 4	
Currently Teaching	4.0 5.5 44.4	56.0 76.7 61.5	9.0 12.3 64.3	4.0 5.5 80.0	73.0 61.3
Left Teaching	3.0 12.0 33.3	18.0 72.0 19.8	4.0 16.0 28.6	0.0 0.0 0.0	25.0 21.0
Never Taught	2.0 9.5 22.2	17.0 81.0 18.7	1.0 4.8 7.1	1.0 4.8 20.0	21.0 17.6
COLUMN TOTAL	9.0 7.6	91.0 76.5	14.0 11.8	5.0 4.2	119.0 100.0

<u>CHI-SQUARE</u>	<u>D.F.</u>	<u>SIGNIFICANCE</u>	<u>MIN E.F.</u>	<u>CELLS WITH E.F. < 5</u>
3.92364	6.0	0.6870	0.882	7 OF 12 (58.3%)

NUMBER OF MISSING OBSERVATIONS = 3

TEACHERS HAVE INDEPENDENCE OF ACTION

Employment Status	Responses				ROW TOTAL
	Strongly Agree 1	Agree 2	Disagree 3	Strongly Disagree 4	
Currently Teaching	5.0 7.0 62.5	35.0 49.3 60.3	29.0 40.8 64.4	2.0 2.8 28.6	71.0 60.2
Left Teaching	3.0 12.0 37.5	9.0 36.0 15.5	10.0 40.0 22.2	3.0 12.0 42.9	25.0 21.2
Never Taught	0.0 0.0 0.0	14.0 63.6 24.1	6.0 27.3 13.3	2.0 9.1 28.6	22.0 18.6
COLUMN TOTAL	8.0 6.8	58.0 49.2	45.0 38.1	7.0 5.9	118.0 100.0

<u>CHI-SQUARE</u>	<u>D.F.</u>	<u>SIGNIFICANCE</u>	<u>MIN E.F.</u>	<u>CELLS WITH E.F. < 5</u>
8.24618	6.0	0.2206	1.305	6 OF 12 (50.0%)

NUMBER OF MISSING OBSERVATIONS = 4

TEACHERS RECEIVE FAIR TREATMENT FROM THEIR EMPLOYERS

Employment Status	Responses				RCW TOTAL
	Strongly Agree 1	Agree 2	Disagree 3	Strongly Disagree 4	
Currently Teaching	1.0 1.4 20.0	56.0 76.7 64.4	12.0 16.4 57.1	4.0 5.5 66.7	73.0 61.3
Left Teaching	3.0 12.0 60.0	15.0 60.0 17.2	5.0 20.0 23.8	2.0 8.0 33.3	25.0 21.0
Never Taught	1.0 4.8 20.0	16.0 76.2 18.4	4.0 19.0 19.0	0.0 0.0 0.0	21.0 17.6
COLUMN TOTAL	5.0 4.2	87.0 73.1	21.0 17.6	6.0 5.0	119.0 100.0
<u>CHI-SQUARE</u>	<u>D.F.</u>	<u>SIGNIFICANCE</u>	<u>MIN E.F.</u>	<u>CELLS WITH E.F. < 5</u>	
7.45449	6.0	0.2809	0.882	8 OF 12 (66.7%)	

NUMBER OF MISSING OBSERVATIONS = 3

TEACHERS HAVE AN OPPORTUNITY FOR SELF EXPRESSION

Employment Status	Responses				ROW TOTAL
	Strongly Agree 1	Agree 2	Disagree 3	Strongly Disagree 4	
Currently Teaching	10.0	48.0	14.0	0.0	72.0
	13.9	66.7	19.4	0.0	60.5
	50.0	60.8	70.0	0.0	
Left Teaching	6.0	15.0	5.0	0.0	26.0
	23.1	57.7	19.2	0.0	21.8
	30.0	19.0	25.0	0.0	
Never Taught	4.0	16.0	1.0	0.0	21.0
	19.0	76.2	4.8	0.0	17.6
	20.0	20.3	5.0	0.0	
COLUMN TOTAL	20.0 16.8	79.0 66.4	20.0 16.8	119.0 100.0	

<u>CHI-SQUARE</u>	<u>D.F.</u>	<u>SIGNIFICANCE</u>	<u>MIN E.F.</u>	<u>CELLS WITH E.F. < 5</u>
3.83833	4	0.4283	3.529	4 OF 9 (44.4%)

NUMBER OF MISSING OBSERVATIONS = 3

TEACHING IS AN INTERESTING WORK ACTIVITY

Employment Status	Responses				RCW TOTAL
	Strongly Agree 1	Agree 2	Disagree 3	Strongly Disagree 4	
Currently	34.0	33.0	4.0	1.0	72.0
Teaching	47.2	45.8	5.6	1.4	60.5
	69.4	51.6	80.0	100.0	
Left	10.0	16.0	0.0	0.0	26.0
Teaching	38.5	61.5	0.0	0.0	21.8
	20.4	25.0	0.0	0.0	
Never	5.0	15.0	1.0	0.0	21.0
Taught	23.8	71.4	4.8	0.0	17.6
	10.2	23.4	20.0	0.0	
COLUMN	49.0	64.0	5.0	1.0	119.0
TOTAL	41.2	53.8	4.2	0.8	100.0

<u>CHI-SQUARE</u>	<u>D.F.</u>	<u>SIGNIFICANCE</u>	<u>MIN E.F.</u>	<u>CELLS WITH E.F. < 5</u>
6.65149	6	0.3543	0.176	6 OF 12 (50.0%)

NUMBER OF MISSING OBSERVATIONS = 3

TEACHING IS SATISFYING WORK

Employment Status	Responses				ROW TOTAL
	Strongly Agree 1	Agree 2	Disagree 3	Strongly Disagree 4	
Currently Teaching	23.0 32.4 74.2	32.0 45.1 54.2	13.0 18.3 59.1	3.0 4.2 50.0	71.0 60.2
Left Teaching	3.0 12.0 9.7	16.0 64.0 27.1	5.0 20.0 22.7	1.0 4.0 16.7	25.0 21.2
Never Taught	5.0 22.7 16.1	11.0 50.0 18.6	4.0 18.2 18.2	2.0 9.1 33.3	22.0 18.6
COLUMN TOTAL	31.0 26.3	59.0 50.0	22.0 18.6	6.0 5.1	118.0 100.0

<u>CHI-SQUARE</u>	<u>D.F.</u>	<u>SIGNIFICANCE</u>	<u>MIN E.F.</u>	<u>CELLS WITH E.F. < 5</u>
5.26846	6	0.5099	1.119	5 OF 12 (41.7%)

NUMBER OF MISSING OBSERVATIONS = 4

TEACHING PROVIDES AN ADEQUATE LEVEL OF INCOME

Employment Status	Strongly Agree 1	Responses		Strongly Disagree 4	ROW TOTAL
		Agree 2	Disagree 3		
Currently	1.0	18.0	38.0	16.0	73.0
Teaching	1.4	24.7	52.1	21.9	60.3
	100.0	60.0	61.3	57.1	
Left	0.0	7.0	11.0	8.0	26.0
Teaching	0.0	26.9	42.3	30.8	21.5
	0.0	23.3	17.7	28.6	
Never	0.0	5.0	13.0	4.0	22.0
Taught	0.0	22.7	59.1	18.2	18.2
	0.0	16.7	21.0	14.3	
COLUMN	1.0	30.0	62.0	28.0	121.0
TOTAL	0.8	24.8	51.2	23.1	100.0

<u>CHI-SQUARE</u>	<u>D.F.</u>	<u>SIGNIFICANCE</u>	<u>MIN E.F.</u>	<u>CELLS WITH E.F. < 5</u>
2.35729	6	0.8941	0.182	3 OF 12 (25.0%)

NUMBER OF MISSING OBSERVATIONS = 1

TEACHING PROVIDES JOB SECURITY

Employment Status	Strongly Agree 1	Responses		Strongly Disagree 4	ROW TOTAL
		Agree 2	Disagree 3		
Currently Teaching	6.0	45.0	16.0	6.0	73.0
	8.2	61.6	21.9	8.2	60.8
	54.5	61.6	57.1	75.0	
Left Teaching	2.0	14.0	8.0	2.0	26.0
	7.7	53.8	30.8	7.7	21.7
	18.2	19.2	28.6	25.0	
Never Taught	3.0	14.0	4.0	0.0	21.0
	14.3	66.7	19.0	0.0	17.5
	27.3	19.2	14.3	0.0	
COLUMN TOTAL	11.0 9.2	73.0 60.8	28.0 23.3	8.0 6.7	120.0 100.0

<u>CHI-SQUARE</u>	<u>D.F.</u>	<u>SIGNIFICANCE</u>	<u>MIN E.F.</u>	<u>CELLS WITH E.F. < 5</u>
3.61654	6	0.7284	1.400	6 OF 12 (50.0%)

NUMBER OF MISSING OBSERVATIONS = 2

IMPORTANCE OF HUMAN RELATIONS IN SELECTING AN OCCUPATION

Employment Status	Responses				ROW TOTAL
	Strongly Agree 1	Agree 2	Disagree 3	Strongly Disagree 4	
Currently	32.0	31.0	9.0	1.0	73.0
Teaching	43.8	42.5	12.3	1.4	60.3
	60.4	56.4	75.0	100.0	
Left	9.0	15.0	1.0	0.0	25.0
Teaching	36.0	60.0	4.0	0.0	20.7
	17.0	27.3	8.3	0.0	
Never	12.0	9.0	2.0	0.0	23.0
Taught	52.2	39.1	8.7	0.0	19.0
	22.6	16.4	16.7	0.0	
COLUMN TOTAL	53.0 43.8	55.0 45.5	12.0 9.9	1.0 0.8	121.0 100.0

<u>CHI-SQUARE</u>	<u>D.F.</u>	<u>SIGNIFICANCE</u>	<u>MIN E.F.</u>	<u>CELLS WITH E.F. < 5</u>
4.22779	6	0.6459	0.190	5 OF 12 (41.7%)

NUMBER OF MISSING OBSERVATIONS = 2

IMPORTANCE OF INTERESTING AND REWARDING WORK IN SELECTING AN OCCUPATION

Employment Status	Strongly Agree 1	Responses		Strongly Disagree 4	ROW TOTAL
		Agree 2	Disagree 3		
Currently	48.0	23.0	2.0	0.0	73.0
Teaching	65.8	31.5	2.7	0.0	60.3
	58.5	63.9	66.7	0.0	
Left	15.0	9.0	1.0	0.0	25.0
Teaching	60.0	36.0	4.0	0.0	20.7
	18.3	25.0	33.3	0.0	
Never	19.0	4.0	0.0	0.0	23.0
Taught	82.6	17.4	0.0	0.0	19.0
	23.2	11.1	0.0	0.0	
COLUMN	82.0	36.0	3.0	0.0	121.0
TOTAL	67.8	29.8	2.5	0.0	100.0

<u>CHI-SQUARE</u>	<u>D.F.</u>	<u>SIGNIFICANCE</u>	<u>MIN E.F.</u>	<u>CELLS WITH E.F. < 5</u>
3.42190	4	0.4899	0.570	3 OF 9 (33.3%)

NUMBER OF MISSING OBSERVATIONS = 1

IMPORTANCE OF SOCIAL STATUS IN SELECTING AN OCCUPATION

Employment Status	Responses				ROW TOTAL
	Strongly Agree 1	Agree 2	Disagree 3	Strongly Disagree 4	
Currently Teaching	2.0 2.7 40.0	19.0 26.0 63.3	44.0 60.3 62.9	9.0 11.0 50.0	73.0 60.3
Left Teaching	1.0 4.0 20.0	4.0 16.0 13.3	16.0 64.0 22.9	4.0 16.0 25.0	25.0 20.7
Never Taught	2.0 8.7 40.0	7.0 30.4 23.3	10.0 43.5 14.3	4.0 17.4 25.0	23.0 19.0
COLUMN TOTAL	5.0 4.1	30.0 24.8	70.0 57.9	16.0 13.2	121.0 100.0
<u>CHI-SQUARE</u>	<u>D.F.</u>	<u>SIGNIFICANCE</u>	<u>MIN E.F.</u>	<u>CELLS WITH E.F. < 5</u>	
4.41224	6	0.6211	0.950	5 OF 12 (41.7%)	

NUMBER OF MISSING OBSERVATIONS = 1

IMPORTANCE OF ABILITY TO EARN MONEY IN SELECTION OF AN OCCUPATION

Employment Status	Strongly Agree 1	Responses		Strongly Disagree 4	ROW TOTAL
		Agree 2	Disagree 3		
Currently	5.0	30.0	35.0	3.0	73.0
Teaching	6.8	41.1	47.9	4.1	60.3
	62.5	54.5	63.6	100.0	
Left	2.0	12.0	11.0	0.0	25.0
Teaching	8.0	48.0	44.0	0.0	20.7
	25.0	21.8	20.0	0.0	
Never	1.0	13.0	9.0	0.0	23.0
Taught	4.3	56.5	39.1	0.0	19.0
	12.5	23.6	16.4	0.0	
COLUMN TOTAL	8.0 6.6	55.0 45.5	55.0 45.5	3.0 2.5	121.0 100.0

<u>CHI-SQUARE</u>	<u>D.F.</u>	<u>SIGNIFICANCE</u>	<u>MIN E.F.</u>	<u>CELLS WITH E.F. < 5</u>
3.50414	6	0.7434	0.570	6 OF 12 (50.0%)

NUMBER OF MISSING OBSERVATIONS = 1

APPENDIX G

Year of First Full-time Employment

Employment Status	Date of Employment										Total Un-emp.	
	79	80	81	82	83	84	85	86	87	Other		
Currently Teaching	1	0	5	4	7	5	22	21	4	3	1	73
Left Teaching	1	0	4	4	5	3	6	1	1	0	1	26
Never Taught	1	0	0	2	1	2	4	5	1	4	3	23
	3	0	9	10	13	10	32	27	6	7	5	122

Dates of Graduation of All Groups

Employment Status	Dates of Graduation										Total
	79	80	81	82	83	84	85	86	NA		
Currently Teaching	0	1	7	5	7	6	20	26	1		73
Left Teaching	0	0	4	6	3	5	6	0	2		26
Never Taught	1	0	1	3	0	5	2	10	1		23
Totals	1	1	12	14	10	16	28	36	4		122

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