LEADER BEHAVIOR OF BIOLOGY TEACHERS AND PRINCIPALS AND ITS RELATIONSHIP WITH PRESENT BIOLOGY CURRICULUM PRACTICES

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Preface

In the preliminary stages of this thesis the author worked in conjunction with three other individuals. In many ways this thesis is really one of a four part study of various biology curriculum factors. For further information the reader should check into the three studies listed below. All will be available at the Oklahoma State University Library in the near future.

Virgil Ackerson is conducting a study into the climate of the school and its affect on the biology teacher and the biology classroom and laboratory practices.

Terry McNeill is conducting a study into the attitudes of the biology teacher and its affect on the biology classroom and laboratory practices in the school.

Wilford Lee is conducting a study into the leader behavior of the high school principal and his affects on the attitudes of the biology teacher of the school.

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CHAPTER I

THE NATURE OF THE PROBLEM

Introduction

The purpose of this study was to investigate the relationship between the leader behavior of secondary school principals and biology teachers and the biology curriculum practices of those secondary schools. Teacher behavior in the classroom has long been recognized as being very important. Many of the earlier studies in education were concerned with the teacher-pupil interaction in the classroom (Anderson, 1939). The principal plays a key role as an educator. He has many roles to play as the leader and organizer of school activities, but the role as educational leader of the school is probably the most important one (Buell, 1964 and Henderson, 1966). The more essential education becomes to society the more important is its administration (Gregg, 1969).

Significance of the Study

In recent years, many educators have been concerned with the science curriculum. In 1959, the American Institute of Biological Sciences began a curricular study and developed the Biological Science Curriculum Study, to be referred to as BSCS (Grobman, 1969). During the development of this project Hurd (1961) was asked to write a study

of biological education in the United States. Using Hurd's study of biology as a basis, the curriculum study proceeded with their project. Hurd's book presented an exhaustive review of historical data as well as some achievement and learning studies. However, many factors of the school environment were not included. There is a great need for statistical research on those factors in high school that may affect the biology curriculum.

Definition of Terms

1. BLAC: Refers to the Biology Laboratory Activity Checklist used to determine the laboratory practices of the biology class.

2. BCAC: Refers to the Biology Classroom Activity Checklist used to determine the classroom activities of the biology class.

3. LBDQ: Refers to the Leader Behavior Description Questionnaire used to type the secondary school principal.

4. TLBDQ: Refers to the modified Leader Behavior Description Questionnaire used to type the secondary school biology teacher.

5. Biology teachers: Full time and/or part time certified secondary school biology teachers.

6. Teachers: Full time and/or part time certified secondary school teachers.

7. Principals: The administrator who is the leader of the school where the biology teachers and teachers are employed. As an administrator, he utilizes or maintains existing structures or procedures in order to attain organizational goals.

8. Initiating Structure: A subtest of the LBDQ which refers to the leader's behavior in delineating the relationship between himself

and the members of his work group, and in endeavoring to establish well-defined patterns of organization, channels of communication and methods of procedure (Halpin, 1959).

9. Consideration: A subtest of the LBDQ which refers to behavior indicative of friendship, mutual trust, respect, and warmth in the relationship between the leader and the members of his staff. (Halpin, 1959).

10. Type 1 Principal or Biology Teacher: An individual who ranks high in both the Consideration and Initiating Structure dimensions of leader behavior as measured by the LBDQ or TLBDQ.

11. Type 2 Principal or Biology Teacher: An individual who ranks high in the Consideration dimension and low in the Initiating Structure dimension of leader behavior as measured by the LBDQ or TLBDQ.

12. Type 3 Principal or Biology Teacher: An individual who ranks low in the Consideration dimension and high in the Initiating Structure dimension of leader behavior as measured by the LBDQ or TLBDQ.

13. Type 4 Principal or Biology Teacher: An individual who ranks low in both the Consideration and Initiating Structure Dimensions of leader behavior as measured by the LBDQ or TLBDQ.

14. Biology Curriculum Practices: Includes all activities used in conjunction with the curriculum content in the biology classroom and laboratory.

Statement of the Problem

Two problems have been identified for this study: 1) Is there a relationship between the secondary school biology students' perceptions of present biology curriculum practices and the leader behavior of

their biology teachers? a) Is there a relationship between the secondary school biology students' perceptions of present biology curriculum practices and the leader behavior of their principal?

Assumptions

The following assumptions were made during the conduct of the study: 1) That the responses of the biology students to the BLAC accurately reflect their perceptions of the present laboratory practices within their school, 2) That the responses of the biology students to the BCAC accurately reflect their perceptions of the present classroom practices within their school, 3) That the responses of the biology students to the TLBDQ accurately reflect their perceptions of the leader behavior of their biology teacher, 4) That the responses of the teachers to the LBDQ accurately reflect their perceptions of the leader behavior of their principal.

Statement of the Hypotheses

H_1 The type of laboratory practices in the secondary school biology class will not differ significantly among the types of biology teacher leader behavior.

H_{1a} The type of laboratory practices in the secondary school biology class will not differ significantly between high and low Initiating Structure of biology teachers.

H_{1b} The type of laboratory practices in the secondary school biology class will not differ significantly between high and low Consideration of biology teachers.

H_2 The type of classroom practices in the secondary school biology

classes will not differ significantly among the types of biology teacher leader behavior.

H_{2a} The type of classroom practices in the biology class will not differ significantly between high and low Initiating Structure of biology teachers.

H_{2b} The type of classroom practices in the biology class will not differ significantly between high and low Consideration of biology teachers.

H_3 The type of laboratory practices in the secondary school biology classes will not differ significantly among the types of principal leader behavior.

H_{3a} The type of laboratory practices in the biology class will not differ significantly between high and low Initiating Structure of principals.

H_{3b} The type of laboratory practices in the biology class will not differ significantly between high and low Consideration of principals.

H_4 The type of classroom practices in the secondary school biology classes will not differ significantly among the types of principal leader behavior.

H_{4a} The type of classroom practices in the biology class will not differ significantly between high and low Initiating Structure of principals.

H_{4b} The type of classroom practices in the biology class will not differ significantly between high and low Consideration of principals.

Limitations of the Study

This study is limited by the inherent weakness of the instrumentation. Inventory type instruments do not require subjects to perform at their maximum levels and subjects may give false or dishonest responses if they feel coerced or wish to make a desired impression or if they lack sufficient insight to make objective responses concerning their behavior.

The findings of this study should be limited to the population from which the sample was selected.

CHAPTER II

A SELECTED REVIEW OF THE LITERATURE

Introduction

There are many studies dealing with leadership and leader behavior and with high school biology curriculum practices. However, no study has been located that deals with the relationship of the two. In order to investigate this relationship, it is necessary to survey some of the existing knowledge in these areas.

Biology Curriculum Practices

Before the turn of the century, biology as we know it today did not exist. Instead, the secondary school usually taught botany, zoology, and physiology (Barnes, 1966). Kochendorfer (1966) feels that several trends in secondary school biology curriculum practices have taken place. From about 1890-1900 the major role of textbook writing was taken care of by the scientists. Schools grew rapidly for the next thirty years and created a need for more teachable textbooks, particularly for the terminal students. This resulted in educators writing an increased number of the biology textbooks. While these texts seemed to meet the needs and abilities of the students, they began to get further and further behind the activities of the scientific community. During the 1950's the importance of the role of the scientists became apparent and large teams of scientists and educators collaborated to

write new textbooks. These groups were aided by large amounts of federal funds to implement ideas that were thought to be psychologically and scientifically sound. This cooperation between high school biology teachers, educational theorists, and scientists resulted in a greater degree of agreement concerning the needs and goals of students than had ever been in evidence before. The fact that this group produced the BSCS curriculum materials and made the benefits of this collaboration available to the students has in effect removed many question marks from the preceding model. It remains to be seen if the agreement of this group is going to affect the classroom teacher's conception of course goals and whether his teaching practices are going to be in accord with those recommended by BSCS.

Blankenship (1965) studied teacher attitudes towards BSCS and found those teachers who ranked high in independent thought and action reacted favorably to the BSCS program. Kochendorfer (1966) found that teachers with experience in the BSCS program are more likely to have classroom practices that correspond to BSCS objectives than teachers with little or no experience in the program. Barnes (1966) found that teachers with experience in the BSCS program are more likely to have laboratory work developed according to BSCS objectives than teachers with little or no experience in the program.

Teacher Leader Behavior

Teacher behavior in the classroom has long been recognized as being very important. A great share of the earlier studies were concerned with the interaction between the teacher and the pupils in the classroom (Anderson, 1939). Later, studies by Jayne (1945) and Morsh

(1956) were concerned with the relationship between teacher behavior and teacher effectiveness. Giving further emphasis to the importance of studying teacher behavior is the following statement by Medley and Mitzel (1959): "the problem of relating behavior of teachers to effects on pupils is crucial not only to further research in teacher effectiveness, but to the future of education itself."

Withall (1961) found that teacher-pupil relationships seem to improve if teachers display a genuine interest in the pupils by listening to them and responding thoughtfully to their questions. Whithall's (1963) results were backed up by one of his later studies and subsequent studies by Cogan (1963).

Flanders (1967) indicates that the behavior of the teacher, more than any other individual, sets the climate of the class. Medley (1963) feels that if a teacher has any impact on the pupils classroom learning, it will be through his behavior in the classroom. Goldberg (1968) found that pupils perceive different kinds of teachers' behaviors differently and this differential in perception influences the amount of school work performed. Teacher behavior then, may influence the learning process.

Is the teacher behavior discussed in the teacher-pupil relationship studies the equivalent of teacher leader behavior? Halpin (1966) feels they are different names for the same behavior as evidenced by the following statement:

> The behavior of the leader and the behavior of group members are inextricably interwoven --- For example, Mary Noel, fourth-grade teacher is the formally designated leader of the children in her class. How she behaves as a leader is influenced by the behavior of the children.

What is meant by leader behavior? Halpin (1966) discusses two

specific dimensions of leader behavior, Initiating Structure and Consideration. Initiating Structure refers to the leader's behavior in distinguishing the relationship between himself and members of the work group, and in establishing well-defined patterns of organization, channels of communication, and methods of procedure. Basically then, Initiating Structure means the leader is concerned with the performance of individuals on his staff, the quality of work they do, and expects everything to be done on schedule. Consideration refers to behavior indicative of friendship, mutual trust, respect, and warmth in the relationship between the leader and the members of his staff. As an example of Consideration, a leader tends to develop a more personal relationship with his staff and will help them in various ways to the extent of doing personal favors.

McBeath and Andrews (1960) did a study of teacher leader behavior and teacher effectiveness. They found when teacher Consideration and Initiating Structure was greater than average, the teachers were generally effective; when the teacher leader behavior was less than average, the teachers were generally ineffective. They also found that students rated the effectiveness of the teacher closer to Consideration than to Initiating Structure. Greenfield and Andrews (1961) found teachers showing a high degree of leadership tend to induce high achievement in their pupils. Also Initiating Structure as a dimension of leadership is more strongly related to pupil growth than in the Consideration dimension.

Principal Leader Behavior

Logsdon (1964) believes the principal plays a key role as an

educational leader as determined from the following statement:

> From the beginning, a principal's duties involved the most important parts of the educational process. He has always been concerned with pupils, learning materials, and teaching methods. It became easy to say "As is the principal, so is the school."

Other educators feel the principal has many roles to play as the leader and organizer of school activities, but the role as educational leader of the school is the most important one (Buell, 1964 and Henderson, 1966). Hoedt and Rothney (1963) studied the relationship of principals' attitudes toward an educational program and the success of the program. They concluded that a program may not make much headway unless the principal is an active supporter. They also felt that the attitudes of the principal may have more influence upon a program than the attitudes of any other individual. Jacobs (1965) found the leader behavior of principals as related to the number of educational innovations in their schools to be significantly different. The principals who represented the highly innovative schools rated higher on both Initiating Structure and Consideration than those principals with lower numbers of innovations in their schools.

Another important part of the principals' leader behavior is its effect on the teachers' behavior. Petersen (1966) feels that a teacher's opinion of himself affects the students in his classroom. She felt that principals could help teachers to grow in self-esteem by giving them trust, respect, and encouragement to try new ideas. Keeler and Andrews (1963) found that the leader behavior of the principal as perceived by his staff is related to the productivity of the school. The greater the principal leader behavior is above average, the greater the productivity of the school. Chase (1953) found that the teacher's

ratings of their superintendents, principals, and supervisors were related to their satisfaction with the school system in which they were working. He found that enthusiastic teachers had a tendency to rank their supervisors high, while the dissatisfied teachers were likely to rank their supervisors low.

The Rationale

In order to meet the needs of society, the school must be a dynamic and innovative structure capable of constant change. This type of structure demands a dynamic form of leadership. The instructional leader in secondary education is the principal (Coffee, 1968). Glen F. Ovard (1966), in his text on secondary school administration, states:

> The principal is the key person through which educational change can occur. In a society of change, the principal must be an innovator . . . he must evaluate all proposals for change.

The effective principal is an effective leader (Coffee, 1968). A distinction can be made between an educational leader and an administrator. To lead is to initiate new procedures as a part of the process of problem-solving through which an organization attempts to accomplish its goals and objectives (Hemphill, 1958). An administrator is an individual who uses existing procedures to achieve organizational goals or objectives (Lipham, 1964). An administrator is concerned with maintaining objectives and goals while an educational leader is concerned with changing them.

Preston and Heintz (1949) studied types of leadership most effective in group attitude changes, and found participatory to be more effective than supervisory. Hare (1953) substantiated their findings

in a later study. A participatory leader is much the same as the Type I principal or teacher as defined earlier. He is friendly, has open lines of communication, but also maintains high standards of work and emphasizes the meeting of deadlines.

From the review of the literature then, the Type I leader is an important factor in education. Principals with this type of leader behavior have been instrumental in innovating educational change and teachers with this type of leader behavior have been more effective and induced greater achievement in their pupils.

Educational theorists since the turn of the century, have been suggesting that the problem-solving or inquiry approach be used in science laboratories (Twiss, 1917; Hunter, 1934; Richardson, 1957; Burnett, 1957; Rutledge, 1966; Hurd, 1961; Glass, 1962; Schwab, 1952). During this same period, there has been much criticism of teachers using the laboratory for other purposes and for making the laboratory work mere formality. In the past decade, the public school curriculum was in a state of revision. During this time, the science and mathematics programs in particular changed greatly.

New curricula for all the mathematics and sciences were developed. In the biological science area the BSCS introduced three separate versions. A statement appearing in the BSCS Newsletter 17 (1963) reports the intent of the BSCS writers:

> . . . The writers seek to teach science as a way of thinking--as a method of seeking answers. To do this, they stress underlying concepts and understandings. Student work is centered in the laboratory, where real problems are explored; open ended experiments and other materials are used as the media for conveying an understanding of science. Through emphasis of basic concepts and the illustration of such concepts in many ways, the student is given practice in drawing generalizations, in seeking relationships, and in finding his own answers.

From the literature reviewed, it has been shown that principals high in Consideration and Initiating Structure have been supportive of problem solving situations. Principals high in both of these dimensions have been shown to support new curricular programs. Therefore, it seems reasonable to assume that the leader behavior of the principal may be related to the biology curriculum practices in a school.

Teachers high in Consideration and Initiating Structure have been shown to be more effective and instrumental in inducing high achievement in their pupils. Therefore, it seems reasonable to assume that the leader behavior of the teacher would be related to the biology curriculum practices in a school.

CHAPTER III

PROCEDURES FOR THE STUDY

Instruments Used in the Study

Biology Classroom Activities Checklist

The Biology Classroom Activities Checklist (BCAC) (Kochendorfer, 1968) was used to assess the type of classroom practices in the sample schools. The instrument is made up of fifty-three items that can be classified into seven areas: 1) Role of the teacher in the classroom, 2) Student classroom participation, 3) Use of textbook and reference materials, 4) Design and use of tests, 5) Laboratory preparation, 6) Type of laboratory practices, and 7) Laboratory follow-up practices. The instrument is designed so that the individual's response to each item is true or false.

The items for the checklist were based on a list of teaching practices that were judged to contribute positively toward the attainment of BSCS objectives. Of the fifty-three items on the BCAC, twenty-seven were judged as describing practices that contribute negatively toward the attainment of BSCS objectives and twenty-six were judged as describing positive practices. These items were submitted to a panel of judges of which each individual was either a BSCS staff consultant, a member of the BSCS committee, or a member of the BSCS writing team. Correlations between the author's opinion and the judges opinion ranged

from +.95 to +.88.

Reliability and validity data were collected as this checklist was administered to over 1200 students of sixty-four teachers. The reliability coefficient was computed as .96. The validity coefficient was computed by two methods as .84.

The checklist is scored by adding the positive responses on the pro-BSCS items and the negative responses on the con-BSCS items. The possible range of scores would be from zero to fifty-three or it could be based on percentages from zero to one hundred. Higher scores indicate classroom practices that tend to conform to the objectives of the BSCS curriculum.

Biology Laboratory Activity Checklist

The Biology Laboratory Activity Checklist (BLAC) (Barnes, 1968) was used to assess the type of laboratory instruction in the sample schools. This instrument is composed of sixty items that can be classified into four areas: 1) Pre-laboratory practices, 2) Laboratory practices, 3) Post-laboratory practices, and 4) General reaction to the laboratory. The instrument is designed so that the individual's response to each item is true or false. The items for the checklist were taken from BSCS materials and were constructed to include laboratory practices that were judged to contribute positively to BSCS objectives and laboratory practices that were judged to contribute negatively to BSCS objectives. The items were then submitted to a panel of judges who were familiar with the BSCS objectives, rationale, and laboratory practices. These judges included BSCS consultants, college biologists, high school biology teachers, and science supervisors.

Barnes (1968) feels the validity is based upon two points:

> 1) that each item is based upon statements by individuals who participated in the development of the BSCS program, and 2) that each item was verified by a panel of judges who were thoroughly familiar with the BSCS program.

Barnes (1966) ran a pilot study on two classes for each of five biology teachers. He analyzed the results with a t-test and found they were significant indicating that the two separate groups of students for each teacher did not disagree about the type of laboratory practices used by their respective teachers.

The checklist is scored by adding the positive responses of the pro-BSCS items and the negative responses of the con-BSCS items. The possible range of scores is from zero to sixty. Higher scores indicate laboratory practices that tend to conform to the objectives of the BSCS curriculum.

Leader Behavior Description Questionnaire

The Leader Behavior Description Questionnaire (LBDQ) was developed at Ohio State University as a project of the Ohio State leadership studies. Hemphill and Coons (1957) constructed the original form of the LBDQ, Halpin and Winer (1952) adapted the instrument and identified Initiating Structure and Consideration as the two fundamental dimensions. These two dimensions were identified by the factor analysis of responses of B-29 crew members describing the leader behavior of their aircraft commanders. In later research Halpin (1953) reported the most effective leaders were those who exhibited a high instance of both characteristics and scored highly on both dimensions. The reliability is estimated by the split-half method to be .83 for Initiating Structure

and .92 for Consideration (Halpin, 1957).

Evenson (1959) reports that teachers within each of forty secondary schools agreed among themselves in describing the behavior of the principal on both the Initiating Structure and Consideration dimensions which indicates the validity of the instrument. The basic data for the analysis of the principals came from twelve scores for each of them.

There are forty items in the instrument, fifteen for the Initiating Structure dimension, fifteen for the Consideration dimension, and ten are buffer items. The items are short, descriptive statements of ways which leaders may behave. The items are scored by the frequency with which the leader engages in the various types of behavior by checking one of five choices: always, often, occasionally, seldom or never. Each item is scored on a scale from zero to four, therefore, the possible ranges of scores on each dimension is from zero to sixty.

Teacher Leader Behavior Description Questionnaire

The Teacher Leader Behavior Description Questionnaire (TLBDQ) is an adaptation of the LBDQ (McBeath and Andrews, 1960). The dimensions of this instrument are the same as those for the LBDQ, and it contains the same number of items. The items have been modified so they can be used specifically for teachers (see Appendix A). Basically, this is the same instrument as the LBDQ.

Division of the Leaders into Four Types

Halpin (1958) pointed out that the Initiating Structure and Consideration are the fundamental dimensions of Leader Behavior and the most effective leaders are those who score high on both dimensions.

he also noted that four types of leaders could be identified using the two dimensions of the LBDQ. In a later study Peoples (1964) described four types of principals. These four types of principals were based on the scores from the two dimensions of the LBDQ. A Type 1 principal ranked high in both dimensions of the LBDQ. A Type 2 principal ranked high in Consideration and low in Initiating Structure. A Type 3 principal ranked low in both dimensions. A Type 4 principal ranked high in Initiating Structure and low in Consideration. Figure 1 illustrates how these types of leader behavior are determined.

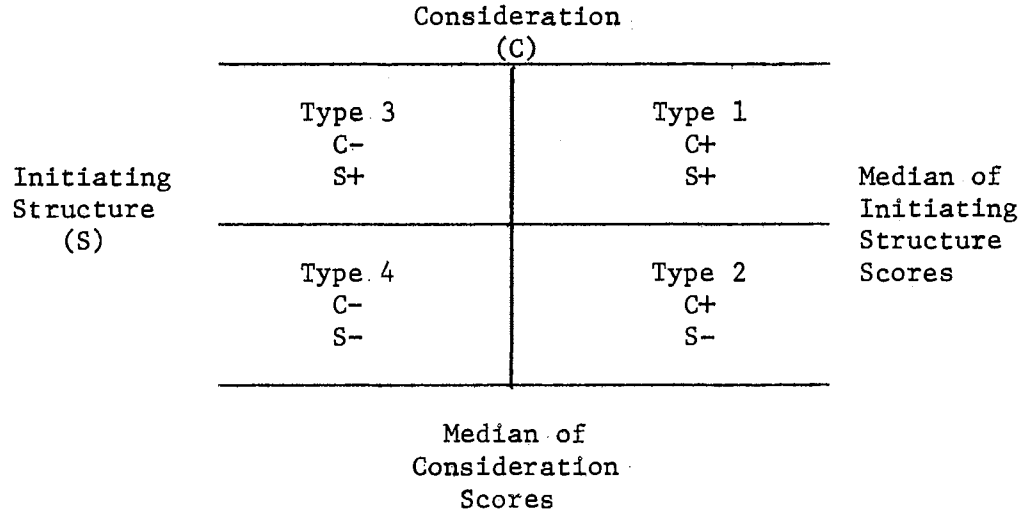

Figure 1. A quandrant scheme for describing Leader Behavior on the Initiating Structure and Consideration dimensions. (Halpin, 1966)

The description of the types of leaders in each quadrant in Figure 1 is taken from Peoples (1964) as follows:

1. Type 1 Teacher or Principal: This leader is perceived as one who regards as important the personal feelings, attitudes, and needs of teachers and at the same time he maintains highly structured organization. For example, he is friendly, does personal favors for his group members, and takes time to listen to the group members. However, he keeps definite performance standards, criticizes poor work, and emphasizes the meeting of deadlines.

2. Type 2 Teacher or Principal: This leader is similar to Type 1 but he tolerates a very loose organization. For example, he never assigns group members to a specific task and he never coordinates the work of the group members.

3. Type 3 Teacher or Principal: This leader differs from Type 1 in that he rarely shows warmth in relationships with group members. He does do personal favors for group members but he never consults them regarding important decisions.

4. Type 4 Teacher or Principal: This leader possesses characteristics of both Type 2 and Type 3 leaders. He has little concern for motives of group members and is impersonal. Also, he never coordinates work of the group and never makes specific assignments.

Since other researchers have found it feasible to group leaders into four different types, it was decided to divide the leaders of this sample into four different types.

The four Types of leaders in the present sample were designated as follows (see Figure 1): Type 1 scored above the mean on both Initiating Structure and Consideration. Type 2 scored below the mean on Initiating Structure and above the mean on Consideration. Type 3 scored above the mean on Initiating Structure and below the mean on

Consideration. Type 4 scored below the mean on both Initiating Structure and Consideration. The means are based upon the total sample of teachers and principals respectively.

Sample Selection

The population for this study was taken from Oklahoma high schools located within an eighty-mile radius of Stillwater, excluding communities with populations less than one thousand residents and more than fifty thousand residents as indicated by the 1960 U.S. census (1960). The schools in the sample offered sophomore biology. Thirty schools were randomly picked from this population to serve as the sample for this study. The teachers were included in the study to assess leader behavior of the principal. Two sections of biology students for each biology teacher were used to assess the biology curriculum practices and the teacher leader behavior.

Data Collection

During a conference with each superintendent the author and associates discussed the general outline of the study and scheduled a day for the administration of the instruments. The LBDQ was administered to the teachers. If possible, two sections of biology were used for each biology teacher. One section used the BLAC and TLBOQ and the other section used the BCAC and TLBOQ. If the school had only one section of biology all of the instruments were given to that class.

A cover sheet accompanied each instrument which asked for certain demographic data (see Appendix B) such as sex, age, and classification for possible use in the analysis of the instrument data.

Treatment of the Data

Scoring the Instruments

The teachers; responses to the Leader Behavior Description Questionnaire, and the students' responses to the Biology Laboratory Activities Checklist, Biology Classroom Activities Checklist, and Teacher Leader Behavior Description Questionnaire were hand scored and double checked by the author and associates as per instructions by the authors of the instruments.

The personal data of the students and personal and professional data for each individual teacher and principal were compiled by the author and associates.

CHAPTER IV

PRESENTATION AND ANALYSIS OF THE DATA

Introduction

The instruments were administered to the students and faculty of thirty senior high schools that offered at least one section of laboratory biology in the sophomore year.

Testing the Hypotheses

Each major null hypothesis and its two null subhypotheses were tested as a group using the Multiple-Classification Analysis of Variance. Since the common level of significance is $p = .05$, the author rejected all null hypotheses at this level.

> H_1 The type of laboratory practices in the secondary school biology class will not differ significantly among the types of biology teacher leader behavior.

As shown in Table I, the computation of the analysis of variance for this hypothesis yielded an F-value of 3.55. Using 1 and 30 degrees of freedom the F-value was not significant. Therefore, the hypothesis cannot be rejected.

> H_{1a} The type of laboratory practices in the secondary school biology class will not differ significantly between high and low Initiating Structure of biology teachers.

The calculated F-value for this hypothesis is 1.95. Using 1 and 30 degrees of freedom, the F-value is not significant. Therefore, the hypothesis cannot be rejected (see Table II).

TABLE I

SUMMARY DATA AND ANALYSIS OF VARIANCE DATA FOR THE RELATIONSHIP BETWEEN TEACHER TYPES AND BIOLOGY STUDENTS' PERCEPTIONS OF BIOLOGY LABORATORY PRACTICES

	Teacher Type			
	1	2	3	4
Number	7	10	10	7
Mean BLAC Scores	33.58	31.13	28.80	27.43
Variance	17.01	5.17	1.74	2.18

Source	df	ss	ms	F	p
Consideration (Rows)	1	129.13	129.13	21.85	$p>.001$
Initiating Structure (Columns)	1	11.55	11.55	1.95	$.20<p<.10$
Teacher Type (Interaction)	1	21.00	21.00	3.55	$.10<p<.05$
Within	30	177.39	5.91		
Total	33	339.07			

TABLE II

SUMMARY DATA AND ANALYSIS OF VARIANCE DATA FOR THE RELATIONSHIP BETWEEN TEACHER INITIATING STRUCTURE AND BIOLOGY STUDENTS' PERCEPTIONS OF BIOLOGY LABORATORY PRACTICES

	Teacher Initiating Structure	
	High	Low
Number	17	17
Mean BLAC Scores	30.77	29.60
Variance	13.23	7.24

Source	df	ss	ms	F	p
Consideration (Rows)	1	129.13	129.13	21.85	$p>.001$
Initiating Structure (Columns)	1	11.55	11.55	1.95	$.20<p<.10$
Teacher Type (Interaction)	1	21.00	21.00	3.55	$.10<p<.05$
Within	30	177.39	5.91		
Total	33	339.07			

H_{1b} The type of laboratory practices in the secondary school biology class will not differ significantly between high and low Consideration of biology teachers

The calculated F-value for this hypothesis is 21.85. Using 1 and 30 degrees of freedom, the F-value is significant (see Table III). Therefore, the null hypothesis is rejected. The laboratory practices of biology teachers with high Consideration differ significantly from the laboratory practices of biology teachers with low Consideration.

TABLE III

SUMMARY DATA AND ANALYSIS OF VARIANCE DATA FOR THE RELATIONSHIP BETWEEN TEACHER CONSIDERATION AND BIOLOGY STUDENTS' PERCEPTIONS OF BIOLOGY LABORATORY PRACTICES

	Teacher Consideration	
	High	Low
Number	17	17
Mean BLAC Scores	32.14	29.24
Variance	10.84	2.29

Source	df	ss	ms	F	p
Consideration (Rows)	1	129.13	129.13	21.85	$p>.001$
Initiating Structure (Columns)	1	11.55	11.55	1.95	$.20<p<.10$
Teacher Type (Interaction)	1	21.00	21.00	3.55	$.10<p<.05$
Within	30	177.39	5.91		
Total	33	339.07			

Table IV shows the correlation of Initiating Structure, Consideration, and BLAC. A t-test was calculated on the r = -.3030 correlation between Initiating Structure and BLAC. The t-value for this correlation was 1.80. Using 30 degrees of freedom, a t-value of 2.04 was needed for significance. This correlation therefore was not significant. The t-value for the correlation between Consideration and BLAC for r = .6465 was 4.79 which was significant.

TABLE IV

CORRELATION BETWEEN INITIATING STRUCTURE AND CONSIDERATION OF BIOLOGY TEACHERS AND THE BIOLOGY STUDENTS' PERCEPTIONS OF THE BIOLOGY LABORATORY PRACTICES

Teacher Leader Behavior	BLAC Scores	df	p
Initiating Structure	-.3030	32[a]	$.10 < p < .05$
Consideration	.6465	32	$p > .001$

[a]Used df of 30

H_2 The type of classroom practices in the secondary school biology classes will not differ significantly among the types of biology teacher leader behavior.

As shown by Table V, the calculated F-value for this hypothesis was .05, which is extremely non-significant. Therefore, the hypothesis of non-significance must be accepted.

TABLE V

SUMMARY DATA AND ANALYSIS OF VARIANCE DATA FOR THE RELATIONSHIP BETWEEN TEACHER TYPES AND BIOLOGY STUDENTS' PERCEPTIONS OF BIOLOGY CLASSROOM PRACTICES

		1	2	3	4
Number[a]		7	7	7	7
Mean BCAC Scores		30.65	27.89	26.62	24.25
Variance		9.23	7.35	4.95	.85
Source	df	ss	ms	F	p
Consideration (Rows)	1	102.88	102.88	18.31	$p > .001$
Initiating Structure (Columns)	1	45.56	45.56	8.11	$.01 < p < .005$
Teacher Type (Interaction)	1	.27	.27	.05	$p < .20$
Within	24	134.86	5.62		
Total	27	283.57			

[a]Six teachers were dropped for lack of sufficient data on the BCAC

H_{2a} The type of classroom practices in the biology class will not differ significantly between high and low Initiating Structure of biology teachers.

The calculated F-value for this hypothesis was 8.11. Using 1 and 24 degrees of freedom, the F-value is significant (see Table VI). Therefore, the null hypothesis is rejected. The classroom practices of biology teachers with high Initiating Structure differs significantly from the classroom practices of teachers with low Initiating Structure.

TABLE VI

SUMMARY DATA AND ANALYSIS OF VARIANCE DATA FOR THE RELATIONSHIP BETWEEN TEACHER INITIATING STRUCTURE AND BIOLOGY STUDENTS' PERCEPTIONS OF BIOLOGY CLASSROOM PRACTICES

	Teacher Initiating Structure	
	High	Low
Number[a]	14	14
Mean BCAC Scores	28.64	26.07
Variance	10.93	7.34

Source	df	ss	ms	F	p
Consideration (Rows)	1	102.88	102.88	18.31	$p > .001$
Initiating Structure (Columns)	1	45.56	45.56	8.11	$.01 < p < .005$
Teacher Type (Interaction)	1	.27	.27	.05	$p < .20$
Within	24	134.86	5.62		
Total	27	283.57			

[a]Six teachers droped for lack of sufficient data on the BCAC

H_{2b} The type of classroom practices in the biology class will not differ significantly between high and low Consideration of biology teachers.

The calculated F-value for this hypothesis was 18.31. Using 1 and 24 degrees of freedom, the F-value is significant (see Table VII). Therefore, the null hypothesis is rejected. The classroom practices of biology teachers with high Consideration differs significantly from the

classroom practices of teachers with low Consideration.

TABLE VII

SUMMARY DATA AND ANALYSIS OF VARIANCE DATA FOR THE RELATIONSHIP BETWEEN TEACHER CONSIDERATION AND BIOLOGY STUDENTS' PERCEPTIONS OF BIOLOGY CLASSROOM PRACTICES

	Teacher Consideration	
	High	Low
Number[a]	14	14
Mean BCAC Scores	29.27	25.44
Variance	9.27	4.18

Source	df	ss	ms	F	p
Consideration (Rows)	1	102.88	102.88	18.31	$p>.001$
Initiating Structure (Columns)	1	45.56	45.56	8.11	$.01<p<.005$
Teacher Type (Interaction)	1	.27	.27	.05	$p<.20$
Within	24	134.86	5.62		
Total	27	283.57			

[a]Six teachers dropped for lack of sufficient data on the BCAC

Table VIII shows the correlation of Initiating Structure, Consideration and BCAC. A t-test was calculated on the r = -.3257 correlation between Initiating Structure and BCAC. The t-value for this

correlation was 1.75. Using 26 degrees of freedom, a t-value of 2.06 was needed for significance. This correlation was not significant. The t-value for the correlation between Consideration and BCAC for r = .6039 was 3.86, which was significant.

TABLE VIII

CORRELATION BETWEEN INITIATING STRUCTURE AND CONSIDERATION OF BIOLOGY TEACHERS AND THE BIOLOGY STUDENTS' PERCEPTIONS OF THE BIOLOGY CLASSROOM PRACTICES

Teacher Leader Behavior	BCAC Scores	df	p
Initiating Structure	-.3257	26	$.10<p<.05$
Consideration	.6039	26	$p>.001$

H_3 The type of laboratory practices in the secondary school biology classes will not differ significantly among the types of principal leader behavior.

As shown by Table IX, the calculated F-value for this hypothesis was 1.15. This value is not significant, therefore, the null hypothesis must be accepted.

H_{3a} The type of laboratory practices in the biology class will not differ significantly between high and low Initiating Structure of principals.

The calculated F-value for this hypothesis is .96 (see Table X). Therefore, the null hypothesis must be accepted.

TABLE IX

SUMMARY DATA AND ANALYSIS OF VARIANCE DATA FOR THE RELATIONSHIP BETWEEN PRINCIPAL TYPES AND BIOLOGY STUDENTS' PERCEPTIONS OF BIOLOGY LABORATORY PRACTICES

	Principal Types			
	1	2	3	4
Number	10	5	5	10
Mean BLAC Scores	30.28	29.19	31.85	29.77
Variance	14.21	3.86	15.11	11.90

Source	df	ss	ms	F	p
Consideration (Rows)	1	2.18	2.18	.19	$p<.20$
Initiating Structure (Columns)	1	11.28	11.28	.96	$p<.20$
Principal Type (Interaction)	1	13.47	13.47	1.15	$p<.20$
Within	26	304.49	11.71		
Total	29	331.42			

TABLE X

SUMMARY DATA AND ANALYSIS OF VARIANCE DATA FOR THE RELATIONSHIP BETWEEN PRINCIPAL INITIATING STRUCTURE AND BIOLOGY STUDENTS' PERCEPTIONS OF BIOLOGY LABORATORY PRACTICES

	Principal Initiating Structure	
	High	Low
Number	15	15
Mean BLAC Scores	30.80	29.58
Variance	14.04	8.83

Source	df	ss	ms	F	p
Consideration (Rows)	1	2.18	2.18	.19	$p < .20$
Initiating Structure (Columns)	1	11.28	11.28	.96	$p < .20$
Principal Type (Interaction)	1	13.47	13.47	1.15	$p < .20$
Within	26	304.49	11.71		
Total	29	331.42			

H_{3b} The type of laboratory practices in the biology class will not differ significantly between high and low Consideration of principals.

The calculated F-value for this hypothesis is .19 (see Table XI). This F-value is far below the level of significance, so the hypothesis of no significance must be accepted.

TABLE XI

SUMMARY DATA AND ANALYSIS OF VARIANCE DATA FOR THE RELATIONSHIP BETWEEN PRINCIPAL CONSIDERATION AND BIOLOGY STUDENTS' PERCEPTIONS OF BIOLOGY LABORATORY PRACTICES

	Principal Consideration	
	High	Low
Number	15	15
Mean BLAC Scores	29.92	30.46
Variance	10.52	13.00

Source	df	ss	ms	F	p
Consideration (Rows)	1	2.18	2.18	.19	$p<.20$
Initiating Structure (Columns)	1	11.28	11.28	.96	$p<.20$
Principal Type (Interaction)	1	13.47	13.47	1.15	$p<.20$
Within	26	304.49	11.71		
Total	29	331.42			

Table XII shows the correlation between Initiating Structure and Consideration of principals and the BLAC. As shown, neither the Initiating Structure nor the Consideration of principals correlated with the BLAC.

TABLE XII

CORRELATION BETWEEN INITIATING STRUCTURE AND CONSIDERATION OF PRINCIPALS AND THE BIOLOGY STUDENTS' PERCEPTIONS OF THE BIOLOGY LABORATORY PRACTICES

Principal Leader Behavior	BLAC Scores	df	p
Initiating Structure	-.1285	28	$.50<p<.10$
Consideration	-.0645	28	$p<.50$

H_4 The type of classroom practices in the secondary school biology classes will not differ significantly among the types of principal leader behavior.

As shown by Table XIII, the calculated F-value for this hypothesis was .58. This value is not significant, therefore, the null hypothesis must be accepted.

TABLE XIII

SUMMARY DATA AND ANALYSIS OF VARIANCE DATA FOR THE RELATIONSHIP BETWEEN PRINCIPAL TYPES AND BIOLOGY STUDENTS' PERCEPTIONS OF BIOLOGY CLASSROOM PRACTICES

		Principal Types			
		1	2	3	4
Number[a]		8	5	5	8
Mean BCAC Scores		28.06	25.52	29.25	26.58
Variance		12.20	2.48	17.51	8.97
Source	df	ss	ms	F	p
Consideration (Rows)	1	1.79	1.79	.17	$p < .20$
Initiating Structure (Columns)	1	35.87	35.87	3.44	$.10 < p < .05$
Principal Types (Interaction)	1	6.06	6.06	.58	$p < .20$
Within	22	228.15	10.37		
Total	25	271.87			

[a]Four schools dropped for lack of sufficient data on the BCAC

H_{4a} The type of classroom practices in the biology class will not differ significantly between high and low Initiating Structure of principals.

This hypothesis approached significance. The F-value at the .05 level was 4.30 and the calculated F-value was 3.44 (see Table XIV). It was not significant however, and the null hypothesis had to be accepted.

TABLE XIV

SUMMARY DATA AND ANALYSIS OF VARIANCE DATA FOR THE RELATIONSHIP BETWEEN PRINCIPAL INITIATING STRUCTURE AND BIOLOGY STUDENTS' PERCEPTIONS OF BIOLOGY CLASSROOM PRACTICES

	Principal Initiating Structure	
	High	Low
Number[a]	13	13
Mean BCAC Scores	28.52	26.17
Variance	13.32	6.35

Source	df	ss	ms	F	p
Consideration (Rows)	1	1.79	1.79	.17	$p<.20$
Initiating Structure (Columns)	1	35.87	35.87	3.44	$.10<p<.05$
Principal Type (Interaction)	1	6.06	6.06	.58	$p<.20$
Within	22	228.15	10.37		
Total	25	271.87			

[a]Four schools dropped for lack of sufficient data on the BCAC

H_{4b} The type of classroom practices in the biology class will not differ significantly between high and low Consideration of principals.

The calculated F-value for this hypothesis was .17 (see Table XV). This value is far below the level of significance, and the null hypothesis must be accepted.

TABLE XV

SUMMARY DATA AND ANALYSIS OF VARIANCE DATA FOR THE RELATIONSHIP BETWEEN PRINCIPAL CONSIDERATION AND BIOLOGY STUDENTS' PERCEPTIONS OF BIOLOGY CLASSROOM PRACTICES

	Principal Consideration	
	High	Low
Number[a]	13	13
Mean BCAC Scores	27.08	27.61
Variance	9.60	12.91

Source	df	ss	ms	F	p
Consideration (Rows)	1	1.79	1.79	.17	$p<.20$
Initiating Structure (Columns)	1	35.87	35.87	3.44	$.10<p<.05$
Principal Type (Interaction)	1	6.06	6.06	.58	$p<.20$
Within	22	228.15	10.37		
Total	25	271.87			

[a]Four schools dropped for lack of sufficient data on the BCAC

Table XVI shows the correlation between Initiating Structure and Consideration of Principals and the BCAC. As shows, there is practically no correlation between Initiating Structure and Consideration of principals with the BCAC.

TABLE XVI

CORRELATION BETWEEN INITIATING STRUCTURE AND CONSIDERATION OF PRINCIPALS AND THE BIOLOGY STUDENTS' PERCEPTIONS OF THE BIOLOGY CLASSROOM PRACTICES

Principal Leader Behavior	BCAC Scores	df	p
Initiating Structure	.0764	24	$p<.50$
Consideration	-.0435	df	$p<.50$

A significant difference in the type of biology classroom and laboratory practice between biology teachers of high and low Consideration was found. Also, a significant difference in the type of biology classroom practice between biology teachers of high and low Initiating Structure was found. For a summary of the data involving different types of teachers, see Table XVII.

No significant difference in the biology classroom and laboratory practices as compared to various types of principals was found. For a summary of this data, see Table XVIII.

TABLE XVII

SUMMARY OF MEANS FOR SCHOOLS EMPLOYING DIFFERENT TYPES OF BIOLOGY TEACHERS

Teacher Type	Number of Schools		Mean* Initiating Structure		Mean* Consideration		Mean* BLAC	Mean* BCAC
	a	b	a	b	a	b		
1	7	7	44.79	45.32	42.10	42.02	33.58	30.65
2	10	7	38.75	39.56	41.75	42.26	31.13	27.89
3	10	7	43.61	43.61	36.68	36.05	28.80	16.62
4	7	7	38.45	38.69	33.16	34.15	27.43	24.25

*Means of the means for each school

a-Only schools with data for BLAC

b-Only schools with data for BCAC

TABLE XVIII

SUMMARY OF MEANS FOR SCHOOLS EMPLOYING DIFFERENT TYPES OF PRINCIPALS

Principal Type	Number of Schools		Mean* Initiating Structure		Mean* Consideration		Mean* BLAC	Mean* BCAC
	a	b	a	b	a	b		
1	10	8	43.69	44.38	47.33	47.06	30.28	28.06
2	5	5	35.02	35.03	45.43	46.05	29.19	25.52
3	5	5	43.37	43.37	40.55	40.55	31.85	29.25
4	10	8	33.34	33.08	38.94	38.55	29.77	26.58

*Means of the means for each school

a-Only schools with data for BLAC

b-Only schools with data for BCAC

CHAPTER V

SUMMARY OF FINDINGS AND IMPLICATIONS

Introduction

This study is based upon two major premises. 1) The leader behavior of the biology teacher may be related to the curriculum practices in the biology classroom and laboratory as perceived by the high school biology student. 2) The leader behavior of the principal may be related to the curriculum practices in the biology classroom and laboratory as perceived by the high school biology student. The leader behavior of the principal was assessed by the Leader Behavior Description Questionnaire, the teacher leader behavior by the Teacher Leader Behavior Description Questionnaire, and the biology curriculum practices by the Biology Classroom Activity Checklist and the Biology Laboratory Activity Checklist.

Summary of Findings

Each major hypothesis and its related sub-hypotheses were subjected to a multiple-classification analysis of variance to find significance between the means of data on each principal and biology teacher. Four analyses using the Pearson product-moment correlation equations were conducted between 1) Consideration and Initiating Structure of teachers and mean scores on the BLAC, 2) Consideration and Initiating Structure of teachers and mean scores on the BCAC, 3) Consideration and Initiating

Structure of principals and mean scores on the BLAC, and 4) Consideration and Initiating Structure of principals and mean scores on the BCAC.

The findings are as follows:

1. Mean BLAC and BCAC scores did not vary significantly among the four different types of biology teachers.

2. Mean BLAC scores of biology teachers with high Initiating Structure did not vary significantly from the mean BLAC scores of those with low Initiating Structure.

3. Mean BCAC scores of Biology teachers with high Initiating Structure vary significantly from the mean BCAC scores of those with low Initiating Structure.

4. Mean BLAC and BCAC scores of biology teachers with high Consideration vary significantly from the mean BLAC and BCAC scores of those with low Consideration.

5. Mean BLAC and BCAC scores did not vary significantly among the four different types of principals.

6. Mean BLAC and BCAC scores of principals with high Initiating Structure did not vary significantly from the mean BLAC and BCAC scores of those with low Initiating Structure.

7. Mean BLAC and BCAC scores of principals with high Consideration did not differ significantly from the mean BLAC and BCAC scores of those with low Consideration.

8. The correlation of the mean BLAC and BCAC scores with the Initiating Structure of Biology Teachers is not significant at the .05 level; however, they are significant negatively at the .10 level.

9. The correlation of the mean BLAC and BCAC scores with the

Consideration of Biology teachers is significant and positive. This means that a biology teacher with high Consideration will have a high BLAC or BCAC score in comparison to a biology teacher with low Consideration.

10. The correlation of the mean BLAC and BCAC scores with the Initiating Structure or Consideration of principals is essentially zero.

Implications

The rationale concerned with teacher leader behavior stressed the importance of the teacher in setting the climate of the classroom and aiding in pupil growth and achievement. It was assumed that the biology teacher would be responsible for the curriculum practices in the biology classroom and laboratory.

The main implication is the strong, consistent relationship between high Consideration of biology teachers and high BLAC and BCAC mean scores. This indicates that biology teachers that rank high in Consideration tend to have more inquiry-oriented classrooms and laboratories as perceived by their students than those biology teachers that rank low in Consideration.

Another implication is the relationship between Initiating Structure of biology teachers and BCAC mean scores. Apparently, biology teachers that rank low in Initiating Structure tend to have more inquiry-oriented classrooms as perceived by their students than those biology teachers that rank high in Initiating Structure. This relationship is apparent from the analysis of variance data and the negative correlation at the .10 level. The negative correlation indicates the apparent direction of the relationship.

Another implication is the lack of relationship between the Initiating Structure and Consideration of principals and mean BLAC and BCAC scores. This would indicate that the biology teacher is independent of the principal in determining the biology curriculum practices of the school. This is in agreement with the findings of Ackerson (1970). He found the biology teacher was independent not only of the principal, but also the rest of the faculty in the school.

Educators involved with the improving of learning might find the study of some value to them. Students rated the effectiveness of the teacher more closely to Consideration than to Initiating Structure (McBeath and Andrews, 1960). This study shows that Consideration is very closely related to an inquiry-oriented biology classroom or laboratory. This may give principals an idea of what to consider in teachers if they would like to start new or innovative programs in their schools. Teachers interested in trying an inquiry approach might benefit by realizing that being considerate of the students would greatly enhance the success of their new approach.

The implications of this study must be confined to the limitations stated earlier, and any generalizations made beyond these limitations must be made with care. Also the relationships established should not be considered in a cause and effect manner.

In summary, there are several implications that may be of use to the reader:

1. There is a positive relationship between Consideration of biology teachers and the biology curriculum practices of the school.

2. There is a negative relationship between Initiating Structure of biology teachers and the biology curriculum practices of the school.

3. There is no relationship between principal leader behavior and the biology curriculum practices of the school.

Suggestions for Further Research

Although this study of teacher leader behavior and biology curriculum practices produced some significant relationships, much more is unknown. A few questions for further study are as follows:

1. Are biology teachers considerate because they teach an inquiry-oriented biology class or do they teach an inquiry-oriented biology class because they are considerate?

2. Why is Initiating Structure of biology teachers related negatively to inquiry-oriented biology classes?

3. Is there a relationship between the leader behavior of any teachers and their specific curricular programs?

4. Are there perceptions of leader behavior other than those described by the LBDQ which may be related to biology curriculum practices?

5. Is there a relationship between leader behavior of elementary school teachers and the various curricular programs in these schools?

6. Is there a relationship between leader behavior of biology teachers and their attitudes towards the BSCS biology program?

7. Is there a relationship between the organizational climate of a school and the leader behavior of the biology teacher?

While there were no significant relationships between the leader behavior of principals and biology curriculum practices, there are still several questions to be answered in this area.

8. Are there perceptions of leader behavior other than those described by the LBDQ which may be related to curriculum practices in other areas as well as in biology?

9. Is the leader behavior of principals related to curriculum practices in other fields than biology?

10. How is the leader behavior of principals involved in aiding and developing innovations in curriculum programs in schools?

11. Is there a relationship between leader behavior of principals of elementary schools and the various curricular programs of those schools?

12. What, if any, affect does the leader behavior of principals have on the various curriculum practices in secondary schools?

These preceding twelve questions are but a few that could be raised. They indicate that educators have much to learn about the total educational process.

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APPENDIX A

INSTRUMENTS

FORM I

Introduction:

On the following pages is a list of items that may be used to describe the behavior of your supervisor. Each item describes a specific kind of behavior, but does not ask you to judge whether the behavior is desirable or undesirable. This is not a test of ability. It simply asks you to describe, as accurately as you can, the behavior of your supervisor.

DIRECTIONS:

a. READ each item carefully
b. THINK about how frequently the leader engages in the behavior described by the item.
c. DECIDE whether he always, often, occasionally, seldom or never acts as described by the item.
d. CROSS OUT one of the five letters following the item to show the answer you have selected.

A--Always B--Often C--Occasionally D--Seldom E--Never

Sample Question: Answer Sheet

1. He doesn't enjoy being a member of the group. 1. A B C D E

---

1. He does personal favors for group members.
2. He makes his attitudes clear to the group.
3. He does little things to make it pleasant to be a member of the group.
4. He tries out his new ideas with the group.
5. He acts as the real leader of the group.
6. He is easy to understand.
7. He rules with an iron hand.
8. He finds time to listen to group members.
9. He criticizes poor work.
10. He gives advance notice of changes.
11. He speaks in a manner not to be questioned.
12. He keeps to himself.
13. He looks out for the personal welfare of individual group members.
14. He assigns group members to particular tasks.

15. He is the spokesman of the group.

16. He schedules the work to be done.

17. He maintaines definite standards of performance.

18. He refuses to explain his actions.

19. He keeps the group informed.

20. He acts without consulting the group.

21. He backs up the members in their actions.

22. He emphasizes the meeting of deadlines.

23. He treats all group members as his equals.

24. He encourages the use of uniform procedures.

25. He gets what he asks for from his superiors.

26. He is willing to make changes.

27. He makes sure that his part in the organization is understood by group members.

28. He is friendly and approachable.

29. He asks that group members follow standard rules and regulations.

30. He fails to take necessary action.

31. He makes group members feel at ease when talking with them.

32. He lets group members know what is expected of them.

33. He speaks as the representative of the group.

34. He puts suggestions made by the group into operation.

35. He sees to it that group members are working up to capacity.

36. He lets other people take away his leadership in the group.

37. He gets his superiors to act for the welfare of the group members.

38. He gets group approval in important matters before going ahead.

39. He sees to it that the work of group members is coordinated.

40. He keeps the group working together as a team.

ANSWER SHEET

Form I

Name of Leader Being Described_____

Name of Group Which He Leads_____

A--Always B--Often C--Occasionally D--Seldom E--Never

1. A B C D E	21. A B C D E
2. A B C D E	22. A B C D E
3. A B C D E	23. A B C D E
4. A B C D E	24. A B C D E
5. A B C D E	25. A B C D E
6. A B C D E	26. A B C D E
7. A B C D E	27. A B C D E
8. A B C D E	28. A B C D E
9. A B C D E	29. A B C D E
10. A B C D E	30. A B C D E
11. A B C D E	31. A B C D E
12. A B C D E	32. A B C D E
13. A B C D E	33. A B C D E
14. A B C D E	34. A B C D E
15. A B C D E	35. A B C D E
16. A B C D E	36. A B C D E
17. A B C D E	37. A B C D E
18. A B C D E	38. A B C D E
19. A B C D E	39. A B C D E
20. A B C D E	40. A B C D E

FORM III

Introduction:

On the following pages is a list of items that may be used to describe the behavior of your teacher. Each item describes a specific kind of behavior, but does not ask you to judge whether the behavior is desirable or undesirable. This is not a test of ability. It simply asks you to describe, as accurately as you can, the behavior of your teacher. NO MARKS should be made in this booklet.

DIRECTIONS:

a. READ each item carefully.
b. THINK about how frequently the teacher engages in the behavior described by the item.
c. DECIDE WHETHER he always, often, occasionally, seldom or never acts as described by the item.
d. CROSS OUT one of the five letters on the answer sheet to show the answer you have selected for each item.

A--Always B--Often C--Occasionally D--Seldom E--Never

Sample Question: Answer Sheet

1. He doesn't enjoy being a member of the class 1. A B C D E

---

1. He does personal favors for class members.
2. He makes his attitudes clear to the class.
3. He does little things to make it pleasant to be a member of the class.
4. He tries out his new ideas with the class.
5. He acts as the real leader of the class.
6. He is easy to understand.
7. He rules with an iron hand.
8. He finds time to listen to class members.
9. He criticizes poor work.
10. He gives advance notice of changes.
11. He speaks in a manner not to be questioned.
12. He keeps to himself.
13. He looks out for the personal welfare of individual class members.
14. He assigns class members to particular tasks.

15. He is the spokesman of the class.

16. He schedules the work to be done.

17. He maintains definite standards of performance.

18. He refuses to explain his actions.

19. He keeps the class informed.

20. He acts without consulting the class.

21. He backs up the class members in their actions.

22. He emphasizes the meeting of deadlines.

23. He treats all class members as his equals.

24. He encourages the use of uniform procedures.

25. He gets what he asks for from his superiors.

26. He is willing to make changes.

27. He makes sure that his part in the organization is understood by class members.

28. He is friendly and approachable.

29. He asks that class members follow standard rules and regulations.

30. He fails to take necessary action.

31. He makes class members feel at ease when talking with them.

32. He lets class members know what is expected of them.

33. He speaks as the representative of the class.

34. He puts suggestions made by the class into operation.

35. He sees to it that class members are working up to capacity.

36. He lets other people take away his leadership in the class.

37. He gets his superiors to act for the welfare of the class members.

38. He gets class approval in important matters before going ahead.

39. He sees to it that the work of class members is coordinated.

40. He keeps the class working together as a team.

ANSWER SHEET

Form III

Name of Teacher Being Described_____

Name of Class Which He Teaches_____

A--Always B--Often C--Occasionally D--Seldom E--Never

1. A B C D E	21. A B C D E
2. A B C D E	22. A B C D E
3. A B C D E	23. A B C D E
4. A B C D E	24. A B C D E
5. A B C D E	25. A B C D E
6. A B C D E	26. A B C D E
7. A B C D E	27. A B C D E
8. A B C D E	28. A B C D E
9. A B C D E	29. A B C D E
10. A B C D E	30. A B C D E
11. A B C D E	31. A B C D E
12. A B C D E	32. A B C D E
13. A B C D E	33. A B C D E
14. A B C D E	34. A B C D E
15. A B C D E	35. A B C D E
16. A B C D E	36. A B C D E
17. A B C D E	37. A B C D E
18. A B C D E	38. A B C D E
19. A B C D E	39. A B C D E
20. A B C D E	40. A B C D E

FORM IV

INSTRUCTIONS:

The purpose of this checklist is to determine how well you know what is going on in your biology class. Each statement describes some laboratory activity. The activities are not judged as either good or bad. Therefore, this checklist is not a test and is not designed to grade either you or your teacher. You are to read each statement and decide if it describes the activities in your class. All answers should be recorded on the answer sheet. NO MARKS should be made in this booklet.

Sample Question: Answer Sheet

1. My teacher often takes class attendance. 1. T F

If the statement describes what occurs in your classroom, cross out the T (True) on the answer sheet; if it does not, cross out the F (False).

1. My teacher usually tells us step-by-step what we are to do in the laboratory.
2. We spend some time before every laboratory in determining the purpose of the experiment.
3. We often cannot finish our experiments because it takes so long to gather equipment and prepare solutions.
4. The laboratory meets on a regularly scheduled basis (such as every Friday).
5. We often use the laboratory to investigate a problem that comes up in class.
6. The laboratory usually comes before we talk about the specific topic in class.
7. Often our laboratory work is not related to the topic that we are studying in class.
8. We usually know the answer to a laboratory problem that we are investigating before we begin the experiment.
9. Members of our class are able to help in the preparation of upcoming laboratory exercises.
10. Our teacher usually explains what results we should expect from an investigation.
11. We are encouraged to read up on an experiment before we do it with hope of finding the answer.

12. Many of the experiments that are in the laboratory manual are done by the teacher or other students while the class watches.

13. The data that I collect are often different from data that are collected by the other students.

14. Our teacher is often busy grading papers or doing some other personal work while we are working in the laboratory.

15. During an experiment we record our data at the time we make our observations.

16. We are sometimes asked to design our own experiment to answer a question that puzzles us.

17. We often ask the teacher if we are doing the right thing in our experiments.

18. The teacher answers most of our questions about the laboratory work by asking us questions.

19. We spend less than one-fourth of our time in biology doing laboratory work.

20. We spend at least half of our time in biology doing laboratory work.

21. We never have the chance to try our own ways of doing the laboratory work.

22. Very little of our laboratory time is spent in the classification of specimens.

23. We work with a variety of equipment and materials in our laboratory activities.

24. Plastic (plaster, wood, etc.) models and wall charts are often used in our laboratory exercises.

25. We work with a variety of living plants, animals, and microbes.

26. We can usually answer most of our laboratory work questions by finding the answers in the textbook.

27. Our laboratory work consists primarily of the identification of the structures of various organisms.

28. The laboratory provides many opportunities in identifying and defining problems to be investigated.

29. Our experiments can almost always be completed in a single laboratory period.

48. We do not usually get the chance to repeat an experiment even when our first attempts were careless and sloppy.

49. We often make tables and draw graphs of data that we collect in our investigations.

50. We sometimes have to repeat an experiment in order to get the expected results.

51. We often present to the class our results and conclusions from an investigation.

52. We sometimes do an additional experiment because the data previously collected suggest a new question to us.

53. Our tests include many questions based on things that we have learned in the laboratory.

54. I feel that I gain a better understanding of the nature of scientific investigation as a result of the teacher's lectures than when I do experiments.

55. In many of our laboratory activities I do not actually feel that I am participating in real scientific investigations.

56. Our teacher feels that the laboratory is the most important part of our biology course.

57. I feel that I gain a better understanding of the nature of scientific investigation as a result of class discussions.

58. The students in our class feel that the laboratory is the most important part of our biology course.

59. I feel that I gain a better understanding of the nature of science because of my own investigations.

60. I feel that I gain a better understanding of the nature of science primarily as a result of classroom demonstrations by the teacher.

ANSWER SHEET

Form IV

Name of Teacher Being Described_____

Name of Class Which He Teaches_____

T--True F--False

1.	T	F	21.	T	F	41.	T	F
2.	T	F	22.	T	F	42.	T	F
3.	T	F	23.	T	F	43.	T	F
4.	T	F	24.	T	F	44.	T	F
5.	T	F	25.	T	F	45.	T	F
6.	T	F	26.	T	F	46.	T	F
7.	T	F	27.	T	F	47.	T	F
8.	T	F	28.	T	F	48.	T	F
9.	T	F	29.	T	F	49.	T	F
10.	T	F	30.	T	F	50.	T	F
11.	T	F	31.	T	F	51.	T	F
12.	T	F	32.	T	F	52.	T	F
13.	T	F	33.	T	F	53.	T	F
14.	T	F	34.	T	F	54.	T	F
15.	T	F	35.	T	F	55.	T	F
16.	T	F	36.	T	F	56.	T	F
17.	T	F	37.	T	F	57.	T	F
18.	T	F	38.	T	F	58.	T	F
19.	T	F	39.	T	F	59.	T	F
20.	T	F	40.	T	F	60.	T	F

FORM V

INSTRUCTIONS:

The purpose of this checklist is to determine how well you know what is going on in your biology class. Each statement describes some classroom activity. The activities are not judged as either good or bad. Therefore, this checklist is not a test and is not designed to grade either you or your teacher. You are to read each statement and decide if it describes the activities in your class. All answers should be recorded on the answer sheet. NO MARKS should be made in this booklet.

Sample Question	Answer Sheet
1. My teacher often takes class attendance.	1. T F

If the statement describes what occurs in your classroom, cross out the T (True) on the answer sheet; if it does not, cross out the F (False).

---

1. Much of our class time is spent listening to our teacher tell us about biology.
2. My teacher doesn't like to admit his mistakes.
3. If there is a discussion among students, the teacher usually tells us who is right.
4. My teacher often repeats almost exactly what the textbook says.
5. My teacher often asks us to explain the meaning of certain things in the text.
6. My teacher shows us that biology has almost all of the answers to questions about living things.
7. My teacher asks questions that cause us to think about things that we have learned in other chapters.
8. My teacher often asks questions that cause us to think about the evidence that is behind statements that are made in the textbook.
9. My job is to copy down and memorize what the teacher tells us.
10. We students are often allowed time in class to talk among ourselves about ideas in biology.
11. Much of our class time is spent in answering orally or in writing questions that are written in the textbook or on study guides.

12. Classroom demonstrations are usually done by students rather than by the teacher.

13. We seldom or never discuss the problems faced by scientists in the discovery of a scientific principle.

14. If I don't agree with what my teacher says, he wants me to say so.

15. Most of the questions that we ask in class are to clear up what the teacher or text has told us.

16. We often talk about the kind of evidence that is behind a scientist's conclusion.

17. When reading the text, we are expected to learn most of the details that are stated there.

18. We frequently are required to write out definitions to word lists.

19. When reading the textbook, we are always expected to look for the main problems and for the evidence that supports them.

20. Our teacher has tried to teach us how to ask questions of the text.

21. The textbook and the teacher's notes are about the only sources of biological knowledge that are discussed in class.

22. We sometimes read the original writings of scientists.

23. We are seldom or never required to outline sections of the textbook.

24. Our tests include many questions based on things that we have learned in the laboratory.

25. Our tests often ask us to write out definitions of terms.

26. Our tests often ask us to relate things we have learned at different times.

27. Our tests often ask us to figure out answers to new problems.

28. Our tests often give us new data and ask us to draw conclusions from these data.

29. Our tests often ask us to put labels on drawings.

30. My teacher usually tells us step-by-step what we are to do in the laboratory.

31. We spend some time before every laboratory in determining the purpose of the experiment.

32. We often cannot finish our experiments because it takes so long to gather equipment and prepare solutions.

33. The laboratory meets on a regularly scheduled basis (such as every Friday).

34. We often use the laboratory to investigate a problem that comes up in class.

35. The laboratory usually comes before we talk about the specific topic in class.

36. Often our laboratory work is not related to the topic that we are studying in class.

37. We usually know the answer to a laboratory problem that we are investigating before we begin the experiment.

38. Many of the experiments that are in the laboratory manual are done by the teacher or other students while the class watches.

39. The data that I collect are often different from data that are collected by the other students.

40. Our teacher is often busy grading papers or doing some other personal work while we are working in the laboratory.

41. During an experiment we record our data at the time we make our observations.

42. We are sometimes asked to design our own experiment to answer a question that puzzles us.

43. We often ask the teacher if we are doing the right thing in our experiments.

44. The teacher answers most of our questions about the laboratory work by asking us the questions.

45. We spend less than one-fourth of our time in biology doing laboratory work.

46. We never have the chance to try our own ways of doing the laboratory work.

47. We talk about what we have observed in the laboratory within a day or two after every session.

48. After every laboratory session, we compare the data that we have collected with the data of other individuals or groups.

49. Our teacher often grades our data books for neatness.

50. We are required to copy the purpose, materials, and procedures used in our experiments from the laboratory manual.

51. We are allowed to go beyond the regular laboratory exercise and do some experimenting on our own.

52. We have a chance to analyze the conclusions that we have drawn in the laboratory.

53. The class is able to explain all unusual data that are collected in the laboratory.

ANSWER SHEET

Form V

Name of Teacher Being Described_____

Name of Class Which He Teaches_____

T--True F--False

1.	T	F	21.	T	F	41.	T	F
2.	T	F	22.	T	F	42.	T	F
3.	T	F	23.	T	F	43.	T	F
4.	T	F	24.	T	F	44.	T	F
5.	T	F	25.	T	F	45.	T	F
6.	T	F	26.	T	F	46.	T	F
7.	T	F	27.	T	F	47.	T	F
8.	T	F	28.	T	F	48.	T	F
9.	T	F	29.	T	F	49.	T	F
10.	T	F	30.	T	F	50.	T	F
11.	T	F	31.	T	F	51.	T	F
12.	T	F	32.	T	F	52.	T	F
13.	T	F	33.	T	F	53.	T	F
14.	T	F	34.	T	F			
15.	T	F	35.	T	F			
16.	T	F	36.	T	F			
17.	T	F	37.	T	F			
18.	T	F	38.	T	F			
19.	T	F	39.	T	F			
20.	T	F	40.	T	F			

APPENDIX B

DEMOGRAPHIC DATA

Complete this form by checking or filling in the appropriate blanks.

SEX: ___Male ___Female **AGE:** _____

CLASSIFICATION: ___Freshman ___Sophomore ___Junior ___Senior

LIST PRESENT SCHEDULE OF COURSES:

1._____ 5._____

2._____ 6._____

3._____ 7._____

4._____ 8._____

EXTRACURRICULAR ACTIVITIES:

1. Sports

___Football ___Basketball ___Baseball ___Track ___Wrestling

Other_____

2. Fine Arts

___Band ___Chorus ___Glee Club ___Debate ___Drama (Plays)

Other_____

3. Clubs

___FFA ___FHA ___ETA ___T&I ___Science Club ___Pep Club

___Student Council

Other_____

Teachers' and Principals' Data Sheet:

Marital Status: ( ) single ( ) married ( ) widowed ( ) divorced

Sex: ( ) male ( ) female AGE: _____

Primary Teaching Area: #1_____ and #2_____

Teaching Experience: 1. (total)_____

2. (at this school)_____ 3. (in present teaching area)_____

4. (under present principal)_____ 5. (experience as principal)_____

Average Class Size: (use laboratory enrollment if separate from lecture)

( ) less than 15____ ( ) 16-20 ( ) 21-25 ( ) 26-30

( ) greater than 30___

Degrees: ( ) BS or BA ( ) BS or BA + 15 hrs. ( ) masters

( ) masters + 15 hrs. ( ) masters + 30 hrs. ( ) EdS

( ) EdD or PhD ( ) other (explain)_____

College Credit Hours in Science (approximate):

	Biology	Chemistry	Physics	Earth Science
1. Undergraduate	___	___	___	___
2. Graduate	___	___	___	___

Membership in Professional Organizations: (in order of preference)

If you are a biology teacher, have you attended any biology institutes in the past ten years? If so, list and indicate if BSCS oriented:

Class Schedule:

Sec. 1_____ Sec. 4_____

Sec. 2_____ Sec. 5_____

Sec. 3_____ Sec. 6_____

APPENDIX C

LBDQ, BLAC, AND BCAC SCORES FOR SCHOOLS

TEACHER LBDQ, BLAC, AND BCAC SCORES FOR THIRTY SCHOOLS

School Number	LBDQ Score		BLAC Score	BCAC Score
	Initiating Structure	Consideration		
1	35.23	39.46	31.96	----*
2	40.13	40.67	29.73	25.53
3	41.70	36.91	26.47	25.47
4	40.62	40.51	32.22	----*
5	37.17	41.94	31.17	----*
6	46.04	45.96	37.54	31.79
7	39.36	35.55	25.59	23.50
8	37.00	45.90	30.65	27.55
9	40.86	38.06	27.79	24.13
10	47.78	40.65	38.65	36.14
11	42.31	39.16	29.56	26.03
12	40.39	40.27	28.62	26.52
13	44.40	38.20	30.30	----*
14	42.83	44.13	29.82	28.84
15	39.82	37.89	28.04	25.29
16	43.76	29.75	28.80	25.29
17	39.02	31.91	25.96	23.57
18	38.35	35.83	28.30	24.71
19	43.32	33.88	28.44	24.00
20	38.59	39.77	27.82	----*
21	50.81	42.88	37.48	32.00
22	39.98	42.95	33.41	29.30
23	40.96	40.00	29.96	26.26
24	40.00	35.79	29.78	----*
25	45.00	37.79	29.41	24.39
26	42.65	38.06	26.91	28.28
27	42.90	40.50	31.97	30.63
28	42.22	40.56	29.63	27.77
29	31.75	22.88	26.55	23.11
30	44.71	39.44	29.70	27.40
31	44.42	36.79	30.27	29.00
32	39.86	43.24	35.50	33.40
33	39.57	42.78	30.71	26.64
34	43.80	36.90	28.17	29.33

*Not enough data for analysis.

PRINCIPAL LBDQ, BLAC, AND BCAC SCORES FOR THIRTY SCHOOLS

School Number	LBDQ Score		BLAC Score	BCAC Score
	Initiating Structure	Consideration		
1	42.91	49.18	31.96	----*
2	31.29	44.57	29.73	25.53
3	31.42	39.42	26.47	25.47
4	38.86	44.86	31.69	----*
5	21.90	31.90	37.54	31.79
6	44.93	48.36	25.59	23.50
7	44.93	44.13	30.65	27.55
8	42.60	44.07	27.79	24.13
9	39.64	41.18	38.65	36.14
10	47.32	48.82	29.04	26.28
11	37.00	37.71	30.30	----*
12	35.42	41.33	29.82	28.84
13	34.08	45.67	28.04	25.29
14	49.07	43.25	28.80	25.29
15	35.87	36.00	25.96	23.57
16	38.65	40.35	28.30	24.71
17	32.19	42.06	28.44	24.00
18	31.75	43.38	27.82	----*
19	44.57	50.71	37.48	32.00
20	30.29	36.76	33.41	29.30
21	38.42	47.25	29.96	26.26
22	38.86	40.57	29.60	24.93
23	49.90	44.80	26.91	28.28
24	46.53	39.47	30.80	29.20
25	32.45	45.09	26.55	23.11
26	40.69	47.69	29.70	27.40
27	39.29	42.71	30.27	29.00
28	38.92	45.92	35.50	33.40
29	42.31	36.15	30.71	26.64
30	40.16	49.68	28.17	29.33

*Not enough data for analysis.

VITA 3

Stephen Ray Hensley

Candidate for the Degree of

Doctor of Education

Thesis: LEADER BEHAVIOR OF BIOLOGY TEACHERS AND PRINCIPALS AND ITS RELATIONSHIP WITH PRESENT BIOLOGY CURRICULUM PRACTICES

Major Field: Higher Education

Biographical:

Personal Data: Born in Hays, Kansas, November 10, 1942, the son of Calvin M. and Phyllis Hensley.

Education: Graduated from Lenora High School, Lenora, Kansas, in May, 1960; received the Bachelor of Science degree from the Kansas State University, with a major in Physical Education, in June, 1964; received the Master of Science degree from Oklahoma State University, with a major in Natural Science, in May, 1968; completed the requirements for the Doctor of Education degree in July, 1971.

Professional Experience: Biology and Math Instructor at Hoxie High School, Hoxie, Kansas, 1964-1967; Assistant Instructor with the Education 4352 classes at the Oklahoma State University, Stillwater, Oklahoma, 1968-1969; Assistant Instructor with the Biology Department at the Oklahoma State University, Stillwater, Oklahoma, summer and fall, 1970-1971; Instructor with the Biology Department at the Fort Hays Kansas State College, Hays, Kansas, spring, 1971.