AN INVESTIGATION INTO THE RELATIONSHIP BETWEEN ORGANIZATIONAL CLIMATE AND THE BIOLOGY STUDENTS' PERCEPTION OF PRESENT BIOLOGY PRACTICES

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PREFACE

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

Stephen Hensley is conducting a study into the leader behavior of the principal and the biology teacher and its affect on the biology classroom and the 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 is to report the results of an investigation into the affect of authenticity (or openness) of the school climate on the biological curriculum practices as perceived by male and female high school biology students. All schools seem to have a personality or climate which is imparted by the leader (principal) and the followers (the teachers) interacting with each other. For example, in one school one may encounter an energetic, lively organization which is apparently achieving its goals but at the same time providing social needs satisfaction. In another high school one may find the exact opposite in that the morale is low and the organization is stagnant. The source or cause of the apparent climate of a high school is very difficult to pinpoint because of the interaction of so many compounding variables.

The Organizational Climate Description Questionnaire (25) was developed by Halpin and Croft to identify the climate of individual schools. This is achieved by the assessment of principal-teacher interactions and teacher-teacher interactions on eight dimensions. The following study is focused on the climate of the school and its affect on the biology curriculum practices.

Significance of the Study

There is a great need for statistical research on factors in the high school that may have some affect on the biology curriculum. Much concern has been expressed dealing with the science curriculum since 1955. One example is the Biological Science Curriculum Study (BSCS) (10) of the American Institute of Biological Sciences. In the development of the project Hurd (33) was asked to write a background study of biology in the United States. His book presents an exhaustive review of historical data including some achievement and learning studies. Using Hurd's commentary on biology as a basis, the BSCS proceeded on their project. Many of the factors in the school environment were not included in the review. It is hoped that this study will lead to a better understanding of the relationship between organizational climate and biology curriculum practices as perceived by the high school students.

Definition of Terms

Organizational Climate (23) -- the organizational personality that a school exhibits. Metaphorically, "personality" is to the individual what "climate" is to the organization. The school may be classified in any of six organizational climates ranging from the "open" climate to the "closed" climate.

Open Climate (23) -- the profile for the open climate describes a school situation where the teachers work well together without bickering and griping. The school is an energetic, lively organization which is moving toward its goals, but which is also providing satisfaction for the individuals social needs. Leadership acts emerge easily and appropriately as they are required. The group is not preoccupied exclusively with either task achievement or social-needs satisfaction but both are in balance. The behavior of the teachers and the principal is genuine, or "authentic."

Closed Climate (23) -- the profile for the closed climate describes a school situation where there is nothing going on achievement-wise. Some attempts are being made to move the organization, but they are met with apathy; they are not taken seriously by the group members. Simply stated, morale is low, and the organization seems to be stagnant. The behavior of the teachers and the principal is "inauthentic."

The Subtests -- the questionnaire is composed of sixty-four statements which describe or outline the behavior of the school in eight areas. These are described below with the first four pertaining to the teacher and the last four pertaining to the principal.

> Disengagement indicates that the teachers do not work well together. They pull in different directions with respect to the task; they gripe and bicker among themselves.
>
> Hindrance refers to the teacher's feeling that the principal burdens them with routine duties, committee demands, and other requirements which the teachers construe as unnecessary busy work.
>
> Esprit refers to "morale." The teachers feel that their social needs are being satisfied, and that they are, at the same time, enjoying a sense of accomplishment in their job.
>
> Intimacy refers to the teachers' enjoyment of friendly social relations with each other.
>
> Aloofness refers to behavior by the principal which is characterized as formal and impersonal. He "goes by the book" and prefers to be guided by the rules and policies rather than to deal with the teachers in an informal, face-to-face situation.

> Production Emphasis refers to behavior by the principal which is characterized by close supervision of the staff. He is highly directive and task-oriented.
>
> Thrust refers to behavior marked not by close supervision of the teachers, but by the principal's attempt to motivate the teachers through the example which he personally sets. He does not ask the teachers to give of themselves anything more than he willingly gives of himself; his behavior, though starkly task-oriented, is nonetheless viewed favorably by the teachers.
>
> Consideration refers to behavior by the principal which is characterized by an inclination to treat the teachers "humanly," to try to do a little something extra for them in human terms. (24)

Male High School Biology Students -- will include all male students attending biology classes taught in the sample high schools.

Female High School Biology Students -- will include all female students attending biology classes in the sample high schools.

High School Biology -- a course indicated by the school descriptions to be a one-year course in biology including laboratory. This is usually the course taken to satisfy the one unit of credit of laboratory science for the high school diploma.

Biological Curriculum Practices -- will include all activities used in conjunction with the curriculum content in the biology classroom and laboratory. For specific examples see Appendix A.

Statement of the Problem

The following problem has been identified for further study: Is there a relationship between male and female high school biology students' perceptions of present biology curriculum practices and the organizational climate of their school? Several studies in the past few years have upheld the validity (2,62) of the Organizational Climate Description Questionnaire in identifying the climate of high schools.

The affect that the climate may have upon the curriculum practices of the school as yet has not been the subject of a study. One variable, the organizational climate of the school, may have a relationship with the perceptions of biology curriculum practices present within the school.

Assumptions

The following assumptions will be made during the conduct of the study: 1) That the responses of the students to the Biology Laboratory Activities Checklist accurately reflect their perceptions of present laboratory practices within their school, 2) That the responses of the students to the Biology Classroom Activities Checklist accurately reflect their perceptions of present classroom practices within their school, and 3) That the responses to the OCDQ by the teachers and the principal of each school accurately reflects the organizational climate of the school in question.

Statement of the Hypotheses

The hypotheses to be investigated in this study are:

H_1 There is no significant relationship between male and female high school biology students' perceptions of biology laboratory practices in open climate schools and male and female high school biology students' perceptions of biology laboratory practices in closed climate schools.

H_{1a} There is no significant relationship between female high school biology students' perceptions of biology laboratory practices in open climate schools and female high school biology students' perceptions of biology laboratory practices in closed climate schools.

H_{1b} There is no significant relationship between male high school biology students' perceptions of biology laboratory practices in open climate schools and male high school biology students' perceptions of biology laboratory practices in closed climate schools.

H_{1c} There is no significant relationship between male high school biology students' perceptions of biology laboratory practices and female high school biology students' perceptions of biology laboratory practices in the closed climate schools.

H_{1d} There is no significant relationship between male high school biology students' perceptions of biology laboratory practices and female high school biology students' perceptions of biology laboratory practices in the open climate schools.

H_2 There is no significant relationship between male and female high school biology students' perceptions of biology classroom practices in the open climate schools and male and female high school biology students' perceptions of the biology classroom practices in the closed climate schools.

H_{2a} There is no significant relationship between female high school biology students' perceptions of biology classroom practices in the open climate schools and female high school biology students' perceptions of biology classroom practices in the closed climate schools.

H_{2b} There is no significant relationship between male high school biology students' perceptions of biology classroom practices in the open climate schools and male high school biology students' perceptions of biology classroom practices in the closed climate schools.

H_{2c} There is no significant relationship between male high school biology students' perceptions of biology classroom practices and female high school biology students' perceptions of biology classroom practices in the open climate schools.

H_{2d} There is no significant relationship between male high school biology students' perceptions of biology classroom practices and female high school biology students' perceptions of biology classroom practices in the closed climate schools.

Limitations of the Study

This study will be concerned with the relationship of two variables, the organizational climate and the biology classroom and laboratory practices present within the school. Because of the evidence in earlier studies that males show differing scientific interests and attitudes than do females, the sex of the students will be controlled. Because of the limitations of the size of the faculty in the schools studied the sex of the teachers and principals will not be controlled. The findings of this study should be limited to the population from which the sample was taken.

CHAPTER II

A SELECTED REVIEW OF LITERATURE

Introduction

There are many studies dealing with biology objectives, course content, textbooks, learning, achievement gains, and instructional resources. However, no study has been located that deals with the authenticity of the relationship between professionals in the school (openness of the school) and the biology classroom and laboratory practices. Several studies do indicate that the revisions of biology from 1890-1960 were simply a reordering of the course content (33). After a review of the development of the learning of biology from 1890-1960 Hurd concluded:

> 1) Methods which most actively involve the learner appear to be the most effective for the acquisition and retention of learning.
> 2) The logical organization of biology courses in terms of the historical development of its conclusions does not seem to result in the most effective learning.
> 3) The permanence of student learning in biology courses is dependent to some degree upon the extent to which he is able to conceptualize his knowledge. (33)

This review of literature is divided into three parts as follows: 1) development of high school biology curriculum in historical perspective, 2) literature related to the organizational climate, and 3) a rational dealing with the authenticity dimension of the school situation. The chapter will conclude with a general summary.

Development of High School Biology Curriculum in Historical Perspective

A look at the history of the biology curriculum will reveal the evolution of thought on what function the laboratory should perform for the student and what should constitute biology practices. According to Hurd (33),

> Although a few high school courses were taught under the title of biology before 1900 they were not organized around a biological theme nor did they present an integrated "picture" of the biological sciences.

The laboratory prior to this century came from psychological theory of mental discipline. Any kind of activity was justified as long as it was demanding and difficult.

In 1905 the Biology Committee of the Central Association of Science and Mathematics Teachers (65) recommended that a full year of botany or zoology be offered rather than a half year of each. In 1909 the High School Teachers Association of New York City (44) issued a report entitled "The Practical Use of Biology." In this report the association suggested 1) an economic phase, 2) a health phase, 3) a cultural phase, and 4) a disciplinary phase.

The American Society of Zoologists (9) stressed the need for laboratory facilities and a good textbook. Two-thirds of the course should be spent in laboratory work making detailed drawings in a notebook to be handed in and one-third should be spent on subject matter textbook work. No mention was made of the teaching approach to be used.

By 1910 the general course of biology enrolled only 1.1% of the high school population. (33) The course labelled biology was essentially three separate sub-courses: botany, zoology, and human physiology. However, the separate courses of botany, zoology, and physiology, were beginning to fall in enrollment and a changing science curriculum was needed which, as a survey (82) showed, was a course that is adapted to the majority of the pupils.

The Central Association of Science and Mathematics Teachers (15) attempted to develop a changing curricula by defining the purposes and the course of study through four years of high school.

By 1913 the Committee on Natural Sciences (57) defined objectives (1) and rendered several suggestions (2) as follows:

1. To train the pupil in observation and reasoning.
2. Laboratory work should be better structured with less attention to useless drawings, detailed microscopic work and complicated experimentation; the emphasis should be upon the acquisition of knowledge first hand.

A year later the same committee revised their statement on the biology curriculum. An example follows:

> Biology should give pupils some training in careful observation, in forming logical conclusions, in solving problems and in carrying out projects. (58)

In 1917 Twiss (87) emphasized strongly the importance of the problem solving function of the science laboratory. A few years later Hunter reiterated:

> The laboratory should be a place where teachers and pupils together ask questions of nature. . . . The laboratory should be a place where pupils get a first-hand experience with materials that may or may not be new to them, but which are used with one end in view, the answering of a question which can only be answered by contact with natural objects. (32)

The period after 1920 was a time of reorganization of the biology curriculum in an attempt to implement the educational theory developed earlier. Several groups in several regions (State of Illinois, Cleveland, University of Chicago and others) reported on new curricula being used or suggestions for new biology courses. A general summary of the era is presented by Hurd:

> The movement to humanize the study of biology, which had been gaining momentum for several decades, was by now a generally accepted point of view for curriculum makers. (33)

From 1930 to 1950 the biology curricula and particularly the laboratory practices as practiced by science teachers and their students were criticized by many people. One example of such criticism was leveled by Hunter (32) in his science teaching manual when he discussed what he called "Misuse of the Laboratory." Also, curriculum groups of the era were more influenced by the contemporary American scene and the growing importance of science and technology than were the committees in previous decades. (33) The direction of the developments in biology turned the emphasis to young people and the meeting of their needs and problems. In 1947 the Forty-sixth Yearbook of the National Society for the Study of Education restated the educational emphasis of science in the school and the life of the pupil:

> Problem-solving activities are an integral part of science teaching and learning and the science laboratory is a natural place for pupils to engage in these activities. (74)

Again in the 1950's the science curricula came under attack. First, Richardson (67) stated that he implored the use of the laboratory for only illustration or verification. In the same year Burnett commented that ". . . conventional laboratories are not really laboratories at all." (14) Finally the Joint Commission on the Education of Teachers of Science and Mathematics criticized laboratory work thus:

> Laboratory work, which should form the core of instructional programs if a spirit of inquiry and critical analysis is to prevail, is too often used only as a form of visual education rather than as a means of investigation. (36)

At the beginning of the 1960's the term most frequently applied to the emphasis on problem-solving was "inquiry" or "science as process." Hurd (34) pointed out that "the goals for science teaching are described as an understanding of the nature of science, its modes of inquiry and conceptual inventions." Glass (21) emphasized the case for the rise of the inquiry approach in the laboratory:

> Our task is not simply to teach a lot of scientific facts . . . but it is far more important that the learner comprehend the true nature of the process by which knowledge about matter and energy increases . . .

Schwab's (73) Inglis Lecture at Harvard in 1961 outlines two major functions of the science laboratory: "To provide a tangible experience of some of the problems dealt with and of the difficulty of acquiring data" and "to provide occasions for and invitations to the conduct of miniature but exemplary programs of inquiry."

In summary, since 1900 there have been theorists suggesting the problem-solving process or the inquiry approach be used in the science laboratories of the schools. During this same period there have been workers criticizing the use of the laboratory for other purposes. During the late 1950's and early 1960's many new curriculum projects were introduced that attempted to solve this criticism by producing materials which lend themselves to the inquiry teaching method.

In the period from 1955 to 1970 the public school curriculum was in a constant state of revision. In particular the science and mathematics areas were placed under scrutiny during this period. Physical science studies introduced were the Chemical Education Materials Study (CHEMS) and the Chemical Bond Approach (CBA) for the chemistry area; Physical Science Study Curriculum (PSSC) for the physics area; and the Earth Science Curriculum Project for the earth science area. In the biological science area the Biological Sciences Curriculum Study (BSCS) introduced three separate versions. In addition, the BSCS has produced a remedial version, an advanced version, numerous laboratory blocks and other related materials.

All of these new materials have updated the content from the traditional text to an inquiry oriented approach based upon the laboratory. Arnold Grobman and William Mayer in the foreword of the 2nd edition of the BSCS Green Version described the new laboratory oriented project: "The materials were structured around a series of major theses: science as investigation and inquiry . . . " (52) In the foreword the CHEMS Committee characterizes the intent of the curriculum project:

> The title, Chemistry--An Experimental Science, states the theme of this one year course . . . Heavy reliance is placed upon laboratory work so that chemical principles can be drawn directly from student experience. (60)

An analysis of the other curriculum studies reveal similar stated goals for each particular curriculum study. (39)

In the research of the curriculum projects, there have been many evaluation studies conducted. Many reports have been published dealing with achievement gains and sexual differences. Though results indicated no significant differences, the directions of the differences are consistent in the literature. (41,53) Other research studies have been concerned with the attitudes of biology teachers using BSCS materials. Several reports dealt with the use, efficiency and achievement gains using laboratory blocks and BSCS laboratory exercises. (5, 79,42,35)

Taking a closer look at sex differences and achievement, it has been well-documented that girls do better in school than boys do, at least so far as teacher-rated achievement is concerned. (55)

On standardized educational achievement tests sex differences are small but their directions are consistent from one study to another. Girls typically excel in English, spelling, and writing; boys excel in mathematical reasoning, history, geography, and science. (84) Lance (41) in a comparison of gain in achievement made by students in BSCS biology and students of a conventional course in biology found that "for both the BSCS and 'traditional' groups, boys out-performed girls." Moore (53), in evaluating the effectiveness of BSCS biology to high ability ninth grade students, found "in all sub-groups in all tests the boys out-scored the girls."

While there are science achievement differences between the sexes, there are also motivational differences. Differences in interests appear at all ages, males are more interested in adventurous, mechanical, scientific, and leadership activities; females in artistic, musical, literary, clerical, and social science activities. (81,85) Horner discusses the female vs male competition for science oriented achievement:

> A large number of the men did far better when they were in competition than when they worked alone. For the women the reverse was true. Fewer than one-third of the women, but more than two-thirds of the men, got significantly higher scores in competition. (30)

"Cooley and Reed . . . echo the findings of earlier studies that girls have markedly lower science interests." (77) In summary, motivational and achievement differences between the sexes may affect the student's perceptions of the biological curriculum practices.

In the review to biological literature an attempt was made 1) to give a historical review of biology, 2) to give some of the educational theory behind the developments from 1900 to the present, and 3) to present some research data on biology curriculum. These points will be combined with the organizational climate literature in the rationale at the end of Chapter II.

Organizational Climate Studies

Since the conception of the Organizational Climate Description Questionnaire (25) in 1963 by Halpin and Croft, there have been numerous studies dealing with various aspects of the school and the school climate. Several studies were conducted from a macro-viewpoint comparing complete schools with other schools. Tanner (83) conducted an investigation into the relationship between social behaviors and the school climate. He found no relationship between climate and the problem-solving modes of cooperativeness, competitiveness, and aggressiveness. Social insight correlated positively with open climates in elementary and junior high schools and negatively with senior high schools. However, teachers tended to rate elementary schools as more open, junior high schools as familiar, and senior high schools as more closed.

Richens (68) compared the organizational climates of urban and suburban high schools in a study in 1967. He compared thirty urban and thirty-three suburban high schools located in Detroit and the Twin Cities of St. Paul-Minneapolis. There was no significant relationship between the staff-perceived climate and the location of the high school in either urban or suburban setting.

Gentry and Kenney (20) and a student of Gentry's, James Hinson (29) compared Negro and White schools of a large urban school system. There was evidence that Negro schools are seen as exhibiting primarily a paternalistic or closed climate and white schools as primarily a paternalistic or open climate. They described Negro faculties as having low morale and being highly disengaged, and the principal emphasizing production with a modest degree of consideration. White faculties were described as having high morale and the principal as being hard working and considerate. The leadership in Negro schools primarily stems from the principal compared to the leadership in white schools arising out of the principal and teachers alike.

Looking within the school a number of studies have dealt with the climate effects on pupil achievement and other variables. Millar (51) conducted a study in the Edmonton, Alberta, schools dealing with climate effects on achievement. He concluded that the global concept of climate had no direct relationship to student achievement but the subtest, Intimacy, correlated positively with achievement (r=.29). Using another sample of eight urban schools Millar was able to find correlations for both Intimacy (r=.804) and Aloofness (r=-.827) with pupil achievement.

Feldvebel (19) directed a study dealing with the same subject: climate versus achievement. He also concluded that there was no relationship between the global concept of organizational climate and student achievement. He found a correlation between the subtests Consideration (r=.39) and Production Emphasis (r=.399).

Three years later Pumphrey (55) investigated the relationship between organizational climate and selected variables associated with pupils. He was not able to show a relationship between climate and four student variables; 1) achievement, 2) pupil self-concept, 3) classroom behavior, and 4) pupil absence or tardiness. Pumphrey's conclusion seems to add validity to Millar's and Feldvebel's earlier findings. He concluded:

> The study did not find empirical evidence to support the assumption that pupils . . . benefitted more from one organizational climate than from another. (55)

Sommerville (78) conducted a study where the primary purpose of the study was to investigate the relationship between school climate and the students' self-concepts, levels of aspirations, attitudes, and opinions about school. Sommerville concluded in his abstract:

> . . . it was concluded that the measured student variables are not significantly related to the relative degree of openness of the school climate in high socioeconomic schools. However, the school related self-concept is related to the degree of openness of the climate when both the Esprit of the teachers and Thrust of the principal are high. Students in low socioeconomic schools with relatively open climates have significantly higher personal-social self-concepts, levels of aspiration, attitudes and opinions about school than those in relatively closed climates. High socioeconomic schools have a significantly greater proportion of relatively open climates than low socioeconomic schools. (78)

Appleberry (3) conducted a study into the relationship between organizational climate and the pupil control orientation of the school. Schools with more open climates were significantly more humanistic in their pupil control ideology than schools with more closed climates. Teachers, but not principals, (in more open schools) were significantly more humanistic in their pupil control ideology than teachers serving in more closed schools.

Many other studies dealt with the main determiners of the organizational climate, the faculty: the teachers and the principal. Two such areas are the size of the school and the informal subgroups effects. McLeod (49) found that the smaller the school, the more open the climate; the larger the school, the more closed the climate. Anderson (1) conducted a study dealing with differences in perception of climate between members of the same subgroup, composite perception of subgroups within the same school, and between school differences of comparable subgroups in perception of climate. He found no significant relationship when the climate of the schools was the main determiner. However, when differences in subtests were used, the Thrust and Esprit dimensions were statistically significant when subgroups of the same school were compared. No relationship was found on the between school differences but the presence of the principal did have a constant discernible affect on perception.

Heller (27) also investigated the informal structure in the organizational climate of schools. He concluded that the informal structure can detract from or contribute to the attainment of formal organizational goals. The total membership of the formal organization and the membership of the informal groups perceived both the existing and derived organizational climates in a similar way. Therefore, the subtests may have individual effects on the climate and the perception of climate is essentially the same by informal groups as well as the formal groups.

The subgroup orientation of the school may be related to another variable, readiness or expectation of change in the school setting. Helsel (28), working with teachers' perception of climate openness and their expectations of successful change, found that his hypothesis was not supported. However, the relationship was found to be in the direction predicted and approached significance. Results of statistical tests supported the relationships of the subtest Aloofness, Thrust, Consideration, Hindrance, and Production Emphasis to expectations of successful change. The overall results in light of the subtest data "suggest that the principal may play an important linking role between the teachers" and successful change perceptions of the faculty. Ricker (69), investigating secondary school faculty readiness to change, found that readiness is directly related to the openness of the organizational climate of the school. Other variables such as years of teaching experience, age, degree held, and amount of continuing education were positively related to readiness to change.

Readiness to change, expectation of change, and subgroup perceptions may be related to another variable, communication in the school setting. Several studies have been conducted delving into the relationships between school communication and the school climate. Dugan (17) investigated the communication behavior of the principal in conjunction with the openness of the school. A significant relationship was found between the communication behavior of principals and the organizational climates of their schools. "Teachers in open climate schools tended to rate administrators as more satisfactory communicators." Harkins (26) in a later study found that communication behavior was significantly related to the perceptions of the school's organizational climate. The specific subtests related were found to be Consideration and Esprit.

Piper (61) used subgroups based on communication patterns to arrive at the perceptions of the organizational climate by each subgroup. He found that the subgroups were tied together by liaison persons who were members of two or more groups. Also "male-to-male communication saturation was higher than male-to-female or female-to-female." The effect of the principal was not treated.

Every study on organizational climate includes the principal due to the nature of the instrument. However, a number of studies have dealt directly with the principal as the main factor. Lutjemeier (45) found that "there was a tendency for principals to perceive organizational climate as more open than the climates as perceived by teachers." Wiggins (91), through the use of a leader behavior questionnaire, investigated the relationship between leader behavior and organizational climate. He found that leader behavior and organizational climate were not significantly related, however, a significant relationship was found between the principals' interpersonal orientation and school climate. Leader succession had no affect on the existing climate of the school. Petrie (59) also investigated leader behavior specifically with leader succession as the main thesis. He found significant changes in both leader and group behavior after leader succession. Petrie presents the following generalization:

1) The activity level of the principal is visible to the teachers.
2) The activity of a principal (the person) is described in a similar manner by members of all organizations in which he has functioned.
3) Teachers differentiate in their feeling toward leaders and their successors.
4) Deference is extended to the principal regardless of the teachers' evaluation of the esteem and prestige due the principal.
5) Deference extended leaders and their successors is different.

Tremko (86), in a related study, found "that closed organizational climates are seemingly related to a principal's tenure in a school and his years of experience as an administrator." Also, school size is related to climate and the socio-economic level of the school is related to the degree of closedness or openness of the school. McLeod (49) found that principals with six years experience or less had more open climates. Principals with seven years teaching experience or more had more open climates.

Muhm (54) studied the relationship between climate of the school and the occupational characteristics of the principals as perceived by the teacher. As in previous research studies the global concept of climate did not show relationships with the principal's occupational characteristics. However, the subtests exhibited a significant relationship between the measured subtest score and actual descriptions of the principal as perceived by the teachers. One such example deals with the Production Emphasis subtest:

> The study also indicated that those teachers who tended to perceive the principal as emphasizing production also perceived him as being ambitious, imaginative, original, persuasive, resourceful, and high in self-control. If the principal was perceived as being low in production emphasis, teachers tended to perceive him as considerate, cooperative, emotionally stable, fair, high in judgement, and patient.

Kaup (37) attempted to study the relationship between the school climate and the pattern of decision-making. He found no evidence to support the relationship between openness of the school and the decentralization of decision-making practices. Esprit had a positive relationship with the decentralization of decision-making practices.

On the same line of thought, principal dogmatism could be a significant factor. Levy (43) investigated the relationship between dogmatism and opinionation of principals and school climate. He found relationships between the dogmatism of principals and their perception of Production Emphasis (positive correlation) and Thrust (negative correlation). Huff (31) investigated the dispersion of dogmatism as a variable and the organizational climate of the school. Unlike Levy, Huff found no relationships between the two variables. However, Huff did not test the subtest dimensions individually as did Levy.

All the variables so far discussed apply to either the school as a whole or the participants in the organizational climate. Other variables are types of organizational patterns of teaching methods, and innovations present in the school situation. Mancuso (46) conducted a study dealing with organizational climate and the merits of the graded and nongraded school. The only significant relationships found were individualized instruction subgroups of each teaching style. No significant differences in any climate dimensions were found. Dolan (16) looked at team teaching teachers as compared to non-team teaching teachers perceptions of decision-making and organizational climate. He could find no relationships between decision-making and organizational climate. Dolan concluded:

> A school in which members are encouraged to innovate may generally be perceived by the entire staff as having a generalized style of functionally flexibility or rigidity or openness of organizational climate. Even those members who do not extensively participate in decision-making may consequently perceive the organizational climate in the same dimension as the high participants.

Dolan indicates that an innovative atmosphere may be related to school climate. Marcum (47) selected fifteen of the most innovative schools and fifteen of the least innovative schools. School climate differed from the most innovative schools as opposed to the least innovative schools. Both teachers and principals described the least innovative schools' climate as being closed. Innovative schools were described as being open. Bennett (7) attempted to find what relationships may exist between the number and types of educational innovations and climate of secondary schools in Pennsylvania and New York. He found no significant relationships between the climates and eight climate dimensions and number of administrative innovations.

Bennett concludes:

> Considering the two more open climates (open and autonomous), and the two more closed climates (paternal and closed), and the more open climates had a higher positive relationship to both the number and types of innovations.

In summary, an attempt was made to discuss the literature related to the organizational climate from the total school view to the individual view to the curriculum approaches and innovations in the school. Overall, the literature seems to play down the global use of climate and to suggest the use of the subtests as individual entities.

The Rationale

The organizational climate of the school was defined by Halpin and Croft as "the organizational 'personality' of a school; figuratively, 'personality' is to individual what 'climate' is to the organization." (23) Through factor-rotation the author identified three areas that the test items seemed to be measuring. These three parameters were identified as:

1) Authenticity: The "authenticity" or "openness" of the leader's and the group members' behavior.
2) Satisfaction: The group members' attainment of conjoint satisfaction in respect to task accomplishment and social needs.
3) Leadership Initiation: The latitude within which the group members, as well as the leader, can initiate leadership acts. (24)

One of these parameters, Authenticity, was recommended by Halpin and Croft as an area of further research. The problem of authenticity has been explored by Rinder and Campbell (70), Seeman (75), Erickson (18), and Argyris (4). They all started from different viewpoints but found the authenticity of interaction to be a prime factor in their studies. Halpin and Croft examined authenticity in their study using four interrelated conceptual frames of reference:

1. The problem of the marginal man;
2. The problem of other-directedness and of societal pressures which impose conformity upon the individual;
3. The problem of person-to-person relations in cross cultural exchange;
4. The crisis of identity. (23)

The manner in which the problem of the marginal man can be associated with the school setting is explained by Halpin and Croft:

> Teaching can be construed as a marginal profession. The salaries of teachers are below those for other professions. For the most part, a teacher cannot be in business for himself, as can a physician, a lawyer, or an architect; he must practice his profession as a member of a community-supported organization (the school system), and in each community this organization exercises a monopoly. Hence, if the teacher is bound by personal and social ties to a given community, he cannot easily leave his job; he often must swallow his indignation and learn to "adjust" to the situation. Furthermore, a great many teachers were marginal students in their college or university, in that they had drifted into a choice of teaching as a career only after unsuccessful attempts to make the grade in other departments on the campus. Finally, since teachers are recruited primarily from lower middle-class groups and, in recent years, have come in increasing numbers from the lower-class stratus, the marginality of their status is further accentuated. It therefore is not surprising that teachers behave as do other marginal men. They are eager to overconform to what they think is expected of them. They fit themselves into a stereotype, and in doing so repress or repudiate parts of "themselves." (23)

This problem of over conformity by the teacher to the total school environment could be a factor in the type curriculum presented in the classroom.

The problem of other-directedness and of societal pressures imposing conformity upon the individual in the school setting is interpreted by Halpin and Croft:

> The second conceptual framework appears under various labels, including, for example, "other-directedness versus inner-directedness," and the pressure for conformity. In short, when we speak of "authenticity" we must contend with the

> question: "Authentic to what?" In a society in which most people are "inner-directed" there exists at least some standard against which "authenticity" can be gauged. But in an other-directed society in which man's actions are gauged mainly either by expediency or by a desire to conform to the group, it is difficult to find a stable standard against which "authenticity" can be evaluated. (23)

Bidwell in referring to Waller describes the situation where the teachers may be forced to conform:

> . . . teachers' special training and cosmopolitan occupational outlook alienate them from the parochial towns where they teach and at times make them morally threatening to townspeople. But their mobility, ready replaceability and child clientele render them peculiarly vulnerable to domination by local citizens and school officials. (8)

The school environment may put pressure on the innovative teacher. This pressure may be to tone down his courses or to conform to the traditional methods of the other teachers in the school.

The third frame of reference, the problem of person-to-person relationships in cross-cultural exchange, and how it can be translated into the school setting is described by Halpin and Croft:

> If we view the entire profession of education as one sub-culture in our society, then we can look at the responses that members of this sub-culture make when they are confronted by members of other professional or public sub-cultures in America. Thus, when Admiral Rickover or Dr. Robert M. Hutchins criticizes public education, do the members of a given school system, or of a given College of Education respond to criticism by stereotyping the critic, thereby illegitimatizing his criticism? Or do the teachers, principals, and professors allow themselves to be "open" to the criticism so that they can perhaps enrich their own understanding of education by taking into account the critic's "axis of reference" as well as their own? (23)

If the teacher and/or the principal are closed to new ideas this will only compound the above mentioned problem areas of authenticity. But if the teachers and the principal are "open" to the new ideas or criticism concerning the school curriculum this should help the organization to offer a dynamic curriculum.

The final frame of reference of authenticity, the crisis of identity, and how it can be defined in terms of the school setting is explained by Halpin and Croft:

> The differences in the child's behavior as he goes through succeeding stages in developing a sense of identity are not entirely dissimilar to the differences that characterize the behavior of the principal and the teachers as we move from the Closed to the Open Climate. Indeed, we suspect that the types of interpersonal interactions that occur between the principal and the teachers within each of the six Organizational Climates may have counterparts in the patterns of interpersonal reactions that occur between the parent and the child in different families, or in the same family at different stages in the child's development. Some adolescents never succeed in achieving an Open Climate. The conditions that retard an individual's development toward maturity may be psychologically analogous to those that prevent a faculty's climate from becoming Open. (23)

The school organization in many ways is like the aging adolescent who never reached maturity. The organization may never be able to climb out of the closed climate strait-jacket. This would help reinforce the other problems associated with the concept of authenticity in the school setting.

As one can see, the interaction between the principal and the teachers in a school combined with many other variables (19), defines the organizational climate of the school. (23) The authenticity of the relationship between the teachers and the principal or the degree of openness of the school may affect the teacher's daily classroom performance.

Teachers in the closed climate are disengaged and do not work well together. They are confronted with low Esprit giving them low job satisfaction and low social-needs satisfaction. The closed climate principal does not facilitate the task accomplishment of teachers, is highly aloof, has low consideration and high production emphasis. A school with these characteristics is saturated by inauthentic principal-teacher interactions. (24) This has possibilities of affecting the type and direction of curriculum practices to be presented in classes as well as the teaching methods to be used.

The possible effects of the organizational climate of the school; how it affects the different sexes in the school setting; and the biology curriculum practices presented was the focal point of this study.

Summary

Several trends can be extracted from the literature:

1) The biology curriculum from 1890 to 1960 has been under constant revision. These revisions were mainly a re-ordering of curriculum content.

2) In theory, the laboratory has undergone a change from mainly illustration and verification to the use of the laboratory for discovery and problem-solving through the inquiry approach.

3) Most research studies in biology have dealt with achievement gains, comparisons between teaching methods, sexual differences, and efficiency of new curriculum studies.

4) There is no relationship between climate and pupil achievement. However, certain subtests do show high correlations.

5) All other variables held constant, the larger the size of the school the more closed it tends to be.

6) The communication behavior of the school is significantly related to school climate.

7) Principals tend to rate schools as being more open than do the teachers of the school.

8) Leader behavior of the principal is not related significantly to school climate. However, certain principal variables are related to closedness of schools.

9) The global concept of school climate has repeatedly shown no significant differences in comparisons. However, subtest comparisons have been shown to be reliable.

10) Certain innovative teaching methods and number of innovations appearing in the school were related in some ways to the climate present in the school.

11) Authenticity in many organizations is a factor in the conduct of the organization.

CHAPTER III

PROCEDURES

Instrumentation

Biology Laboratory Activity Checklist (6) -- the Biology Laboratory Activity Checklist, referred to as the BLAC, was used to assess the nature and extent of laboratory instruction in the sample schools. This instrument is composed of sixty items classified into four areas: 1) pre-laboratory practices, 2) laboratory practices, 3) post-laboratory practices, and 4) general reaction to the laboratory. The items are scored by the students as either true or false.

The statements for the checklist were taken from BSCS materials and were constructed to include both laboratory practices that were recommended by the BSCS and judged to contribute positively to BSCS objectives and laboratory practices that were discouraged by BSCS or that were judged as practices negative to BSCS objectives. Later the items were submitted to a panel of judges who were familiar with BSCS laboratory, objectives, and rationale. The judges included BSCS consultants, college biologists, high school biology teachers, and a science supervisor. Finally the checklist was revised to the sixty items included.

Barnes explains the validity of the BLAC:

> The validity of the BLAC is based on two points: 1) that each item was 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. (6)

Barnes (5) also analyzed by a _t_-test the pilot study results of two classes for each of five high school biology teachers. The results of the _t_-test were significant indicating that the two separate groups of students for each teacher did not disagree about the nature and extent of the laboratory practices.

The checklist is scored by adding the positive responses on the pro-BSCS items and the negative responses on the anti-BSCS items. The possible range of these scores will be from zero to sixty. The higher scores indicate laboratory practices with a greater degree of conformity to the objectives of the BSCS curriculum.

Biology Classroom Activities Checklist (40) -- the _Biology Classroom Activities Checklist_, to be referred to as the BCAC, was used to assess the nature and extent of the classroom practices in the sample schools. The instrument is composed of fifty-three items 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 items are scored by the students as either true or false.

The statements for the checklist were compiled in a list of teaching practices that were judged to be those that contribute positively toward the attainment of BSCS objectives. Of the fifty-three items on the BCAC, twenty-six were judged as describing practices that contributed positively toward the attainment of BSCS objectives and twenty-seven were judged as describing negative practices. The items were submitted to a panel of judges of which each individual was either a member of the BSCS writing team, a member of the BSCS committee, or a BSCS staff consultant. Correlations between the authors' opinion and the judges' opinions ranged from +.95 to +.88.

This checklist was administered to over 1200 students of sixty-four teachers and reliability and validity data were gathered. The reliability coefficient was computed as .96. Two methods of computing the validity each yielded a coefficient of .84.

The checklist is scored by adding the positive responses on the pro-BSCS items and the negative responses on the anti-BSCS items. The possible range of scores would be from zero to fifty-three or based on percentages from zero to one hundred. The higher scores indicated classroom practices with a greater degree of conformity to the objectives of the BSCS curriculum.

Organizational Climate Description Questionnaire (25) -- the Organizational Climate Description Questionnaire, to be referred to as the OCDQ, was used to evaluate the organizational climate of the respective schools. The final version of the OCDQ contains sixty-four Likert-type items which are used to assess one of eight subtest areas. Each of the subtests measures one of the eight dimensions of the organizational climate. The first four dimensions; disengagement, hindrance, esprit, and intimacy; measure the characteristics of the teachers as a group and the last four dimensions; aloofness, production emphasis, thrust, and consideration; measure the characteristics of the principal as a leader.

After the OCDQ is administered to the teachers and the principal the scores on each subtest from each respondent are calculated. These scores are then used to figure the standard score for each subtest for each school in question. The pattern or profile formed by the eight school standard scores depicts the schools' organizational climate profile.

Halpin and Croft in the development of the OCDQ factor analyzed the profiles for 71 schools to determine whether the profiles would allow them to differentiate "meaningful" types of organizational climates. They were able to identify six patterns of organizational climates and they developed what they called a "prototypic profile" for each of the six climates. The patterns emerged along a rough continuum as follows: open, autonomous, controlled, familiar, paternal, and closed. Halpin and Croft "found that these could be ranked in respect to the school's score on Esprit." (24) A school's profile may be compared to six prototypic profiles "by computing the absolute differences between each subtest score in a school's profile and the corresponding score in the first prototypic profile, then in the second one, and so on." Upon summing "the absolute differences between the profile scores, a low sum indicates that the two profiles are highly similar." (23)

Appleberry (3) used an

> . . . alternate method of ranking schools on the climate continuum. This method involves summing the school's scores on the Esprit and Thrust subtest. While not identifying discrete climates, this method does allow a ranking of the school along a climate continuum from open to closed.

Validity Studies

Doubt has been expressed as to the six climates as proposed by Halpin and Croft. Smith (76) compared the organizational climate to twenty-three external variables or characteristics of the schools which were clustered into five factor analysis. Smith concluded that "the concept of organizational climate as identified by the OCDQ was to be empirically sound and viable." However, he was

> . . . led to the conclusion that it was not enough to identify the organizational climate . . . it is important to study the profile of sub-test scores in assessing the organizational climate of the school. (76)

Stansbury (80) retested a new set of schools with the OCDQ using the same format and methods as Halpin and Croft on the original study. He obtained essentially the same results as Halpin and Croft. Stansbury concluded that

> . . . the subtests could be improved by some rearrangement of items and the additions of items . . . Future studies that use the OCDQ should limit its use to the eight sub-test scores. (80)

McFadden (48) compared the OCDQ ratings with the ratings of professional observers present in the school. The observers were able to agree significantly among themselves on climates in the schools. However, the observers' ratings would not correlate (r=.18) significantly with the OCDQ ratings. McFadden concluded that the validity of the OCDQ is questionable.

Andrews (2) conducted a study of Canadian schools in grades one through twelve. His data upheld his contention that the OCDQ was a valid measure for use in assessing the climate of schools beyond the elementary school. Combined schools (schools with all twelve grades in one building) tended to have fewer open and more closed systems. Andrews "concluded that the subtests of the OCDQ provide reasonably valid measures of important aspects of the principal's leadership in the perspective of interaction with his staff." (2)

Other validity studies completely discourages the use of the global concept of climate as defined by the OCDQ. Plaxton (62) found no overall relationship between the global concept of climate and personality types. However, he did find significant relationships between personality variables and four of the eight subtests: Production Emphasis, Aloofness, Thrust, and Hindrance.

Brown (13) isolated eight climates instead of Halpin and Croft's original six climates. However, he indicated that the OCDQ was a well constructed instrument. Brown did indicate that the subtests were particularly valuable for research purposes and that the instrument was reliable.

Vanderlain (89) concluded that "the climate measurements show little pragmatic value." However, "the subtests of Factor II Esprit seem viable." Dealing with the same area, Roseveare (71) concluded that the subtest, Thrust, of the OCDQ was a valid measure and that the subtest, Esprit, of the OCDQ seemed to have validity.

Most studies show no significant relationships when comparing the climate types with various variables. Further examination of the subtests appears to support the validity (2) and reliability (13) of them. Because the subtest score method (3) of arriving at the openness or closedness of a school will be used in this study the OCDQ seems to be an applicable instrument.

Sample Selection

The population for this study was taken from all Oklahoma high schools which are located within an eighty-mile radius of Stillwater. These included only communities with populations of at least one thousand residents and not more than fifty thousand residents as indicated by the 1960 U. S. census (88). This excluded high schools located in the Oklahoma City and Tulsa area school districts. The population schools were required to offer sophomore biology. The professional staff (the principal and the faculty) were included in the study to assess the climate of the school. Two sections of biology students for each biology teacher were used to assess the biology curriculum practices.

Data Collection

A random sample of thirty schools was drawn from the population used in the study. Through use of the Watts line the author called each school superintendent and scheduled an appointment with him. During the conference with each superintendent the author and associates discussed the general outline of the study and scheduled a day when the principal of the high school would call a faculty meeting. On the day of the faculty meeting, the OCDQ was administered to the teachers and principal. The same day the BLAC was given to the students of one class of biology and the BCAC was given to the students of another class of biology for each biology teacher of the school. If the school had only one section of biology both the BLAC and the BCAC were given to that class.

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

Treatment of the Data

Scoring the Instruments

The teachers' and principals' responses to the Organizational

Climate Description Questionnaire were punched on IBM cards. The punched cards were scored on an IBM 7040 computer using Don B. Croft's (35) program as adapted by Appleberry (3). Appleberry added an additional step to the program in its adaptation,

> This was the placing of the schools on a climate continuum by summing each school's Esprit and Thrust subtest scores, and subtracting the disengagement subtest score. (3)

The Biology Classroom Activities Checklist and the Biology Laboratory Activities Checklist 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 thirty senior high schools who offered at least one section of laboratory biology in the sophomore year. The specification of climate, results of the testing of the hypotheses, and related correlations of data are presented in Chapter IV.

Specification of Climates

As has been mentioned earlier, many studies have been conducted questioning the reliability and validity of the global concept of Halpin and Croft's six climates. (25) Therefore, the subtest method of calculating the openness of a school was used. This method involves the summing of the subtest scores of Thrust and Esprit and subtracting the Disengagement subtest score. (3) This results in a continuum of scores from the most open to the most closed of the sample schools. Schools in the upper one-third of the sample were specified as "open" schools and the schools in the lower one-third of the sample were specified as "closed" schools. The resulting "open" schools and "closed" schools were used in the testing of the hypotheses.

Testing the Hypotheses

A *t*-test was used in testing the null hypotheses. Using the common level of significance, $p = .05$, the author rejected all null hypotheses at this level.

> H.1. There is no significant relationship between male and female high school biology students' perceptions of biology laboratory practices in open climate schools and male and female high school biology students' perceptions of biology laboratory practices in closed climate schools.

TABLE I

SUMMARY DATA AND *t*-TEST DATA FOR THE RELATIONSHIP BETWEEN BIOLOGY STUDENTS' PERCEPTIONS OF BIOLOGY LABORATORY PRACTICES AND ORGANIZATIONAL CLIMATE OF THE SCHOOL

	Biology Students Open BLAC	Biology Students Closed BLAC	*t*
N	12*	10	.3416(N.S.)
$\bar{X}$	29.8726	30.3823	
Σx^2	93.1158	149.7474	
s^2	8.4651	16.6386	

$df = 20$, $p_{(.8)} < .257$

*Two schools in open climate had two biology teachers each.

The calculated value for the hypothesis was .3416. Using $df = 20$, this *t* value is not significant at the .05 level.

H.1.a. There is no significant relationship between female high school biology students' perceptions of biology laboratory practices in open climate schools and female high school biology students' perceptions of biology laboratory practices in closed climate schools.

The calculated value of t is .7613 for the above hypothesis. With df = 20, the related hypothesis is not significant at the .05 level. Therefore, the hypothesis of no significant difference is accepted.

TABLE II

SUMMARY DATA AND t-TEST DATA FOR THE RELATIONSHIP BETWEEN FEMALE BIOLOGY STUDENTS' PERCEPTIONS OF BIOLOGY LABORATORY PRACTICES AND ORGANIZATIONAL CLIMATE OF THE SCHOOL

	Female Biology Students Open BLAC	Female Biology Students Closed BLAC	t
N	12*	10	.7613(N.S.)
$\bar{X}$	30.2638	31.4934	
Σx^2	149.7230	136.0810	
s^2	13.6116	15.0090	

df = 20, $p_{(.5)} < .687$

*Two schools in open climate had two biology teachers each.

H.1.b. There is no significant relationship between male high school biology students' perceptions of biology laboratory practices in open climate schools and male high school biology students' perceptions of biology laboratory practices in closed climate schools.

TABLE III

SUMMARY DATA AND t-TEST DATA FOR THE RELATIONSHIP BETWEEN MALE BIOLOGY STUDENTS' PERCEPTIONS OF BIOLOGY LABORATORY PRACTICES AND ORGANIZATIONAL CLIMATE OF THE SCHOOL

	Male Biology Students Open BLAC	Male Biology Students Closed BLAC	*t*
N	12*	10	.0300 (N.S.)
$\bar{X}$	29.4477	29.4964	
Σx^2	95.6750	191.4200	
s^2	2.9490	21.2690	

df = 20.
*Two schools in the open climate had two biology teachers each.

The calculated value is *t* = .0300 for the second supplementary hypothesis (H.1.b.). Applying df = 20, the value is not significant at the .05 level. In accord with the significant level the null hypothesis is accepted. (See Table III)

H.1.c. There is no significant relationship between male high school biology students' perceptions of biology laboratory practices and female high school biology students' perceptions of biology laboratory practices in the closed climate schools.

TABLE IV

SUMMARY DATA AND t-TEST DATA FOR THE RELATIONSHIP BETWEEN MALE BIOLOGY STUDENTS' PERCEPTIONS OF BIOLOGY LABORATORY PRACTICES AND FEMALE BIOLOGY STUDENTS' PERCEPTIONS OF BIOLOGY LABORATORY PRACTICES IN THE CLOSED CLIMATE SCHOOLS

	Female Biology Students Closed BLAC	Male Biology Students Closed BLAC	*t*
N	10	10	1.03(N.S.)
$\bar{X}$	31.4934	29.4964	
Σx^2	149.7230	191.4200	
s^2	13.6116	21.2690	

df = 18, p(.4) <.862

The calculated value of *t* for the closed climate schools including the variable of student perception is 1.03. Using df = 18, the hypothesis is not significant at the .05 level. Therefore the null hypothesis is accepted at that level. (See Table IV)

H.1.d. There is no significant relationship between male high school biology students' perceptions of biology laboratory practices and female high school biology students' perceptions of biology laboratory practices in open climate schools.

The *t* test value was calculated as .599 for the perceptions of students in the open climate schools. Using df = 22, the calculated *t* is not significant at the .05 level. Based on the rejection level set by the author the null hypothesis (h.1.d.) is accepted. (See Table V.)

TABLE V

SUMMARY DATA AND t-TEST DATA FOR THE RELATIONSHIP BETWEEN MALE BIOLOGY STUDENTS' PERCEPTIONS OF BIOLOGY LABORATORY PRACTICES AND FEMALE BIOLOGY STUDENTS' PERCEPTIONS OF BIOLOGY LABORATORY PRACTICES IN THE OPEN CLIMATE SCHOOLS

	Female Biology Students Open BLAC	Male Biology Students Open BLAC	t
N	12*	12*	.599(N.S.)
$\bar{X}$	30.2637	29.4477	
Σx^2	149.7330	95.6722	
s^2	13.6120	8.6970	

df = 22, p(.6) <.533
*Two schools in the open climate had two biology teachers each.

H.2. There is no significant relationship between male and female high school biology students' perceptions of biology classroom practices in the open climate schools and male and female high school biology students' perceptions of biology classroom practices in the closed climate schools.

The calculated t for the comparison of open climate BCAC means and closed climate BCAC means was .782. Applying df = 19, the table value at the .05 level is 2.093. The calculated t is less than the table score, therefore, the null hypothesis of no significance difference is accepted. (See Table VI)

H.2.a. There is no significant relationship between female high school students' perceptions of biology classroom practices in the open climate schools and female high school biology students' perceptions of biology classroom practices in the closed climate schools.

TABLE VI

SUMMARY DATA AND *t*-TEST DATA FOR THE RELATIONSHIP BETWEEN BIOLOGY STUDENTS' PERCEPTIONS OF BIOLOGY CLASSROOM PRACTICES AND ORGANIZATIONAL CLIMATE OF THE SCHOOL

	Biology Students Open BCAC	Biology Students Closed BCAC	*t*
N	11*	10	.782(N.S.)
$\bar{X}$	26.9128	27.8380	
Σx^2	67.5751	71.8755	
s^2	6.7575	7.9860	

df = 19, p(.5) <.688
*Two schools in the open climate had two biology teachers each; one school did not take BCAC.

TABLE VII

SUMMARY DATA AND *t*-TEST DATA FOR THE RELATIONSHIP BETWEEN FEMALE BIOLOGY STUDENTS' PERCEPTIONS OF BIOLOGY CLASSROOM PRACTICES AND ORGANIZATIONAL CLIMATE OF THE SCHOOL

	Female Biology Students Open BCAC	Female Biology Students Closed BCAC	*t*
N	11*	10	1.86(N.S.)
$\bar{X}$	26.3800	29.1725	
Σx^2	86.2495	137.9710	
s^2	8.6250	14.7746	

df = 19, p(.1) <1.86
*Two schools in open climate had two biology teachers each; one school did not take BCAC.

The calculated t for the comparison of female BCAC mean scores in the closed climate schools as opposed to female BCAC mean scores in the open climate schools is 1.862. Using df = 19, the hypothesis is not significant at the .05 level. Therefore the null hypothesis is accepted. However the table value of 1.86 reveals that the hypothesis is significant at the .1 level showing that the hypothesis approaches significance.

H.2.b. There is no significant relationship between male high school biology students' perceptions of biology classroom practices in the open climate schools and male high school biology students' perceptions of biology classroom practices in the closed climate schools.

TABLE VIII

SUMMARY DATA AND t-TEST DATA FOR THE RELATIONSHIP BETWEEN MALE BIOLOGY STUDENTS' PERCEPTIONS OF BIOLOGY CLASSROOM PRACTICES AND ORGANIZATIONAL CLIMATE OF THE SCHOOL

	Male Biology Students Open BCAC	Male Biology Students Closed BCAC	t
N	11*	10	.493(N.S.)
$\bar{X}$	27.4017	26.6452	
Σx^2	142.1632	91.7400	
s^2	14.2163	10.1933	

df = 19, p(.7) <.391

*Two schools in the open climate had two biology teachers each; one school did not take BCAC

The comparison of males' perceptions is presented in Table VIII. The calculated t = .4934 is not significant at the .05 level for the male perceptions. As the table value of $P_{(.7)} < .391$ indicates, the analysis value does not approach significance. Therefore, the null hypothesis is accepted.

H.2.c. There is no significant relationship between male high school biology students' perceptions of biology classroom practices and female high school biology students' perceptions of biology classroom practices in the open climate schools.

TABLE IX

SUMMARY DATA AND t-TEST DATA FOR THE RELATIONSHIP BETWEEN MALE BIOLOGY STUDENTS' PERCEPTIONS OF BIOLOGY CLASSROOM PRACTICES AND FEMALE BIOLOGY STUDENTS' PERCEPTIONS OF BIOLOGY CLASSROOM PRACTICES IN THE OPEN CLIMATE SCHOOLS

	Male Biology Students Open BCAC	Female Biology Students Open BCAC	t
N	11*	11*	.7091(N.S.)
$\bar{X}$	27.4017	26.3800	
Σx^2	142.1632	86.2495	
s^2	14.2163	8.625	

df = 20, $p_{(.5)} < .687$

*Two schools in the open climate had two biology teachers each; one school did not take BCAC.

The null hypothesis for no significant difference between male and female perceptions in the open climate schools is accepted. The calculated value of t = .7091 does not approach the table value at the .05 level of 2.086.

> H.2.d. There is no significant relationship between male high school biology students' perceptions of biology classroom practices and female high school biology students' perceptions of biology classroom practices in the closed climate schools.

TABLE X

SUMMARY DATA AND t-TEST DATA FOR THE RELATIONSHIP BETWEEN MALE BIOLOGY STUDENTS' PERCEPTIONS OF BIOLOGY CLASSROOM PRACTICES AND FEMALE BIOLOGY STUDENTS' PERCEPTIONS OF BIOLOGY CLASSROOM PRACTICES IN THE CLOSED CLIMATE SCHOOLS

	Male Biology Students Closed BCAC	Female Biology Students Closed BCAC	t
N	10	10	1.6375 (N.S.)
$\bar{X}$	26.6452	29.1725	
Σx^2	91.740	132.97	
s^2	10.1933	14.774	

df = 18, $p_{(.2)} < 1.330$

The calculated t is 1.6475 for the hypothesis. This is not significant at the .05 level using df = 18. Therefore, the null hypothesis is accepted at the indicated confidence level. However, the table value at the .2 level indicates that the hypothesis approaches significance with $p_{(.2)} \leqslant 1.330$.

Related Correlations

The literature indicates that the climate designations may not be valid measures to use in testing hypotheses in a study. The author used the subtest method of openness and closedness as calculated by Appleberry. (3) Therefore, the author, with support from many previously cited validity studies, tested correlations between the subtest scores for the total schools and the BLAC and the BCAC mean scores and between the subtest scores of the biology teachers of each school and the BLAC and the BCAC mean scores.

The only school BCAC which correlates to any extent is the aloofness subtest with the r = .2420. However, the significance level of .05 yields a value of .388. Therefore, the assumption of a significant correlation between the two variables is rejected. (See Table XI)

The correlations between the subtests of the OCDQ and the BLAC mean scores yields a value of r = .3264 for the aloofness subtest. Again though this does not satisfy the significance level value of .388 at the .05 level. Therefore, the assumption of significant correlation between the BLAC scores and subtest dimensions is rejected.

A look at the BCAC mean score correlations with the subtests of the OCDQ for biology teachers will quickly reveal that there are no correlations that approach significance using df = 30 and $p(.05) < .349$. Therefore, the assumption that a significant correlation exists between the biology teachers' perceptions of the organizational climate (subtest dimensions) and the biology classroom practices is rejected.

TABLE XI

CORRELATIONS BETWEEN SUBTEST SCORES OF THE TOTAL SCHOOL FACULTY AND THE BIOLOGY STUDENTS' PERCEPTIONS OF THE BIOLOGY CLASSROOM AND LABORATORY PRACTICES

Subtest Dimensions	BLAC Scores	BCAC Scores
Disengagement	-.0457	.0431
Hindrance	.1214	-.0265
Esprit	.0562	-.0618
Intimacy	-.0585	.0486
Aloofness	.3264	.2420
Production Emphasis	-.1412	-.0926
Thrust	-.0653	-.0131
Consideration	-.0145	-.0540
	df = 30	df = 27
	p(.05)<.349	p(.05) <.367

TABLE XII

CORRELATIONS BETWEEN SUBTEST SCORES OF THE BIOLOGY TEACHERS AND THE BIOLOGY STUDENTS' PERCEPTIONS OF THE BIOLOGY CLASSROOM AND LABORATORY PRACTICES

Subtest Dimensions	BLAC Scores	BCAC Scores
Disengagement	.2282	-.1644
Hindrance	-.1316	-.0376
Esprit	.3776	.1989
Intimacy	-.0814	-.1350
Aloofness	-.0650	-.1971
Production Emphasis	.1899	.0567
Thrust	-.1920	-.1208
Consideration	-.1476	-.1342
	df = 27	df = 30
	p(.05) <.367	p(.05) <.349

Checking the BLAC mean score correlations with the subtests of the OCDQ will show a value of r = .3776 for the Esprit subtest. This value is significant at the .05 level with the table value listed as p(.05) <.367. None of the remaining seven subtest scores are significant at the .05 level and the assumption of correlation for these seven must be rejected. However, for the Esprit subtest the significance level was satisfied and the assumption for correlation between the Esprit subtest and the students' perceptions of the biology laboratory practices is accepted. (See Table XII)

Summary

The two major and eight minor hypotheses were tested and the results summarized in this chapter. All ten null hypotheses had to be accepted at the .05 level of significance. However, two of the minor hypotheses did approach significance.

All subtest correlations were rejected at the .05 level except for the Esprit subtest in conjunction with the biology teachers' perceptions of the school climate. Chapter V will present the findings, implications, and recommendations for further research.

CHAPTER V

SUMMARY OF FINDINGS AND IMPLICATIONS

Introduction

The major premise of this study is that the authenticity of the relationship between the principal and the biology teacher and between the other faculty and the biology teacher may affect the curriculum practices in the biology classroom and laboratory as perceived by the high school student. The authenticity or openness of the school was identified by the Organizational Climate Description Questionnaire. The biology curriculum practices of the teacher were assessed by the Biology Classroom Activity Checklist and by the Biology Laboratory Activity Checklist.

Summary of Findings

The two major hypotheses and eight minor hypotheses were subjected to a t-test to find significance between the means of the data on each school. Two analyses using the Pearson product-moment correlation equation were conducted between 1) the total school subtest mean scores of the OCDQ and the BCAC and BLAC mean scores for each respective school and 2) the biology teachers subtest scores and the BCAC and the BLAC scores for each respective school.

All the ten null hypothesis were accepted at the .05 level of significance. However, hypothesis 2.a. approached significance (significant at the .1 level). This is interpreted to mean that 90% of the time, male biology students in the open climate perceive a lower amount of classroom practices than do male biology students in the closed climate. Also, hypothesis 2.d. approached significance (significant at the .2 level). In this case 80% of the time male biology students in the closed climate will perceive a lower amount of practices present within the classroom than do the female biology students in the closed climate schools.

In the correlation analysis the author was unable to find significance at the .05 level for the students' mean scores on the Biology Classroom Activities Checklist and the subtest scores from both the total school and the biology teachers' perceptions. All correlations for the Biology Laboratory Activities Checklist were non-significant at the .05 level except for the Esprit subtest dimension. The BLAC and the biology teachers' perceptions of the Esprit of the school correlated positively at the significance level previously cited.

Implications

The main implication seems to be that there is really no consistent relationship between the authenticity of the school climate and the biology curriculum practices carried on in the classroom. In relation to the schools that were studied, the data suggests the classroom is an autonomous unit that is left to the control of the teacher. The biology curriculum practices are controlled by the biology teacher and are not infringed upon by the interactions with the principal or other faculty members. This was evidenced by the varying scores on the BCAC and the BLAC of a majority of schools who employed two biology teachers.

Earlier studies were cited which indicated that sex differences in interest, motivation, and achievement may have some affect on the preception of events. A review of the comparisons of male and female mean scores indicates that the differences between male and female students is small but is always in the same direction. In the biology classes studied the male biology students, being more scientifically minded seem to be more critical of the biology teacher's classroom and laboratory practices than do female students. Also, students in the open climates consistently rate teachers lower than do students in the closed climates.

Another important implication of the study developed in the related correlations section of Chapter IV. Earlier studies by Anderson (1), Millar (51), and Feldvebel (19) established relationships between certain subtests and other factors within the school. In this instance the relationship is between the biology teacher's perception of the Esprit of the school and the biology laboratory practices present within the classroom. The morale of the school or the feeling of the biology teacher that his social needs are being satisfied and at the same time he is enjoying a sense of accomplishment in his job apparently has an affect on the biology curriculum practices present in his classroom. Consistently schools with high Esprit also scored high on the BLAC. The Esprit correlation with the BCAC was positive but was not significant. This would suggest that the laboratory practices are more sensitive to outside influence.

The correlations between total school faculty's perception of the aloofness of the principal and the BLAC (r=.3264) and the BCAC (r=.2420) were not significant but pose some interesting questions.

Aloofness describes the principal's behavior which is characterized as formal and impersonal. This suggests that the total school faculty view of the principal may affect the biology curriculum practices presented. However, a look at the biology teacher's perceptions of the Aloofness of the principal and the BLAC (r=-.065) and the BCAC (r=-.1971) mean scores reveals an opposite view. A composite view of all correlations indicates that the other faculty view the principal as highly aloof. The biology teachers, with more scientific background and greater exposure to rules restraint, view the principal as doing his job by the rules.

All other correlations between the total faculty's perception of the school climate and the BLAC and the BCAC mean scores approximated a zero correlation (-.15 to +.15).

The correlations (excluding the Esprit subtest) between the biology teachers' perceptions and the BLAC and the BCAC mean scores were also not significant. However, the author will look at the biology teachers' overall view of the other faculty and of the principal in relation to the amount of biology curriculum practices present within the classroom. In relation to the schools studied, the biology teacher who scores high on biology curriculum practices prefers a faculty who exhibits high Esprit, low Hindrance, and low Intimacy and a principal who exhibits high Production Emphasis, low Aloofness, low Thrust, and low Consideration.

The average openness score for the sampled schools was 32.96. The average openness score for the schools as perceived by the biology teachers was 35.78. This composite view of the data indicates that the biology teachers as a whole view the climate of the schools as more open than does the total faculty as a whole.

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

1. There is no relationship between authenticity and the biology curriculum practices present within the school.

2. Males perceive the biology practices present differently than do females.

3. The biology teachers' perceptions of the Esprit of the school correlates significantly with the biology laboratory practices.

4. The biology teachers view the climate of the school as being more open than do the other faculty members.

Suggestions for Further Research

During the data collecting phase of the investigation the author had many opportunities to discuss various phases of the biology program with the in-service biology teachers. Below are some of the possible areas resulting from these encounters for research related to biology.

1. Do male teachers who are statistically equal to female teachers conduct their biology classes with a different mode of practices?

2. Do biology teachers who have attended BSCS institutes tend to score higher on the BCAC and the BLAC than do teachers who have not attended a BSCS oriented institute?

3. Do biology teachers who have attended Academic Year Institutes tend to score higher on the BCAC and the BLAC than do teachers who have not attended an institute?

4. Does the previous teaching area of the principal have any affect on the biology practices in the school?

5. Does the per pupil expenditure of the school have any affect on the biology classroom and laboratory practices?

In reviewing the literature of the OCDQ and in discussions with superintendents and principals of the various schools, a number of pertinent areas in the school organization seemed to stand out. Several suggestions listed below were the result of these discussions.

6. Is there a difference in the perception of organizational climate by younger teachers as opposed to older teachers?

7. Is there a relationship between teacher attitudes and the organizational climate as perceived by these teachers?

8. Is there a relationship between teacher dogmatism and the organizational climate as perceived by these teachers?

9. Is there a relationship between school climate and the principal succession in the high school?

10. Does the superintendent of the school system have any affect on the climate of the school?

11. Is there a relationship between organizational climate and whether the high school is publically supported, church supported, or private?

This investigation resulted in no significant relationship between school organizational climate (openness of the school) and the biology curriculum practices presented. This raises a question concerning the classroom climate of the biology class.

12. Is there a relationship between classroom climate as defined by <u>Classroom Climate Questionnaire</u> (90) and the biology classroom and laboratory practices?

The final twelve suggestions for further research are but a few of the many possible areas open to study. The three instruments used are relatively young instruments and need more study in order to discover all the implications dealing with them.

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APPENDIX A

INSTRUMENTS

FORM II

INSTRUCTIONS:

Following are some statements about the school setting. Please indicate the extent to which each statement characterizes your school by crossing out the appropriate response on the answer sheet.

RO--Rarely Occurs, SO--Sometimes Occurs, OO--Often Occurs, VFO--Very Frequently Occurs

Sample Question: Answer Sheet

1. Teachers meet in informal groups RO SO OO VFO

1. Teachers' closest friends are other faculty members at this school.

2. The mannerisms of teachers at this school are annoying.

3. Teachers spend time after school with students who have individual problems.

4. Instructions for the operation of teaching aids are available.

5. Teachers invite other faculty members to visit them at home.

6. There is a minority group of teachers who always oppose the majority.

7. Extra books are available for classroom use.

8. Sufficient time is given to prepare administrative reports.

9. Teachers know the family background of other faculty members.

10. Teachers exert group pressure on nonconforming faculty members.

11. In faculty meetings, there is the feeling of "let's get things done."

12. Administrative paper work is burdensome at this school.

13. Teachers talk about their personal life to other faculty members.

14. Teachers seek special favors from the principal.

15. School supplies are readily available for use in classwork.

16. Student progress reports require too much work.

17. Teachers have fun socializing together during school time.

18. Teachers interrupt other faculty members who are talking in staff meetings.

19. Most of the teachers here accept the faults of their colleagues.

20. Teachers have too many committee requirements.

21. There is considerable laughter when teachers gather informally.

22. Teachers ask nonsensical questions in faculty meetings.

23. Custodial service is available when needed.

24. Routine duties interfere with the job of teaching.

25. Teachers prepare administrative reports by themselves.

26. Teachers ramble when they talk in faculty meetings.

27. Teachers at this school show much school spirit.

28. The principal goes out of his way to help teachers.

29. The principal helps teachers solve personal problems.

30. Teachers at this school stay by themselves.

31. The teachers accomplish their work with great vim, vigor, and pleasure.

32. The principal sets an example by working hard himself.

33. The principal does personal favors for teachers.

34. Teachers eat lunch by themselves in their own classrooms.

35. The morale of the teachers is high.

36. The principal uses constructive criticism.

37. The principal stays after school to help teachers finish their work.

38. Teachers socialize together in small select groups.

39. The principal makes all class-scheduling decisions.

40. Teachers are contacted by the principal each day.

41. The principal is well prepared when he speaks at school functions.

42. The principal helps staff members settle minor differences.

43. The principal schedules the work for the teachers.

44. Teachers leave the ground during the school day.

45. Teachers help select which courses will be taught.

46. The principal corrects teachers' mistakes.

47. The principal talks a great deal.

48. The principal explains his reasons for criticism to teachers.

49. The principal tries to get better salaries for teachers.

50. Extra duty for teachers is posted conspicuously.

51. The rules set by the principal are never questioned.

52. The principal looks out for the personal welfare of teachers.

53. School secretarial service is available for teachers' use.

54. The principal runs the faculty meeting like a business conference.

55. The principal is in the building before the teachers arrive.

56. Teachers work together preparing administrative reports.

57. Faculty meetings are organized according to a tight agenda.

58. Faculty meetings are mainly principal-report meetings.

59. The principal tells teachers of new ideas he has run across.

60. Teachers talk about leaving the school system.

61. The principal checks the subject-matter ability of teachers.

62. The principal is easy to understand.

63. Teachers are informed of the results of a supervisor's visit.

64. The principal insures that teachers work to their full capacity.

Organizational Climate Description Questionnaire
Cooperative Research Project #SAE 543(8639)
by Andrew Halpin and Don B. Croft

ANSWER SHEET

Form II

Name of Leader Being Described______________________________

Name of Group Which He Leads______________________________

RO--Rarely Occurs SO--Sometimes Occurs OO--Often Occurs
VFO--Very Frequently Occurs

1.	RO	SO	OO	VFO	23.	RO	SO	OO	VFO	44.	RO	SO	OO	VFO
2.	RO	SO	OO	VFO	24.	RO	SO	OO	VFO	45.	RO	SO	OO	VFO
3.	RO	SO	OO	VFO	25.	RO	SO	OO	VFO	46.	RO	SO	OO	VFO
4.	RO	SO	OO	VFO	26.	RO	SO	OO	VFO	47.	RO	SO	OO	VFO
5.	RO	SO	OO	VFO	27.	RO	SO	OO	VFO	48.	RO	SO	OO	VFO
6.	RO	SO	OO	VFO	28.	RO	SO	OO	VFO	49.	RO	SO	OO	VFO
7.	RO	SO	OO	VFO	29.	RO	SO	OO	VFO	50.	RO	SO	OO	VFO
8.	RO	SO	OO	VFO	30.	RO	SO	OO	VFO	51.	RO	SO	OO	VFO
9.	RO	SO	OO	VFO	31.	RO	SO	OO	VFO	52.	RO	SO	OO	VFO
10.	RO	SO	OO	VFO	32.	RO	SO	OO	VFO	53.	RO	SO	OO	VFO
11.	RO	SO	OO	VFO	33.	RO	SO	OO	VFO	54.	RO	SO	OO	VFO
12.	RO	SO	OO	VFO	34.	RO	SO	OO	VFO	55.	RO	SO	OO	VFO
13.	RO	SO	OO	VFO	35.	RO	SO	OO	VFO	56.	RO	SO	OO	VFO
14.	RO	SO	OO	VFO	36.	RO	SO	OO	VFO	57.	RO	SO	OO	VFO
15.	RO	SO	OO	VFO	37.	RO	SO	OO	VFO	58.	RO	SO	OO	VFO
16.	RO	SO	OO	VFO	38.	RO	SO	OO	VFO	59.	RO	SO	OO	VFO
17.	RO	SO	OO	VFO	39.	RO	SO	OO	VFO	60.	RO	SO	OO	VFO
18.	RO	SO	OO	VFO	40.	RO	SO	OO	VFO	61.	RO	SO	OO	VFO
19.	RO	SO	OO	VFO	41.	RO	SO	OO	VFO	62.	RO	SO	OO	VFO
20.	RO	SO	OO	VFO	42.	RO	SO	OO	VFO	63.	RO	SO	OO	VFO
21.	RO	SO	OO	VFO	43.	RO	SO	OO	VFO	64.	RO	SO	OO	VFO
22.	RO	SO	OO	VFO										

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 up-coming 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.

30. The laboratory includes many activities that make it possible for us to discover things for ourselves.

31. Our laboratory often consists of thoroughly learning the names of structures and their parts.

32. We work a great deal with a variety of preserved specimens and prepared slides.

33. We are able to set our own pace when doing a laboratory investigation.

34. We construct many tables, charts, and graphs in our laboratory notebooks.

35. We spend practically no laboratory time on definitions of biological terms and the learning of these definitions.

36. We spend more laboratory time making dissections of preserved organisms than studying live ones.

37. Our laboratory work consists primarily of making drawings of specimens and labeling them.

38. The equipment that we use is often too complex for most high school students to work with.

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

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

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

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

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

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

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

46. When analyzing data from one of our experiments, we are usually asked to make predictions about what might happen in related experiments.

47. We spend very little time in the interpretation of graphs and tables of the data that we collect.

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.

Biology Laboratory Activity Checklist

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.

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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 procedure 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

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 (approx.):

	Biology	Chemistry	Physics	Earth Sci.
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 ___________________

Student Data Sheet:

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 ___FTA ___T&I ___Science Club ___Pep Club

___Student Council

Other____

APPENDIX C

OCDQ SUBTEST SCORES FOR SCHOOLS

OCDQ SUBTEST AND OPENNESS SCORES

School No.	DIS	HIN	ESP	INT	ALO	PRD	THR	CON	OPEN
1.	51	60	48	53	46	58	40	48	36.5
2.	58	50	43	49	53	53	43	55	28.6
3.	53	55	45	47	44	51	54	54	45.9
4.	62	56	41	50	48	54	44	49	22.8
5.	54	54	43	50	42	59	49	53	38.4
6.	57	51	37	55	51	57	46	50	25.9
7.	57	47	40	46	52	58	48	56	31.2
8.	45	50	48	47	51	62	48	53	50.9
9.	53	48	46	50	55	58	38	56	31.9
10.	50	49	48	48	51	57	49	53	46.7
11.	58	51	42	48	54	54	45	52	29.2
12.	56	52	37	50	52	56	47	54	28.4
13.	61	51	46	53	49	52	41	50	25.5
14.	52	55	54	51	51	55	38	48	40.3
15.	58	53	39	51	48	59	42	55	23.4
16.	52	49	44	48	62	54	45	51	37.0
17.	61	55	44	49	47	56	45	47	28.5
18.	59	52	40	48	49	51	48	57	29.2
19.	58	52	42	53	50	51	43	56	27.2
20.	62	53	46	57	44	54	38	51	21.9
21.	61	54	46	54	43	55	45	46	30.6
22.	59	53	45	54	53	54	40	47	25.5
23.	54	55	44	52	50	51	50	49	40.1
24.	54	47	42	51	50	59	51	50	38.7
25.	62	51	42	56	41	52	45	55	24.4
26.	48	51	45	53	54	52	50	52	46.8
27.	53	54	56	54	50	45	42	50	45.2
28.	65	54	47	56	48	50	36	48	18.1
29.	51	55	44	48	50	58	46	53	37.7
30.	Not enough data for analysis.								

VITA

Virgil Lee Ackerson

Candidate for the Degree of

Doctor of Education

Thesis: AN INVESTIGATION INTO THE RELATIONSHIP BETWEEN ORGANIZATIONAL CLIMATE AND THE BIOLOGY STUDENTS' PERCEPTION OF PRESENT BIOLOGY PRACTICES

Major Field: Higher Education   Minor Field: Botany

Biographical:

Personal Data: Born in Blackwell, Oklahoma, August 11, 1942, the son of Floyd H. and Grace Ackerson.

Education: Attended grade school, junior high, and high school in Blackwell, Oklahoma graduating from Blackwell High School in May, 1960; received the Junior College Associate in Science Degree from Northern Oklahoma Junior College, with emphasis in chemistry, in May, 1962; received the Bachelor of Science Degree from Oklahoma State University, with a major in Natural Sciences Education, in May, 1964; received the Master of Science Degree from the Oklahoma State University, with a major in Secondary Education, in July, 1968.

Professional Experience: Chemistry and Physics Instructor at Charles Page High School, Sand Springs, Oklahoma, 1964-1966; Assistant Instructor with CCSS CHEM Study Institute at the Oklahoma State University, Summer, 1966; Assistant with the Chemistry 1515 and Chemistry 1474 classes at the Oklahoma State University, 1966-1967; Assistant with the Education 4720 class, Spring, 1968; Assistant Instructor with the Education 4352 classes, Fall and Spring, 1968-1969.