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TITLE OF THESIS...STAFFING..AND...SALARY..RATIOS...

...IN...SCHOOL...DISTRICTS..IN.....

...BRITISH...COLUMBIA.....

UNIVERSITY....UNIVERSITY...OF...ALBERTA.....

DEGREE FOR WHICH THESIS WAS PRESENTED.....Ph.D.....

YEAR THIS DEGREE GRANTED.....1972.....

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THE UNIVERSITY OF ALBERTA

STAFFING AND SALARY RATIOS IN SCHOOL DISTRICTS IN BRITISH COLUMBIA

by

© CHARLES CLARENCE UHLMAN

A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES AND RESEARCH

IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE

OF DOCTOR OF PHILOSOPHY

DEPARTMENT OF EDUCATIONAL ADMINISTRATION

EDMONTON, ALBERTA

FALL, 1972

UNIVERSITY OF ALBERTA

FACULTY OF GRADUATE STUDIES AND RESEARCH

The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies and Research for acceptance, a thesis entitled STAFFING AND SALARY RATIOS IN SCHOOL DISTRICTS IN BRITISH COLUMBIA, submitted by Charles Clarence Uhlman in partial fulfilment of the requirements for the degree of Doctor of Philosophy.

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ABSTRACT

This study (1) examined the relationships between the size and salary costs of five staffing components and eight selected variables in a sample of twenty-four British Columbia school districts, (2) compared staffing and salary ratios on a per pupil basis in school districts grouped according to size, and (3) attempted to determine which selected variables were associated with the greatest percentage of variance in each of the staffing and salary ratios.

District superintendents supplied data pertaining to the numbers and salary costs of district personnel. Interviews were conducted with the superintendents to obtain opinions pertaining to perceived staff shortages.

The group of largest school districts had the lowest mean administrative, central office, instructional, and total staff ratios. This same group had the highest mean support ratio, and had a higher mean non-instructional ratio than three of the other four groups. Similar results were obtained for the administrative, central office, and support salary ratios; however, for the remaining salary ratios no consistent pattern was observed.

Correlations between the numbers of staff per 1,000 pupils in various components and the selected variables indicated that significant (0.05) negative correlations existed between the administrative ratio and (a) total number of pupils, (b) total number of staff, and (c) mean teacher qualifications, while significant positive correlations

existed between this ratio and (a) square miles per school, and (b) district taxation per pupil. A significant positive correlation existed between the support ratio and district taxation per pupil; whereas positive, but non-significant correlations existed between this ratio and six of the remaining seven variables. Significant positive correlations existed between the central office ratio and (a) square miles per school, (b) operating budget per pupil, and (c) district taxation per pupil, while negative, but non-significant correlations existed between this ratio and the remaining five variables. Significant positive correlations existed between the non-instructional ratio and (a) operating budget per pupil, and (b) district taxation per pupil; whereas, positive, but non-significant correlations existed between this ratio and five of the remaining six variables. Negative, but non-significant correlations existed between the instructional ratio and five of the eight selected variables. Similar, but considerably lower correlations, existed for the salary ratios.

Square miles per school was associated with the greatest percentage of the variance for the administrative ratio, while number of pupils and operating budget per pupil were associated with the greatest percentage of the variance for the instructional and total staff ratios respectively. District taxation per pupil was associated with the greatest percentage of the variance for each of the central office, support, and non-instructional ratios. Similar associations were apparent for the salary ratios; however, the percentages of variance associated with each variable were considerably lower than for the staffing ratios.

ACKNOWLEDGEMENTS

The writer wishes to express sincere appreciation to his advisor, Dr. E. A. Holdaway, for the advice, assistance, and encouragement provided throughout the study. Special thanks are also extended to Dr. E. Miklos, Dr. D. Friesen, and Dr. E. J. Hanson for their contributions as members of the thesis committee.

Appreciation is extended to Mr. J. Phillipson, Deputy Minister of Education, and to the twenty-four district superintendents in British Columbia who provided data for the study.

The invaluable assistance in computer programming provided by Mrs. C. Prokop is gratefully acknowledged.

Finally, the writer wishes to acknowledge a debt of gratitude to his wife, Virginia, without whose unselfish support and constant encouragement the thesis would not have been written.

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Chapter 1

THE PROBLEM AND DEFINITION OF TERMS

The development of larger and more complex forms of organization in education has been one of the many adjustments which have taken place in response to environmental changes. As organizations increase in size, they tend to become more complex and more highly differentiated in internal structure. Blau and Scott (1962:225) stated that one of the most important changes that occurs as organizations become larger and more complex is the development of an administrative apparatus. Tosi and Patt (1967:161) noted that there have been conflicting suggestions on the relationship of the size of the administrative component to the size of the containing organization. Blau and Scott (1962:226) wrote:

> It is widely assumed that large organizations tend to be over-bureaucratized; that is, that an increase in organizational size is accompanied by a disproportionate increase in administrative overhead; but evidence does not support this assumption.

Research studies conducted in a number of non-educational organizations have reported an inverse relationship between organizational size and the size of the administrative component. Educational studies conducted by Hawley (1965), Gill (1967), Blowers (1969), Vithayathil (1969), Lepatski (1970), and Holdaway (1971) supported the findings of the above studies when they reported that administrative ratios were negatively related to organizational size.

Other researchers disagreed with the above findings. Terrien and Mills (1955:13) observed in their study of California school systems that increases in school organization size were accompanied by increases in the proportion of administrative personnel in administrative positions. Gittell's (1968) longitudinal research of six large urban school systems tended to support the conclusions reached by Terrien and Mills. Additional industrial studies suggested that larger organizations had a greater proportion of employees engaged in administration than did smaller organizations.

A number of researchers examined the relationship between organizational size and complexity, which Blau and Scott (1962) stated may be more important than size with respect to determining administrative ratios. Conflicting findings were reported by these studies, with Anderson and Warkov (1961), and Pondy (1969) reporting a positive relationship between organizational complexity and administrative ratio, while Hawley, et al. (1965), and Klatsky (1970) reported a negative relationship between these two variables.

In relation to increasing educational expenditures, Hanson (1969:1) wrote "Expenditures on education are increasing rapidly throughout the world. Since 1945 the total expenditure on education in Canada has increased at an average annual rate of 16 percent." The Canadian Teachers' Federation (1967:45) pointed out that teachers' salaries accounted for 56.4 percent of the total school board expenditures in 1963. A series of Unit Cost Analysis studies conducted in Alberta reported that teachers' salaries represented

between 52.3 and 57.9 percent of school board operating expenditures. Non-instructional salaries, as reported by Lepatski (1970), represented an average of 21.9 percent of total operating expenditures, while the percentage of operating expenditures for non-instructional salaries in the Alberta Unit Cost Analysis studies ranged between 19.01 and 22.8 percent. The Canadian research reported above was limited to individual school systems in the Unit Cost Analysis studies, and to twenty-one school systems in the metropolitan areas of Vancouver, Victoria, and Winnipeg in the Lepatski investigation.

Several authors (Yeager, 1959; Griffiths, 1962; and Carter, 1968) suggested that the non-instructional components of school systems will increase in size as a result of increasing demands for more services and facilities. Holdaway (1971:31) reported that in seven metropolitan areas of Western Canada larger school districts employed 27.1 percent of their staff in the support component, with a total of 34.6 percent employed in the non-instructional component; whereas, smaller school systems employed 19 percent in the support component and 27.4 percent in the non-instructional component. For the thirty school systems, the support component represented an average of 21.4 percent of total personnel, while the non-instructional component represented an average of 29 percent. Duboyce (1970), in a longitudinal study of the Edmonton Public School District, found that there was an increase in the growth of the central office support component between 1964 and 1969.

These considerations regarding administrative ratios, educational expenditures, and the size and salary costs of support and non-instructional components in school systems raised questions pertaining to the relationships between various staff components, and salary costs of these components, and a number of organizational variables such as organizational size, teacher qualifications, and geographic dispersion. These, and other similar relationships were the subject of this study.

THE PROBLEM

This study was an extension of a series of interrelated studies of staffing ratios and salary costs which were conducted at The University of Alberta by Gill (1967), Blowers (1969), Vithayathil (1969), Duboyce (1970), Lepatski (1970), and Gregory (1971). These studies examined the relationships between the size of school systems and the size and salary costs of various staffing components.

Statement of the Problem

The major purpose of the study was to determine the relationships between (1) school district size, (2) mean teacher qualifications, (3) number of central office departments, (4) geographic dispersion, (5) operating budget per pupil, and (6) district taxation per pupil, and (a) the size of the administrative, support, central office, non-instructional, instructional, and total staff components, and (b) the salary costs for the administrative, support, central office,

non-instructional, instructional, and total staff components for a sample of British Columbia school districts.

The study compared staffing ratios and salary costs in the administrative, support, central office, non-instructional, instructional, and total staff components of school districts in five different size categories.

Research Sub-problems

The major problems for the study were separated into a number of specific research sub-problems:

A. Personnel related sub-problems.

1. What are the distributions of (a) the mean number of personnel per 1,000 pupils, and (b) the mean percentages of personnel, in the administrative, support, central office, non-instructional, instructional, and total staff components in groups of school districts of different sizes?
2. What relationships exist between the (a) number of staff per 1,000 pupils and (b) percentage of staff, in administrative, support, central office, non-instructional, and instructional positions, and (1) school district size, (2) mean teacher qualifications, (3) number of central office departments, (4) geographic dispersion, (5) operating budget per pupil, and (6) district taxation per pupil in school districts in the sample?

3. Which of the variables (1) total number of staff, (2) total number of pupils, (3) mean teacher qualifications, (4) number of central office departments, (5) pupils per square mile, (6) square miles per school, (7) operating budget per pupil, and (8) district taxation per pupil, are the best predictors of each of the administrative, support, central office, non-instructional, instructional, and total staff ratios?

B. Salary costs related sub-problems.

1. What are the distributions of the (a) mean salary costs per pupil and, (b) mean salary costs per staff member, in the administrative, support, central office, non-instructional, instructional, and total staff components in groups of school districts of different sizes?

2. What relationships exist between the (a) salary costs per pupil, and (b) salary cost per staff member in the administrative, support, central office, non-instructional, and instructional components, and (1) school district size, (2) mean teacher qualifications, (3) number of central office departments, (4) geographic dispersion, (5) operating budget per pupil, and (6) district taxation per pupil in school districts in the sample?

3. Which of the variables (1) total number of staff, (2) total number of pupils, (3) mean teacher qualifications, (4) number of central office departments, (5) pupils per

square mile, (6) square miles per school, (7) operating budget per pupil, and (8) district taxation per pupil, are the best predictors of each of the administrative, support, central office, non-instructional, instructional, and total staff salary cost?

C. Staffing adequacy sub-problem.

1. What are the perceived shortages of central office and in-school staff, and the priorities for adding additional non-instructional and instructional staff, in school districts in the sample?

School District Organization

For the purpose of administering the public schools, British Columbia is divided into seventy-six school districts. These school districts include many combinations of cities, villages, district-municipalities, consolidated school districts, and previously unorganized territory (McCubbin, 1970:2). Depending on the type of area they contain, these school districts are classified as (a) rural school districts, or (b) municipal school districts. As of June, 1971, there were seventy municipal and seven rural school districts in the province of British Columbia (Annual Report, 1971:17).

A process of continuous amalgamation of school districts has taken place since 1946, when the Department of Education abolished 650 existing school districts, and divided the province into seventy-four large administrative areas each under a single board (D.B.S.,

1966:21). These large areas, along with fifteen unattached school districts, meant that the total number of school districts was now eighty-nine. Several factors greatly influenced the amalgamation of 1946. Two of the factors were the Cameron Royal Commission, which recommended that large school districts be established throughout the province, and the success of the three large experimental units which had been established in the Peace River, the Nanaimo-Ladysmith, and the Matsqui-Sumas-Abbottsford areas.

From 1946 to 1972 there has been a continuous program of amalgamation of school districts. In 1965, there were eighty-three large school districts and four unattached districts, while in 1970, there were seventy-nine large school districts. At the present time there are seventy-six school districts; however, the unattached school districts have ceased to exist. This continuous amalgamation process has implications for studies of this nature, as school districts which become larger because of amalgamations suddenly acquire some of the characteristics of larger school districts. However, staff patterns in large amalgamated areas may be considerably different from large areas which developed through normal growth patterns.

Also, there is a trend to larger school districts in Canada, and *The Canadian Education Association* in 1971 indicated that further enlargement of school districts is anticipated in British Columbia. "It is the intention of the Department of Education to encourage adjacent and relatively small school districts to combine in order that more effective larger units may be produced" (C.E.A., 1971). It

is interesting to note that since this statement was made, four additional amalgamations have taken place in British Columbia.

Each of the current seventy-six school districts has its own Board of Trustees which is locally elected. A Board of Trustees may be composed of three, five, seven, or nine members as determined by the Minister of Education.

Fifty-six district superintendents, who are Department of Education employees, are appointed to serve seventy-five school districts. The Vancouver School District, which has a separate charter under the Public Schools Act for its administration, has a locally appointed superintendent. Also, a fairly large number of the district superintendents serve more than one school district.

Justification of the Study

At the present time, Canadian educational systems are under considerable pressure to justify existing and proposed expenditures. Hanson (1970:20) for example wrote:

> In the field of public education, governments will make increasingly close and detailed studies in order to demonstrate benefits and costs because of the large proportion of public funds devoted to this function.

The plebiscite or referendum has been introduced into some Canadian school systems, and school districts are encountering extreme difficulties in acquiring additional revenue from this source. In British Columbia, the 108 percent ceiling which the Department of Education has placed upon shareable operating expenditures, has forced some school districts to examine their staffing practices

very closely. Expenditures for staff salaries represent approximately 80 percent of a school district's operating expenditures, and of this 80 percent, approximately 22 percent is allocated for non-instructional salaries. Thus, as this study examined staffing ratios and salary costs of both instructional and non-instructional components, the findings may be particularly relevant.

School boards and administrators, in making decisions regarding the allocation or reallocation of resources, require comparative data; however, Holdaway (1971:30) suggested that "comparative data appears to be lacking in (1) numbers and salary costs of instructional staff, and (2) numbers and salary costs for various categories of non-instructional staff." Castetter (1962:102-103) pointed out that a necessary step in planning and decision making is a survey of instructional and non-instructional personnel. In British Columbia, school districts are making decisions on staff cutbacks, although it is difficult to ascertain the basis on which such decisions are made. Perhaps the results of studies which examine the proportions of staff and salaries in the instructional and non-instructional components in school districts might assist school boards in developing staffing priorities.

This investigation has implications for the organization and administration of school systems. Data presented in the study may be used by school administrators in forecasting the numbers and specialties of non-instructional personnel whose services may be required as their school systems increase in size. Findings of

cross-sectional studies provide comparative data for groups of school districts of different sizes at one point in time; however, they do not represent a growth pattern. Thus, caution must be exercised in predicting staffing patterns over a period of time, as factors other than size may greatly affect the pattern of staff utilization.

In light of the trend towards amalgamation of school districts in British Columbia, the results of this study may assist in determining the types and numbers of personnel required for such districts.

Although several studies have been done in the area of administrative ratios of school systems (Terrien and Mills, 1955; Gittell, 1968; Gill, 1967; Blowers, 1969; Vithayathil, 1969; Duboyce, 1970; and Lepatski, 1970), only Carter, Duboyce, and Lepatski considered numbers and ratios for support personnel, and only Lepatski considered support salary costs. One of the purposes of the present study was to determine and compare support staff ratios in school districts of different sizes in British Columbia.

The majority of studies reported in Chapter 2 examined the relationships between administrative ratios and organizational size and complexity, but few of the studies were extended to include additional variables. This study, which examined the relationships between six staffing ratios and (1) size of the school districts, (2) mean teacher qualifications, (3) number of central office departments, (4) geographic dispersion, (5) operating budget per pupil, and (6) district taxation per pupil, included variables which have not previously been examined in Canadian school systems. Therefore, the

results of this study should add considerably to the current literature, and should provide some new insights as to those factors which may affect the size of staffing components in organizations. Starbuck (1965:519-520) indicated the need for further research in this area when he wrote that "the paucity of research in this area increases the hazards of drawing conclusions regarding the relationship between the size of the administrative component and the size of the organization." Starbuck further stressed the need for more data on every aspect of organizational growth and development.

DEFINITION OF TERMS

The classification of personnel included in this section, which closely resembled the one developed by Gibson and Hunt (1965: 160-163), was developed and progressively refined in a series of interrelated research studies at The University of Alberta. In order to make the results of this study comparable with the earlier studies in the series, and with companion studies by Blowers and Holdaway, the same classification was used in the present research study. Also, Rushing (1966) suggested that the results of many of the administrative ratio studies lack comparability due to the proliferation of definitions which have been used for the administrative component.

Definition of Administrative Staff

Based on the review of the literature, and previous research, administrative staff included all personnel who:

i) plan, organize, direct, coordinate, and control the activities and personnel of a school district;

ii) make key organizational decisions;

iii) supervise the work of other personnel, and;

iv) do not work directly with pupils and their instruction.

All personnel in central offices, within schools, and in the Department of Education who satisfied these criteria were classified as administrative staff.

Central office administrative staff. The central office administrative staff included all personnel who performed the administrative functions above, and who worked out of, or in, the central offices of school districts. In order to make more meaningful comparisons among groups of school districts of different sizes, the central office administrative staff were categorized into four sub-divisions:

i) the "senior" administrative staff which included the district superintendent, assistant superintendent, directors of instruction, and secretary-treasurer;

ii) the "intermediate" administrative staff which included positions such as administrative assistants, assistant secretary-treasurers, personnel, staff development, and staffing officers, public relations and information officers, and data processing officers;

iii) the "supervisory" administrative staff included supervisors, subject consultants, and subject coordinators concerned with instructional matters;

iv) the "service" administrative staff included administrative officers involved with related functions of buildings and maintenance, and purchasing and stores. Engineers, planners, purchasing agents, warehouse and office managers, and supervisors and directors of maintenance, buildings and grounds were included in this category.

In-school administrative staff. The in-school administrative staff included, on a prorated basis, all principals, assistant principals, head teachers, department heads, assistant department heads, subject coordinators, and business managers located in schools.

Administrative Component

The administrative component of a school district included all central office and in-school administrative staff.

Support Component

In this study, all personnel providing support services such as clerical, secretarial, materials center technical, and teacher aides, and who could not be classified as either administrative or instructional personnel, were classified as support personnel. The support component was subdivided into central office and in-school support components. This division was based upon the location of these personnel within the school district.

Central Office Component

The central office component consisted of all central office administrative and support personnel within the school district.

Non-instructional Component

Castetter (1962:108) defined non-instructional personnel as "those personnel who render services, which for the most part, are indirectly related to the instructional process." In this study, the non-instructional component consisted of all central office administrative and support personnel, and all in-school administrative and support staff.

Instructional Component

Following the approach of Gibson and Hunt (1965:162), instructional positions were defined as all positions requiring the rendering of direct and personal services to children in the classroom teaching-learning situation. The instructional component, for this study, included all classroom teachers, guidance personnel, and special services personnel located in schools, and all psychologists, speech therapists, and reading clinicians who were centrally located, but whose work involved direct contact with pupils; however, those who performed supervisory functions were included in the central office supervisory category.

In-school administrators were excluded; however, that prorated portion of an administrator's time spent in classroom instruction was

included in the instructional component. Thus, if an in-school administrator used 60 percent of his time for administration, and 40 percent for classroom instruction, 0.6 full-time equivalents would be charged to the in-school administrative component, and 0.4 full-time equivalents charged to the instructional component.

Administrative Salary Costs

The total gross salaries and allowances, not including fringe benefits, paid to central office administrative staff and to in-school administrative staff, on a prorated basis, were defined as administrative salary costs. Administrative salary costs as used in the remainder of this study will be in reference to this definition.

Support Salary Costs

Support salary costs consisted of the total gross salaries paid to all central office and in-school support staff.

Central Office Salary Costs

The central office salary costs included total gross salaries paid to all central office staff.

Non-instructional Salary Costs

The total gross salaries paid to all non-instructional staff were considered to be non-instructional salary costs.

Instructional Salary Costs

Instructional salary costs included the total gross salaries paid to all staff in the instructional component.

Size of School District

Two measures of school district size were used in this study:

i) the total number of pupils in the school district, and;

ii) the total number of non-instructional and instructional staff employed in the school district.

Geographic Dispersion

For school districts in the sample, geographic dispersion was defined in terms of (a) the number of pupils per square mile, and (b) the number of square miles per school. The number of pupils per square mile was determined by dividing the total number of pupils in the school district by the geographic area of the district, while the number of square miles per school was determined by dividing the geographic area of the district by the total number of schools in the district.

Teacher Qualifications

For the school districts in the sample, teacher qualifications were defined as the number of years of professional and academic training beyond high school.

Number of Central Office Departments

The number of central office departments was defined as the number of persons, in charge of departments, who reported directly to the superintendent and/or secretary-treasurer.

Operating Budget Per Pupil

This variable was defined as the total 1971 elementary and secondary operating expenditures divided by the number of pupils in the school district.

District Taxation Per Pupil

This variable was defined as the total amount of elementary and secondary revenue for 1971, which was raised through district taxation, divided by the number of pupils in the school district.

School District

The larger unit of administration in British Columbia which includes many combinations of cities, villages, district-municipalities, consolidated school districts, and previously unorganized territory. There are presently seventy-six of these larger units in British Columbia.

Staffing Ratios

Ratios of administrative, support, central office, non-instructional, and instructional personnel were expressed as:

$$\frac{\text{Total Number of Personnel in the Category}}{\text{Size of the School District}}$$

Salary Costs Ratios

Salary costs ratios of administrative, support, central office, non-instructional, and instructional personnel were expressed as:

$$\frac{\text{Total Gross Salaries of all Personnel in the Category}}{\text{Size of the School District}}$$

Proration Formula

The administrative proportion of salary costs of in-school personnel was calculated by using the following formula: Administrative Cost = (Admin. Allowance) + (Admin. Percent of Basic Salary) e.g.: For a principal with 60 percent of time allocated for administration, a grid salary of $13,000 and an administrative allowance of $3,500, the administrative cost was calculated as follows:

Administrative Cost = $3,500 + (60% of $13,000)

= $3,500 + $7,800

= $11,300

ORGANIZATION OF THE THESIS

Chapter 1 contains a statement of the problem, the sub-problems, justification of the study, and definition of terms. In Chapter 2, relevant literature and research findings related to the present study are examined.

The sample, research procedures, methods and instruments used in data collection, and the methods of analysis of the data are described in Chapter 3. Assumptions, limitations, and delimitations are also presented in this chapter.

Personnel ratios for the six components, the relationships between the selected variables and the ratios, and the results of a multiple regression analysis are presented in Chapter 4. Chapter 5 presents an analysis and discussion of the salary cost ratios for each of the six components, the relationships between the salary

cost ratios and eight selected variables, and the results of a multiple regression analysis.

In Chapter 6, an analysis of the responses of district superintendents and/or other senior officials in the sample school districts regarding their opinions of perceived staff shortages, changes in utilization of staff, priorities for adding additional staff, and size of the school district is presented.

The final chapter contains a summary of the study, conclusions of the study, discussion of the findings, and suggestions for further research in this area.

Chapter 2

REVIEW OF THE LITERATURE AND RESEARCH ON STAFFING RATIOS AND COSTS

The size and structure of organizations are influenced by organizational and environmental variables. Organizational variables such as the size of the organization, complexity, and specialization, are those in which the organization maintains some form of control; whereas, environmental variables such as government policy and economic conditions are those which are extraneous to the organization and over which the organization exercises little or no control.

Few of the research studies reviewed in this chapter attempted to examine the relationships between both organizational and environmental variables and the size of the administrative component. In fact, most researchers have focused on the relationship between the size of the organization and the size of the administrative and/or support components. Several studies, in addition to examining this relationship, looked at the relationships between and among organizational size, complexity, and size of the administrative and/or support components. Few of the studies included variables other than organizational size and complexity or structural differentiation.

More recently, a number of writers have suggested that research on the topic should be extended to include variables other than organizational size and complexity. Klatsky (1970:428) in discussing the relationship of organizational size to complexity

suggested that:

> The relationship between the size of organizations and the relative size of their administrative staff, or overhead personnel component has received a great deal of attention in comparative organizational research. As the literature on the topic grows, however, the inconsistencies in findings make it increasingly evident that the issues are more complex than they originally appeared to be.

Both Woodward (1965) and Blau and Schoenher (1971) substantiated this point of view by suggesting that variables other than organizational size may be more important in determining the size of the administrative component. Noell and Heydebrand (1971) suggested that factors such as complexity of the task structures, geographic dispersion, functional specialization, departmentalization, and professionalization may be particularly related to the size of the administrative component.

Reiss (1970), in discussing organizational complexity and the relationship between the size of the administrative component and school system size, suggested four factors that could account for the differences in staffing among different school systems: (1) irrationality based on the whims of leaders, (2) the administrative style preferred by a particular individual, (3) the relative wealth of a particular school system which might permit greater or less leeway in the number and type of administrators, and (4) the extent to which responsibilities are subdivided.

The organizational and environmental variables which may be related to the size of the administrative component are too numerous to be examined in a single research study. A decision was therefore made to examine the relationships among five staffing components and

a number of selected variables, namely, (1) size of the school district, (2) geographic dispersion, (3) mean teacher qualifications, (4) number of central office departments, (5) operating budget per pupil, and (6) district taxation per pupil. These particular variables were selected because (a) previous research and literature suggested that they may be related to the size of the various staffing components, and (2) data which could be analyzed were readily available in a measurable form.

Organizational Growth

The increase in size of the administrative component of an organization, in relation to the increase in size of the entire organization, is a relatively new field in the area of educational research. However, in recent years, both organizational theorists and researchers alike, have devoted considerable attention to this subject, which according to Litterer (1965:397), is one of the least developed areas in the study of organizations. Starbuck (1965:495) contended that ". . . the central interest is in what actually happens to administrative structure as organizational size and age increases." Several authors (Boulding, 1953:329; Haire, 1959:273; and Litterer, 1965:430) suggested that as organizations grow, their administrative structures undergo considerable change. Starbuck (1965:496) pointed out that organizational theorists have developed various aspects of the complexity assumption, and have put forth the view that as organizations grow, there is a need for proportionately larger administrative structures.

Tosi and Patt (1967:161) noted that there have been conflicting thoughts and suggestions on the relationship of the size of the administrative component to the size of the containing organization. According to Tosi and Patt (1967:161), there is almost universal belief that the administrative component of any organization increases out of proportion to the increases in the size of the organization. However, they pointed out that much of the research supports the contention that the relative size of the administrative component decreases as the organization increases. It is widely assumed, according to Blau and Scott (1962:226) and Caplow (1957:502), that organizations tend to be over-bureaucratized, in that an increase in organizational size is accompanied by a disproportionate increase in administrative staff. Blau and Scott (1962:226) reported that the research findings do not support this assumption. Findings of recent studies conducted at The University of Alberta have supported the position that the relative size of the administrative component decreases as the organization increases in size.

Several authors (Caplow, 1957; Starbuck, 1965; Rushing, 1966; and Mouzelis, 1967) severely criticized the methodology used in studying organizational growth. Caplow (1957:502) contended that most of the evidence regarding administrative growth is largely indirect and based on case studies of particular plants. Starbuck (1965:509) suggested that the paucity of research in this area increases the hazards of drawing conclusions regarding organizational size and its relationship to the administrative component, while

Rushing (1966:100-108) criticized many of the earlier studies because they used a heterogeneous category to measure the relative size of the administrative component. Mouzelis (1967:179) pointed out that longitudinal studies are particularly rare in the area of research on administrative ratios and organizational size.

Much of the research to be reviewed in this chapter has been refined to the point where many of these criticisms are no longer justified.

Research on Administrative Ratios

This section presents the findings of research which examined the relationships between organizational size and the size of the administrative component in different types of organizations. Several of the studies examined the relationships between organizational size, complexity, and the size of the administrative component. Other researchers examined the relationships between the size of an organization and a variety of other staffing components; however, the majority of the research reviewed in this section focused upon the relationship between organizational size and the size of the administrative component.

Industrial studies. Melman (1951:62-112), in a longitudinal study of manufacturing industries, examined administrative overhead and related it to organizational size, industry size, corporate organization, concentration of control, and operating characteristics. He concluded that the differences in administrative ratio, defined

as the ratio of administrative personnel to production personnel, are independent of all the variables except size. Further, Melman found that the results were the same for all indices of size, decreasing administrative ratios with increasing size of the organization. A study of German industries by Bendix (1956:221-222) produced results which closely approximated those of the Melman study. In contrast, Baker and Davis (1954:14-15), in a study of 211 Ohio manufacturing firms, found no regularity in the relationship between size of organization and proportion of administrative officials. Melman (1951), and Baker and Davis (1954) did not make statistical tests which, according to Starbuck (1965:502), resulted in findings that are highly questionable. After reviewing a number of such studies, Blau and Scott (1962:227) concluded that the size of the administrative component does not necessarily increase with organizational growth and that a negative relationship may exist between the two.

In a historical study of four manufacturing firms, Haire (1959:296-297) concluded that management grows at a slower rate than does the total organization and therefore becomes an increasingly smaller part of the whole. Haire pointed out that management accommodated increases in size of the organization by increasing each administrative span of control. Further, Haire (1959:296-297) concluded that in the early years, the staff component increased rapidly; whereas, in later growth the staff and line components increased at similar rates.

Rushing (1966:100-108) criticized earlier studies because they used a heterogeneous category to measure the relative size of the administrative component. Rushing further suggested that organizational size had quite different effects on different components of administration. In his study of sixty-four manufacturing industries, Rushing (1966:100-108) used six administrative ratios (managerial, clerical, professional, sales, service, and total personnel), and two measures of organizational size (production personnel and total personnel). He found that clerical and professional personnel ratios were both positively correlated with firm size, while managerial and sales ratios were negatively correlated with firm size, and there was an unclear relationship between service personnel ratios and firm size.

Pondy (1969:47-59) in a study of forty-five manufacturing industries concluded that administrative intensity (ratio of administrative personnel per 100 production workers) increased with functional complexity and the separation of ownership and management, and decreased with organizational size. In his study, Pondy included central headquarters personnel as well as personnel located at various operating plants in his definition of administrative personnel. On the basis of a wide variation in the relative size of the administrative component across organizations in different industries, Pondy (1969:47) suggested that there may be an optimum administrative ratio for a given organization.

Klatsky (1970:429), in commenting on the study conducted by Pondy (1969:47-59), suggested that the negative relationship between the administrative component and organizational size was due to assuming control losses across hierarchial levels, rather than to economies of scale with large size. Klatsky (1970:429) further clarified this point when he wrote:

> Although these two explanations seem very different, they are similar in that the control loss concept assumes that it is not profitable to maintain the same administrative ratio as size increases, while the concept of economies of scale assumes it is not necessary and therefore not profitable. Pondy's data cannot differentiate between these explanations since their consequences are the same. However, the control loss hypothesis (Williamson, 1967) could be more directly tested by a variable measuring the number of levels in organizations rather than the number of personnel. If the control-loss hypothesis is valid, there should be a stronger negative relationship between administrative ratio and the number of levels than between administrative ratio and size.

The above quotation has implications for administrative ratio studies of educational organizations, in that, while examining the relationship between administrative components and organizational size, they might also examine the relationship between administrative components and complexity. Campbell et al. (1965:239) stated that ". . . complexity may be in part a function of size." Blau and Scott (1962:227) when referring to the Terrien and Mills (1955) findings that larger school systems supported larger administrative staffs, pointed out that "this complexity, not size itself, may have been responsible for their larger administrative staffs." In fact, Blau and Scott (1962) felt that complexity may be more important than size with respect to determining administrative ratios.

Hospital studies. Anderson and Warkov (1961:26), in their cross-sectional study of forty-nine veterans' hospitals in the United States, related administrative ratios to both organizational size and complexity. Using the annual average daily patient load as a measure of organizational size, they concluded that the larger the hospital, the smaller the administrative staff. On the basis of their research findings, Anderson and Warkov (1961:27) suggested the following propositions:

1. The relative size of the administrative component decreases as the number of persons performing identical tasks in the same place increases.

2. The relative size of the administrative component increases as the number of places at which work is performed increases.

3. The relative size of the administrative component increases as the number of tasks performed at the same place increases (or as roles become increasingly specialized and differentiated.)

In a study of the administrative ratio in thirty-six American Army hospitals, Tosi and Patt (1967:168), concluded that administrative ratio decreases with increases in organizational size. Tosi and Patt (1967:164-168) suggested that the economies and diseconomies of scale may apply in administrative support units, in that, as organizational size increases, the administrative component decreases up to a point where the administrative staff can no longer service the entire organization, and then it begins to increase again. They further suggested that as the organization grows in size and more specialities are required, a greater number of different

administrative and support units may be required. Tosi and Patt (1967:168) cautioned that this was speculation on their part, and must be answered by further research.

Studies of other non-educational organizations. In a 1963 investigation, Haas, Hall, and Johnson (1963:9-17) studied thirty organizations which ranged in size and kind, and concluded that both organizational size and number of operating locations appeared to be inversely related to the administrative component. They supplanted the conventional "administrative" component by "supportive" component, which included all those personnel who were engaged in such activities as "bookkeeping, personnel administration, and maintenance services." Further, they dichotomized all organizational personnel into "direct" versus "supportive" categories; the distinction being based on the nature of the activity performed and the relation (direct or indirect) of the activity to organizational goals.

Indik (1964:301-312), after studying the relationship between organizational size and the supervision ratio in five separate organizations, concluded that the relationship is logarithmic in form, curvilinear in shape, and negative in slope. This negative curvilinear relationship between administrative ratio and organizational size has been supported in various other administrative ratio studies (Haas, Hall, and Johnson, 1963; Hawley, 1965; Klatsky, 1970; Blau, 1970; and Holdaway and Blowers, 1971).

In a study of 156 Public Personnel Agencies, Blau, Heydebrand, and Stauffer (1966:179-191) studied the division of labor (number of occupational titles), professionalization (proportion of operating staff with a university degree), managerial hierarchy (ratio of managerial to non-supervisory personnel, excluding clerks), and administrative apparatus (proportion of clerks to total staff). They reported that size had no effect on either the administrative ratio or the clerical percentages; however, the organizations which they studied were very small. Blau, Heydebrand, and Stauffer (1966:190) suggested that the clerical percentage decreases with size only after a certain organizational size has been reached.

Klatsky (1970:428-438), in a study of fifty-three employment agencies, concluded that the staff component (administrative ratio) was negatively correlated with both organizational size (total personnel employed) and functional differentiation (the number of organizational sub-divisions, the heads of which reported to the agency director). The study further reported that the administrative ratio was more highly correlated with organizational size than it was with functional differentiation. In an attempt to explain the findings of the study, Klatsky (1970:437) suggested that different mechanisms of coordination are characteristic of different levels of functional differentiation:

> . . . personal coordination through the managerial hierarchy when functional differentiation is low; specialized staff for coordination in the middle range of differentiation; and impersonal coordination mechanisms, such as formal rules and

> automation when functional differentiation is high. Only in the middle range would increases in size be associated with a disproportionately large number of staff personnel, since they are the main type of coordination at this stage.

Blau (1970:201-218), in a study of fifty-three employment security agencies and their sub-units, concluded that administrative ratio decreases at a declining rate as organizational size increases. In discussing the relationship between administrative ratio and functional differentiation, and between organizational size and administrative ratio, Blau (1970:201) suggested that:

> The expanding size of organizations gives rise to increasing sub-divisions of responsibilities, facilitates supervision, and simultaneously creates structural differentiation and problems of coordination that require supervisory attention. Large size, therefore, has opposite effects on the administrative component, reducing it because of economy of scale in supervision, and raising it because of the differentiation in large organizations.

These studies by Klatsky (1970:428-438) and Blau (1970: 201-218) also have implications for research on educational organizations regarding the relationship between administrative ratio and organizational size. Research in the area might be extended to examine the relationship between administrative ratio and functional differentiation.

American educational studies. Terrien and Mills (1955: 11-13), in a study of a number of school districts in California, reported that "the larger the size of the containing organization, the greater will be the proportion given over to its administrative component."

In a study of ninety-seven institutions of higher education, Hawley, Boland, and Boland (1956:252-255), found that the number of full-time administrators per 100 faculty members tended to decrease with increasing size, and that faculty size was far more important in determining this ratio than were budget, complexity, number of departments or quality (per cent of faculty with a Ph.D). The researchers found that the administrative ratio decreased as the number of departments and non-departmentalized schools increased (complexity). This finding supported the finding of Hass et al. (1963), but did not lend support to the findings of Anderson and Warkov (1961).

Gittell (1968:53-55) conducted a longitudinal study of the school districts of New York, Chicago, Detroit, St. Louis, Baltimore, and Philadelphia. She found that the administrative personnel per 100 teachers and per 1000 students doubled for New York between 1955 and 1965, while Detroit showed an administrative increase of about one-third, and the ratios for the other four cities remained the same over the ten-year period.

In a survey based on 741 school districts, Carter (1968: 51-57) attempted to determine the staffing patterns of central offices for the school year 1968-69. School districts were separated into eight categories according to the number of students enrolled, and central office ratios were determined for each category.

Carter (1968:55) noted that:

> . . . the total number of central office personnel per 1000 students in districts with enrollments in excess of 75,000 is higher -- by at least 0.5 -- than the number of districts in other enrollment categories with more than 6,000 students.

He also reported that small districts had the highest administrative ratio, and attributed this to the assignment of duties to central office administrative personnel which are ordinarily assumed by school staff in large districts. Further, Carter (1968:55) reported that districts with enrollments in excess of 75,000 had the lowest ratios of general administration, but the highest non-administrative ratio; that is, these districts made more use of support resources such as data processing, secretarial, and clerical personnel.

Alberta educational studies. Beginning in 1967, an integrated series of studies on administrative ratios has been conducted at The University of Alberta. Each of these studies showed refinements in methodology over those conducted earlier. Earlier studies used one definition of administrative ratio, whereas the later studies used multiple definitions of administrative ratio. Other refinements were the extension of staffing ratios to include all personnel employed by local school systems, and not only full-time professionals; the proration of the time spent in instructional and non-instructional duties; and, the inclusion of salary figures so as to give a picture of the relative salary costs of different prorated staff components.

Gill (1967:50), in conducting a cross-sectional study of thirty-eight urban school districts in Western Canada, concluded that ". . . the larger systems tended to have proportionately smaller administrative staffs than smaller systems." In a subsequent cross-sectional study of 108 school systems in Alberta, Vithayathil (1969:106) found ". . . that administrative ratios in school systems decreased as school size increased." Vithayathil also found that the negative relationship between administrative ratio and organizational size existed when the data were analyzed by type of school system (city school district, town school district, counties, and divisions).

Blowers (1969) conducted a cross-sectional and longitudinal study using the same districts which had been studied by Gill (1967). The study examined forty-one urban school districts in Western Canada over a five-year period from 1964-65 to 1968-69. Blowers (1969:158) confirmed Gill's general findings that larger school systems tended to be associated with smaller administrative ratios; however, his longitudinal analysis of the individual systems did not seem to support the cross-sectional findings. Table 1 reviews the statistical findings of the Terrien and Mills (1955), Gill (1967), and Blowers (1969) studies. Although Blowers found that the relationship between administrative ratio and size appeared to be negative, the relationship between administrative ratio and time appeared to be inconsistent. Blowers (1969:158) did report; however, a positive relationship between central office professional staff (psychologists, social workers, and consultants) and size of the school district.

Table 1

Comparison of Mean Percentages of Staff in Administrative Positions in Groups of California School Systems, and Western Canadian School Systems of Different Sizes

	Group	Number in group	No. of Professional Employees	Administrative component-mean percentage	Standard deviation
Terrien and Mills[a]	small	31	13-249	13.7	3.7
	medium	27	250-999	14.3	2.5
	large	10	1000-4620	15.6	1.7
Gill[b]	small	18	47-248	10.7	2.3
	medium	12	252-761	8.6	1.2
	large	7	1026-3099	6.7	1.3
Blowers[c]	small	16	56-185	9.61	2.49
	medium	13	267-616	8.57	2.33
	large	12	904-3700	6.88	1.55

[a]Obtained from Terrien and Mills (1955:13).

[b]Obtained from Gill (1967:46).

[c]Obtained from Blowers (1969:69).

The studies by Gill (1967) and Blowers (1969) included only central office university trained or equivalent personnel plus principals in their administrative component; whereas, Vithayathil (1969) extended the ratios by including vice-principals. Duboyce (1970), in an investigation of the changes in staffing ratios which took place in Edmonton Public School District over the period 1944-1969, extended the definition to include central office support staff (clerical, secretarial, and custodial). The administrative component in this study included central office administrative staff, central office auxiliary staff, central office support staff, and school principals. Duboyce (1970:59) noted that the ratio of central office administrative staff to the number of teachers had undergone cyclical changes, whereas, the auxiliary and support staff had increased substantially over the twenty-five period, especially from 1964 to 1969.

A major research project conducted in 1969-70 by Holdaway (1971:29-33), examined staffing ratios and salary costs of the various components in thirty-one school systems in seven major metropolitan areas of Western Canada. The definition of administrative component used by Duboyce (1970) was further extended to include an in-school support component consisting of secretaries, clerks, custodians, and teacher aides. The in-school administrative component was extended to include, along with principals, assistant principals, department heads, subject coordinators, and business managers. Further refinements in methodology were (1) the proration of

instructional and non-instructional duties, and (2) the inclusion of salary figures in order to provide a picture of the relative salary costs of different prorated components.

The major findings of the Holdaway (1971:31-32) study were: (1) larger school systems tend to have proportionately more staff in areas other than administration; (2) the larger school systems tended to have larger percentages of their staff in central office, support, and total non-instructional components; (3) the larger school systems tended to have a higher percentage of their total salaries allocated to central office support staff and to non-instructional staff; and (4) larger systems tended to spend higher amounts per pupil on the salaries of both instructional and non-instructional components than did smaller systems.

Sabulao and Hickrod (1971:178-191), in a study of a sample of elementary, high school, and unit districts (K-12) in Illinois, attempted to determine the optimum size for school districts relative to cost. The two basic variables used in the study were district size in terms of average daily attendance and school expenditures. Administrative costs per pupil constituted a part of the school expenditures variable.

With regards to the relationship between size and school expenditures, Sabulao and Hickrod (1971:186) reported that:

> The "economy and diseconomy of scale" concept, as it applies to school operation was fully supported. It was evident that as the size of enrollment increased school expenditure decreased up to a certain point in the size continuum. When

> the enrollment exceeded this point per pupil costs started to climb. . . . Size of the district in terms of pupil enrollment in ADA influence per pupil cost. . . .

The authors further reported that "about 58 percent of the variation in administrative cost per pupil was explained by the size of the unit district." The terms of the relationship between administrative cost and size, Sabulao and Hickrod suggested minimum - optimum - maximum size values for economic efficiency. For the elementary district the optimum size was 7,500 ADA, while for secondary and unit districts the optimum size was 2,500 ADA and 8,000 ADA respectively. Maximum size for the three types of school districts was 20,000, 12,000, and 40,000 ADA respectively; however, Sabulao and Hickrod (1971:191), cautioned that the area of "optimum size" is a "veritable Pandora's Box and once opened it may take a host of skilled researchers a very long time to close the lid."

Research on Support Personnel

Since Parkinson (1957) formulated his partially serious, partially humorous "law", considerable research has been conducted regarding the growth rate of the administrative components of organizations. At the same time, considerable attention has been focused on the growth of the clerical and secretarial components of organizations as these organizations increase in size.

Yeager (1959:6), in his analysis of non-instructional personnel throughout the United States, reported that ". . . by far the largest single groups are plant personnel. . . the next largest single

group are food service personnel . . . transportation personnel follow third in order." These three groups, along with clerical and secretarial personnel, comprised approximately eighty-six percent of the total non-instructional component as it was defined by Yeager. The study further reported (1959:7) that the non-instructional group "represents roughly 22 percent of those engaged in services to public schools." Yeager's plant personnel, food services personnel, transportation personnel, and clerical personnel, who comprised 86 percent of the total non-instructional component, corresponded very closely to the support component as defined in studies by Lepatski (1970), Duboyce (1970), and Holdaway (1971).

In a study of four manufacturing firms, Haire (1959:297), found that "the total number of clerical workers does increase as the company increases. In general, as the companies went from forty to eighty employees, the clerical staff doubled . . ."

Hass, Hall, and Johnson (1963:12-17), in attempting to determine the relationship between the relative size of the supportive component and other organizational characteristics, established that, for the various organizational types, the size of the supportive component tended to be inversely related to size.

The Canadian Education Association (1964:2-9), in a study of the number of clerical workers employed by fifty-eight urban school boards, reported that the size of the school system seemed to have little effect on the clerical assistance ratios. These ratios

were calculated in terms of the number of teachers and pupils per clerical worker. There were some differences among the regions of Canada in the amount of clerical assistance provided, and there were noticeable differences among boards in the amount of clerical assistance provided for elementary and secondary schools.

Although the amount of research on the number of teacher aides and technical assistants used in school systems appears to be rather limited, several studies showed that some school systems use these personnel quite extensively. The National Education Association (1967:14-15) reported that in 1965, 428 of 629 school districts in New York employed 3,134 teacher aides. In a study of auxiliary school personnel in British Columbia (1969:1), the British Columbia Teachers' Federation reported that 1,000 paid auxiliary personnel were used in British Columbia during the 1968-69 school year, as compared with only 200 two years earlier. Paid auxiliary personnel in this study included theme markers, laboratory assistants, library assistants, supervision assistants, school aides, and teacher aides. The British Columbia Teachers' Federation reported that the "new" finance formula has encouraged the utilization of non-professional staff. The same publication (1969:1) reported that United States federal government financial support, starting in 1965, had greatly increased the use of non-professionals to the point where a recent American survey indicated that there were nearly 400,000 aides employed in American schools. With these

changes in financial arrangements, future researchers might expect to find a much larger in-school support component due to the employment of paid auxiliary personnel.

Carter (1968:55), in studying 741 school districts in fifty states, found that districts with enrollments in excess of 75,000 had the highest ratio of clerical and secretarial personnel, while districts with enrollments between 6,001 and 12,000 had the lowest ratio of clerical and secretarial personnel.

Canadian studies conducted at The University of Alberta provided supportive evidence for the Carter findings. In comparing the number of central office support staff to the increase in numbers of total central office staff in Edmonton Public School District, Duboyce (1970:59) concluded that "since 1944 the central office support component seems to have become a slightly larger proportion of the total central office staff."

Lepatski (1970:76-77) and Holdaway (1971:16) reported that larger school systems tended to have higher percentages of staff in central office support, in-school support, and total support positions. This trend was also observed for the percentage of staff in clerical positions and in-school aides. Holdaway (1971:23) found that large systems employed 27.09 support staff per 100 teachers, while smaller systems employed 19 support staff per 100 teachers.

The findings of Carter and the Alberta studies supported the findings of the Haire study, which reported that the number of

support staff increased as the organization increased in size; however, they did not support Hass, Hall, and Johnson who reported that a negative relationship existed between the number of support staff and the size of the organization.

The studies by Haire (1959) and Carter (1968) included only clerks and secretaries in their support component, while the study by Duboyce (1970) included only central office support staff in one large urban school system. Lepatski (1970) and Holdaway (1971), although they included both central office and in-school support personnel, restricted their studies to thirty school systems in seven metropolitan areas of Western Canada. The present study examined the numbers of support personnel in twenty-four school districts in British Columbia.

Instructional and Non-instructional Salaries

Lepatski (1970:101), in a study of twenty-one school systems in three metropolitan areas of Western Canada, reported that these school systems spent between 69 and 88 percent of their operating expenditures on the salaries of non-instructional and instructional personnel. These findings, along with the findings of a series of Unit Cost Analysis studies conducted at The University of Alberta (Myroon, 1969; Duke, 1970; Phimester, 1970; Palethorpe, 1970; and Eurchuk, 1970), provided sufficient evidence that the greatest proportion of a school system's financial resources are allocated for non-instructional and instructional salaries.

Instructional Salaries. The Cost of Education Index 1970-71 for the United States, as reported by Furno and Cuneo (1971), indicated that 75.9 percent of net current expenditures for education were for instructional costs (teachers' salaries, local in-school administrators, other in-school professional personnel, in-school clerks and secretaries, textbooks, and teaching materials and equipment), with 60.6 percent allocated for instructional salaries (includes full time, part time, and temporary teachers salaries, as well as prorated portions of administrators, consultants, librarians, counsellors, department heads, etc.). A report by the Canadian Teachers' Federation (1967:44-46) reported that school boards allocated approximately 70 percent of their financial resources for teachers' salaries. Lepatski (1970:130) found that small and very large school systems in Western Canada spend approximately 56 percent of their operating budgets on instructional salaries, whereas other systems spend about 60 percent of their operating budgets on instructional salaries. For the twenty-one school systems, Lepatski (1970:130) reported that percentages of operating expenditures allocated for instructional salaries ranged from 55 to 64 percent.

Unit Cost Analysis studies of four rural Alberta school systems reported that between 52 and 58 percent of total operating expenditures in these systems were for instructional salaries. Total instructional costs for the same systems ranged from 65.5 to 77.5 percent of operating expenditures.

Non-instructional Salaries. Ward (1964), in a study of ten selected school systems in Alberta, attempted to cost the services of non-instructional personnel. Personnel were categorized as: elected personnel, office staff, plant maintenance and operational personnel, and pupil transportation personnel, and then total and per-pupil costs were determined for each of the four categories. Ward included such items as salaries, mileage, materials, and fringe benefits in the "cost" figures. The study reported that the total non-instructional costs increased as the number of pupils increased; however, the per-pupil costs of non-instructional personnel decreased as the number of pupils increased. Ward found that the greatest single cost involved pupil transportation services, with costs of plant maintenance and operation representing the second greatest cost. Costs of office staff and costs of elected personnel ranked third and fourth respectively. Ward found that these rankings applied to both total costs and per-pupil costs.

Using the same school systems as Ward, Percevalt (1964) attempted to determine the cost of administrative services of certified personnel employed in these systems. The actual administrative costs included the administrative allowance of each locally employed administrator, along with the prorated portion of salary which could be attributed to the time the administrator spent on administrative duties. The study reported that salary schedules and qualifications of administrative staff were the least important

factors in per-pupil administrative costs; whereas, the most important factors were size and type of school, administrative time provided, and number of administrative staff employed.

Small (1967), conducted a similar study to determine the "total administrative cost" in the Edmonton Public School District. The "total administrative cost" included both resident administrative costs (administrators located in schools), and other administrative service costs (wages of central office personnel, school supportive staff, maintenance, and contracted services). Small reported that resident professional administrative services made up 35.2 percent of the total administrative service costs. The study also found that these resident administrative costs increased substantially with increasing grade level. By comparing the total administrative service costs to total current expenditures, Small (1967:56), found that 23.1 percent of current expenditures in Edmonton were salaries, wages, and expenses of administrators.

Data obtained from the Alberta Unit Cost Analysis studies illustrated that non-instructional salaries (included full time or prorated portions of personnel who were only indirectly concerned with teaching activities; e.g., building administrators, counsellors, supervisors, librarians, department heads, school clerical personnel, central office personnel, transportation, maintenance, and plant operation personnel) in these five units represented between 19 and 29.5 percent of total operating expenditures. Several of these studies showed that there was a curvilinear relationship between per-

pupil costs and enrollment, with per-pupil costs higher in the schools with lower enrollments.

Furno and Cuneo (1971) reported that non-instructional salaries represented 21.4 percent of total net expenditures in the United States. This percentage agreed with the average of 22.3 percent in the five Alberta studies, and with the 21.9 percent as reported by Lepatski in his study of 21 school systems in Western Canada.

Lepatski (1970:130), reported that non-instructional salaries (central office administration, support, and auxiliary, in-school prorated administration, and support) ranged between 17 and 26 percent of total operating expenditures, with a mean of 21.9 percent. Lepatski (1970:107) also noted that mean non-instructional indices showed a tendency to be larger for groups consisting of larger systems than for groups of smaller school systems. A tendency existed for groups of large systems to have not only higher non-instructional salary expenditures, but also higher central office auxiliary and support salary expenditures; however, the groups of large systems had lower administrative percentage costs than groups of smaller school systems.

Furno and Cuneo (1971:26), reported that "size is an important factor in administrative costs; the smaller a school district, the more it must pay for administration." Lepatski's findings not only supported this statement, but they support

findings of Small, Percevalt, and the Canadian Teachers' Federation; however, they contradicted the findings of the Ward study.

Summary of Chapter 2

The conclusions of the research on administrative ratios reviewed for this study tended to support Rushing's (1967:244) statement that, ". . . contrary to Parkinson and popular conceptions, increases in organizational size apparently do not necessarily result in increases in the relative number of administrative personnel. . ."

Of the twenty-two studies reviewed, despite slightly different definitions of the administrative component, only two studies showed a positive relationship, two showed a cyclical relationship, and sixteen reported a negative relationship between the size of the administrative component and the size of the containing organization. However, when the studies of educational organizations were singled out, the results appeared more conflicting. Of the nine studies of educational organizations examined, two showed a positive relationship, two showed a cyclical relationship, and five showed a negative relationship between the size of the administrative component and organizational size.

Despite slightly different definitions of support staff, the results of studies by Haire (1959), Rushing (1966), Carter (1968), Duboyce (1970), and Lepatski (1970) suggested that the support staff ratios tended to increase as organizational size increased. However, studies by the Canadian Education Association (1964), and Blau et al.

(1966) suggested that organizational size has little effect upon the clerical assistance ratios.

In combination, instructional and non-instructional salaries comprise the largest single expenditure and the major proportion of school system operating budgets. When the data from the studies by Lepatski (1970) and Holdaway (1971) were separated into groups of school systems of different sizes, the data revealed a tendency for mean instructional, central office support, non-instructional, and total salary costs per pupil to increase consistently as the size of the school systems increased. Insofar as non-instructional costs were concerned, the results of the Small (1967) study tended to support the above findings, while the data from the Ward (1964) research tended to contradict them.

Chapter 3

DESCRIPTION OF THE SAMPLE AND RESEARCH PROCEDURES

This chapter contains a description of the manner in which school districts in the sample were selected. Also, the assumptions, limitations, delimitations, and methods and instruments used for data collection are outlined. Finally, the statistical techniques used in the data analysis are presented.

Description of the Sample

The sample for this study included all elementary and secondary personnel employed in twenty-four school districts in British Columbia.

A sample of twenty-four school districts was selected from a population of seventy-six school districts in British Columbia. The method of selection was: (1) deliberate choice of the four school districts of Surrey, Burnaby, Victoria, and Vancouver, and (2) selection of twenty school districts from among the other seventy-two school districts in four size categorizations. The Surrey, Burnaby, Victoria, and Vancouver school districts were deliberately chosen because: (1) they were the four largest school districts in the province, and (2) they contained over thirty-two percent of the total pupil population in the province. The remaining twenty school districts were selected on the basis of size, geographic location, accessibility of data collection, and willingness to supply the data.

The deliberately chosen sample of twenty-four school districts included approximately fifty-six percent of the pupil population in British Columbia. Table 2 lists the school districts, in five size categories, which were included in the sample for this study.

Assumptions and Limitations

The validity of this study depended upon the accuracy and completeness of the data provided by individual school districts in the sample. Two assumptions pertaining to the data were made: (1) that the officials in the school districts correctly interpreted and clearly understood the nature of the information required, and that they supplied complete and accurate data; and (2) that the description of administrative offices were perceived in a similar manner by those officials who supplied the data.

This study was cross-sectional and the findings represented a state of equilibrium, in that they are applicable to growth, but do not represent a growth curve.

Delimitations

This study was delimited to twenty-four school districts in British Columbia. Only personnel employed in elementary and secondary education in these school districts were included in the study. In-school personnel, such as guidance counsellors, and librarians and their assistants, who satisfied the definition of "administrative personnel" were excluded from the "in-school administrative component" and were included in the instructional

Table 2

School Districts Included in The Sample

District Name and Number	Number of Schools	Number of[a] Teachers	Number of Pupils
Group 1 (28,197-73,599)			
39. Vancouver	111	2867.4	73,599
61. Victoria	55	1290.7	31,704
41. Burnaby	53	1309.7	28,586
36. Surrey	74	1176.6	28,197
Group 2 (7,516-15,793)			
24. Kamloops	44	671.6	15,793
23. Central Okanagan	36	490.8	12,498
68. Nanaimo	36	474.8	10,876
33. Chilliwack	32	385.5	9,517
70. Alberni	25	391.2	8,970
35. Langley	30	311.0	7,561
Group 3 (4,230-5,469)			
11. Trail	14	246.2	5,469
15. Penticton	13	215.5	5,200
28. Quesnel	24	205.7	4,938
2. Cranbrook	10	168.4	4,230
Group 4 (1,966-2,626)			
48. Howe Sound	11	108.0	2,626
67. Ladysmith	12	119.5	2,575
30. South Cariboo	12	102.4	2,375
14. Southern Okanagan	4	96.1	2,251
69. Qualicum	10	86.2	1,966
Group 5 (966-1,168)			
21. Armstrong-Spallumcheen	3	49.3	1,168
76. Agassiz	5	51.1	1,042
26. Birch Island	7	45.3	1,032
29. Lillooet	5	45.8	1,006
13. Kettle Valley	7	31.8	699

[a]Includes classroom teachers and teaching portions of administrators.

component. This was done because of the difficulty of obtaining accurate estimates of administrative percentages for these personnel; furthermore, the addition of such information would not have appreciably altered the ratios obtained, since these personnel normally perform instructional related functions.

Central office and in-school support components included only secretarial and clerical personnel, materials center technical personnel, and in-school aides, as maintenance, operations, and transportation services are contracted in a number of school districts. Arriving at realistic estimates was considered to be virtually impossible.

In order to provide comparisons with other Canadian studies, district superintendents, who are Department of Education employees, were included in the individual school district data.

Methods Used for Data Collection

Each district superintendent in the sample school districts was requested to complete a questionnaire (Appendix "B") which required information as of October 1, 1971 on (1) the number of schools and pupils, (2) the numbers and salary costs of teachers in the district, (3) the positions, numbers, and gross salaries of central office administrative and support personnel, (4) the positions, numbers, and gross salaries of in-school administrative and support personnel in the district, (5) the elementary and secondary operating budget for 1971, (6) the amount of revenue for elementary and secondary education provided by government grants and district

taxation, (7) the qualifications of the teaching staff, and (8) the approximate area of the school district. An explanatory letter (Appendix "A") containing a general description of the data required, and describing the purpose and nature of the study accompanied each questionnaire.

A personal interview was conducted with the superintendent and/or other senior officials in each school district in order to (1) discuss the study, (2) obtain further information pertaining to the questionnaire, (3) assist in data extraction, (4) clarify problems pertaining to terminology and accumulation of required data, and (5) administer a questionnaire (Appendix "D") pertaining to the perceived adequacy of the number of personnel in various categories in the school district.

Instruments for Data Collection

Two basic instruments were used for data collection in this study. A questionnaire (Appendix "B"), based on information gathered from the literature and on questionnaires used in previous studies, was used to obtain the required numbers, salary costs, and miscellaneous data. An interview schedule (Appendix "D") was also used to obtain the opinions of district superintendents and/or senior officials pertaining to the adequacy of the numbers of staff in the district. Additional data were collected from the Department of Education, Statistics Canada, and the Department of Municipal Affairs.

Both the questionnaire and the interview schedule were submitted to graduate students and professors in the Department of

Educational Administration at The University of Alberta for suggestions and criticisms. Modifications were made to the two instruments on the basis of these suggestions and criticisms.

The sources of additional data provided an indication of the accuracy of some of the data which were provided by the individual school districts. Where the data for school districts were available from several sources, it was found that the data provided by the school districts were consistent with data obtained from the alternate sources.

Analysis of the Data

From the raw data provided by the twenty-four school districts, administrative, support, central office, non-instructional, instructional, and total staff components were calculated and the size of each school district was determined. By using these data, all ratios defined in Chapter 1 were computed for each school district.

The sample was categorized into five groups according to school district size, and the means of the administrative, support, central office, non-instructional, instructional, and total staff ratios were computed for each group. Analysis of variance was used to determine if there were any significant differences among the five groups of school districts in the number of staff per 1,000 pupils employed in each of the six staffing components.

Mean salary cost ratios were calculated for all personnel in each of the administrative, support, central office, non-

instructional, instructional, and total staff components of each of the five size groups. Analysis of variance was applied to determine if there were any significant differences among the five size groups of school districts regarding the salary cost ratios in each component. Where no significant differences existed between the mean ratios, at the 0.10 level, discussion was in terms of the increasing or decreasing mean ratio values which tended to exist for the five size groups. Selltiz, et al. (1963:422), in discussing statistically significant and important differences, suggested that:

> The fact that a result is statistically significant does not necessarily mean that it is socially or psychologically significant. Many statistically significant differences are trivial. . . . On the other hand, there are cases where a small but reliable difference has great practical importance. . . . One must constantly be concerned with the psychological and social meaning of one's findings as well as their statistical significance.

Although the differences between means for the five size groups were not statistically significant, they appeared to be important, to have practical implications, and to warrant discussion.

Pearson product moment correlation coefficients were calculated to determine the relationships between the staffing and salary cost ratios for the administrative, support, central office, non-instructional, instructional, and total staff components, and (1) the total number of staff, (2) the total number of pupils, (3) mean teacher qualifications, (4) pupils per square mile, (5) square miles per school, (6) number of central office departments, (7) operating budget per pupil, and (8) district taxation per pupil.

Stepwise multiple regression analysis was applied to ascertain which of the predictor variables of (1) total number of staff, (2) total number of pupils, (3) mean teacher qualifications, (4) number of central office departments, (5) pupils per square mile, (6) square miles per school, (7) operating budget per pupil, and (8) district taxation per pupil, was associated with the greatest percentage of the variance in each of the six staffing and salary cost ratios.

The responses of the superintendents and/or senior officials, pertaining to the adequacy of the number of staff in a variety of categories in the school districts, were expressed as frequency distributions and presented in Tables in Chapter 6.

Chapter 4

STAFFING RATIOS AND SELECTED VARIABLES

In this chapter mean ratios are presented for six staffing components, the relationships which existed between the mean staffing ratios and eight selected variables are examined, and finally the results of a multiple regression analysis, which attempted to determine which combination of selected variables predicted each of the six staffing ratios, are presented.

MEAN STAFFING RATIOS FOR SCHOOL DISTRICTS GROUPED BY NUMBER OF PUPILS

Due to the large amount of data and its confidential nature, raw data for the twenty-four school districts in the sample are not presented in this chapter; however, Appendix "E" contains data on which the staffing ratios were based. Tables 32 to 35 present mean numbers of staff in various staffing components for groups of school districts in five size categories.

Numbers of Personnel per 1,000 Pupils and per 100 Staff Members

Tables 3 to 6 present mean ratios and ranges for the administrative, central office, support, non-instructional, instructional and total staff components in five groups of school districts of different sizes. Analysis of variance was applied in order to determine if any differences existed among the five groups of school

districts in the mean number of staff in each of the six components. No significant differences, at the 0.10 level of significance (Scheffé test), existed between the means for any of the five groups of school districts. Mean ratios presented in this section were weighted in terms of the number of pupils in the school district.

Sub-problem A.1

> What are the distributions of (a) the mean numbers of personnel per 1,000 pupils, and (b) the mean percentages of personnel, in the administrative, central office, support, non-instructional, instructional, and total staff components in groups of school districts of different sizes?

Total administrative staff per 1,000 pupils. School districts in Group 1 showed the lowest mean administrative ratio of 3.28 with school districts in Group 4 having the highest ratio of 4.36. Group 5 school districts had a lower mean ratio of 3.99 than both Group 3 and 4 school districts, which had ratios of 4.22 and 4.36 respectively. Table 3 illustrates that the twenty-four school districts in the sample employed an average of 3.55 administrative staff per 1,000 pupils. Examination of the administrative ratios presented in Table 3 shows that larger school districts were associated with smaller administrative ratios than smaller school districts; however, the pattern was inconsistent as the ratio for school districts in Group 5 was lower than the mean ratios for both Group 3 and Group 4 school districts.

Total central office staff per 1,000 pupils. Table 3 illustrates that school districts in Group 1 showed the smallest mean ratio of 2.41, while school districts in Group 5 had the highest mean

Table 3

Means of Selected Personnel Ratios Arranged by Size of School District

Number of Pupils (Size)	N	Total Administrative Staff/1,000 Pupils		Total Central Office Staff/1,000 Pupils		Total Support Staff/ 1,000 Pupils	
		Mean	Range	Mean	Range	Mean	Range
1. 28,197-73,599	4	3.28	3.20-3.51	2.41	1.43-2.87	5.61	5.11-6.68
2. 7,516-15,793	6	3.83	2.87-4.53	3.00	2.95-3.68	4.99	3.12-6.27
3. 4,230-5,469	4	4.22	3.73-4.53	3.01	2.17-3.62	3.78	3.07-4.81
4. 1,966-2,626	5	4.36	3.36-6.13	3.48	3.02-4.80	4.96	2.53-6.85
5. 699-1,168	5	3.99	3.34-5.02	3.80	1.88-6.86	4.49	3.42-6.96
Total Sample	24	3.55	2.87-6.13	2.67	1.43-6.86	5.27	2.53-6.96

No significant differences existed, at the 0.10 level, between the means of the groups of school districts.

ratio of 3.80. Although no significant differences existed between the mean ratios for any of the five groups of school districts, there was a tendency for larger school districts to have smaller mean ratios than did smaller school districts. The sequence of mean ratios from Group 1 to Group 5 was 2.41, 3.00, 3.01, 3.48, and 3.80, with a mean ratio of 2.67 for the twenty-four school districts in the sample.

Total support staff per 1,000 pupils. The school districts in Group 1 showed the highest mean support ratio of 5.61. Mean ratios of 4.99, 3.78, 4.96 and 4.49 existed for the other four groups of school districts. Group 3 school districts had the smallest mean ratio, while the mean ratio for school districts in the sample was 5.27. Except for those school districts in Group 3, there was a tendency for mean support ratios to increase as the size of school districts increased.

Total non-instructional staff per 1,000 pupils. The mean non-instructional ratios, as presented in Table 4, showed no regular pattern of decrease or increase. School districts in Group 4 had the highest mean ratio of 9.32, while school districts in Group 3 had the lowest mean non-instructional ratio. For the three largest groups of school districts the mean ratios of 8.98, 8.82, 8.00, decreased as the size of the school districts decreased; however, there was then an increase to a mean ratio of 9.32 for Group 4 school districts, and a subsequent decrease to a mean ratio of 8.48

Table 4

Means of Selected Personnel Ratios Arranged by Size of School District

Number of Pupils (Size)	N	Total Non-instructional Staff/1,000 Pupils		Total Instructional Staff/1,000 Pupils		Total District Staff/ 1,000 Pupils	
		Mean	Range	Mean	Range	Mean	Range
1. 28,197-73,599	4	8.98	8.59-9.88	40.99	38.96-45.82	48.89	47.55-55.70
2. 7,516-15,793	6	8.82	6.66-9.79	41.78	39.27-43.66	50.60	45.93-53.41
3. 4,230-5,469	4	8.00	6.80-9.22	42.14	39.82-45.02	50.64	46.62-53.21
4. 1,966-2,626	5	9.32	6.78-12.99	43.43	41.13-46.40	52.75	49.89-54.11
5. 699-1,168	5	8.48	6.76-11.52	45.15	42.21-49.04	53.63	48.97-57.06
Total Sample	24	8.82	6.66-12.99	41.46	38.96-49.04	50.28	45.93-57.06

No significant differences existed, at the 0.10 level, between the means of the groups of school districts.

for school districts in Group 5. Only the mean non-instructional ratios of 8.98 and 9.32 for school districts in Groups 1 and 4 were higher than the mean ratio of 8.82 for the school districts in the sample.

Total instructional staff per 1,000 pupils. Although the mean instructional ratios were similar, the mean ratios of 40.99, 41.78, 42.14, 43.43, and 45.15 increased as the size of the school districts decreased. Group 1 school districts had a mean instructional ratio of 40.99; however, this was the only group in which the mean ratio was lower than the mean ratio of 41.46 for the school districts in the sample. Whereas the groups of smaller districts tended to be below the sample mean in non-instructional staff per 1,000 pupils, they tended to be above the sample mean for instructional staff per 1,000 pupils.

Total staff per 1,000 pupils. The mean total staff ratios showed the same rank order of values as the mean instructional ratios, with increasing school district size tending to be associated with decreasing mean ratios. School districts in Group 1 showed the lowest mean total staff ratio of 48.89, while the smallest group of school districts had the highest mean ratio of 53.63. Again, as was the case with the mean instructional ratios, the four largest school districts, with a mean total staff ratio of 48.89, were below the sample mean of 50.28, while the remaining four size categories had means which were above the sample mean.

Total administrative staff per 100 staff members. The largest group of school districts showed the lowest mean administrative ratio of 6.85, while school districts in Group 3 had the highest administrative ratio of 8.41. School districts in Groups 4 and 5, with mean ratios of 8.26 and 7.44, had higher mean administrative ratios than both Group 1 school districts, and school districts in the sample. A tendency existed for larger school districts to have lower mean administrative ratios than smaller school districts. The total administrative staff per 100 staff members showed a similar rank order of values to the total administrative staff per 1,000 pupils.

Total central office staff per 100 staff members. In this size category, there was a tendency for the mean central office ratios to decrease as the school districts increased in size. The mean ratios for the five size groups were 4.83, 5.92, 6.01, 6.59, and 7.09, with Group 1 school districts having a mean ratio of 4.83, while Group 5 school districts had a mean ratio of 7.09. This pattern of values was the same as the pattern of values for the total central office staff per 1,000 pupils. Again in this category, the mean ratio of 5.23 for the school districts in the sample was higher than the mean ratios for all the size categories except Group 1.

Total support staff per 100 staff members. The rank order of the values of 11.25, 9.85, 7.54, 9.40, and 8.37 obtained for this

Table 5

Means of Selected Personnel Ratios Arranged by Size of School District

Number of Pupils (Size)	N	Total Administrative Staff/100 Staff		Total Central Office Staff/100 Staff		Total Support Staff/ 100 Staff	
		Mean	Range	Mean	Range	Mean	Range
1. 28,197-73,599	4	6.85	5.74-7.11	4.83	2.58-5.84	11.25	10.36-12.00
2. 7,516-15,793	6	7.57	5.56-9.14	5.92	5.09-6.95	9.85	6.78-12.13
3. 4,230-5,469	4	8.41	8.00-8.71	6.01	4.67-7.37	7.54	6.59-9.49
4. 1.966-2,626	5	8.26	6.32-9.33	6.59	5.77-8.87	9.40	5.06-12.67
5. 699-1,168	5	7.44	5.97-9.47	7.09	3.85-9.02	8.37	6.83-12.20
Total Sample	24	7.06	5.56-9.47	5.32	2.58-9.02	10.48	5.06-12.67

No significant differences existed, at the 0.10 level, between the means of the groups of school districts.

Table 6

Means of Selected Personnel Ratios Arranged by Size of School District

Number of Pupils (Size)	N	Total Non-instructional Staff/100 Staff Members		Total Instructional Staff/100 Staff Members	
		Mean	Range	Mean	Range
1. 28,197-73,499	4	17.83	17.47-18.07	82.17	81.93-82.53
2. 7,156-15,793	6	17.42	14.49-18.79	82.58	81.21-85.51
3. 4,230-5,469	4	15.96	14.59-18.20	84.04	81.80-85.41
4. 1,966-2,626	5	17.67	13.59-24.00	82.33	76.00-86.41
5. 699-1,168	5	15.81	12.80-20.19	84.19	79.81-87.20
Total Sample	24	17.54	12.80-24.00	82.46	76.00-87.20

No significant differences existed, at the 0.10 level, between the means of the groups of school districts.

ratio was the same as the rank order of the values for the total administrative staff per 1,000 pupils. School districts in Group 1 had the highest mean ratio of 11.25, while school districts in Group 3 showed the lowest mean support ratio of 7.54. Mean ratios of 9.40 and 8.37 for Groups 4 and 5 were again higher than the mean ratio for Group 3. Only school districts in Group 1 had a higher mean support ratio of 11.25 than the mean ratio of 10.48 for the twenty-four school districts in the sample.

Total non-instructional staff per 100 staff members. Again, the pattern which existed for the mean support ratio was evident for the mean non-instructional ratios, except that school districts in Group 5, instead of school districts in Group 3, had the lowest mean non-instructional ratios, 15.81 and 15.96 respectively. School districts in Group 1 had the highest mean ratio of 17.83; however, there was little difference between the mean ratios of 17.42 and 17.67 for Groups 2 and 4. Only school districts in Groups 1 and 4 had higher mean non-instructional ratios than the twenty-four school districts which had a mean ratio of 17.54.

Total instructional staff per 100 staff members. School districts in Group 1 had the lowest mean instructional ratio of 82.17, while school districts in Group 5 had the highest mean ratio of 84.19. The mean instructional ratios for Groups 2, 3, and 4 were 82.58, 84.04, and 82.33 respectively. Only the mean ratio for school districts in Group 4 was inconsistent with the pattern of larger

school districts being associated with lower mean instructional ratios, and smaller school districts being associated with higher mean instructional ratios. School districts in Groups 2, 3, and 5 all had higher mean instructional ratios than the twenty-four school districts in the sample which had a mean ratio of 82.46.

MEANS OF SELECTED VARIABLES FOR SCHOOL DISTRICTS GROUPED BY NUMBER OF PUPILS

Tables 7 and 8 include the selected variables reported in the Pearson product moment intercorrelation matrix, and the predictors which were used in the multiple regression analysis.

Mean teacher qualifications. School districts in Group 1 had the highest mean teacher qualifications, while Group 3 school districts had the lowest mean teacher qualifications. There was little difference between the means for Groups 2, 4, and 5 and the mean for the school districts in the sample.

Number of central office departments. The greatest number of central office departments were in school districts in Group 1, while school districts in Group 5 had the smallest number of departments in their central offices. The mean for the sample was 4, compared to means of 6 and 2 for the largest and smallest school districts.

Pupils per square mile. School districts in Group 1, which contained the large urban school districts, had the greatest number

Table 7

Means of Selected Variables Arranged by Size of School District

Number of Pupils (Size)	N	Mean Number of Pupils	Mean Number of Staff	Mean Teacher Qualifications	Mean Number of Central Office Departments
1. 28,197-73,599	4	40,521	2,021.5	4.47	6
2. 7,516-15,793	6	10,869	550.1	3.99	5
3. 4,230-5,469	4	4,959	248.6	3.81	4
4. 1,966-2,626	5	2,359	124.4	3.89	3
5. 699-1,168	5	989	53.1	3.86	2
Total Sample	24	10,995	552.8	3.99	4

of pupils per square mile, while school districts in Group 5 had the smallest number of pupils per square mile. The smaller the school districts, the fewer the number of pupils per square mile, as these districts tended to be in rural sparsely populated areas of the province. Means for Groups 1 and 5 were 604.80 and 0.45, while the mean for the sample was 6.21.

Square miles per school. This variable, along with pupils per square mile, were the two measures of geographic dispersion used in this study. Group 1 school districts had the fewest number of square miles for their schools 0.9, while the smallest group of school districts had a mean of 404.2 square miles per school. The sample mean of 67.1 square miles per school was smaller than the means for all groups of school districts except Groups 1 and 2. The pattern for this variable was directly opposite to the pattern for the number of pupils per square mile.

Operating budget per pupil. The means for this variable in each size category were obtained by dividing the total elementary and secondary operating budgets for school districts by the total number of pupils in the school districts. School districts in Group 5 had the highest mean operating budgets per pupil of $795.75, while school districts in Group 3 had the lowest mean of $628.42. The mean for the group of largest school districts was $699.62, as compared with a sample of $685.97.

Table 8

Means of Selected Variables Arranged by Size of School District

Number of Pupils (Size)	N	Pupils per Square Mile	Square Miles per School	Operating Budget per Pupil	District Taxation per Pupil
1. 28,197-73,599	4	604.80	0.9	$699.62	$430.32
2. 7,516-15,793	6	5.85	54.9	$646.95	$330.35
3. 4,230-5,469	4	1.86	175.0	$628.42	$286.02
4. 1,966-2,262	5	1.24	193.7	$764.88	$433.55
5. 699-1,168	5	0.45	404.2	$795.75	$443.63
Total Sample	24	6.21	67.1	$685.97	$395.16

Means are weighted in terms of the number of pupils in the school districts.

District taxation per pupil. The values for this variable were obtained by dividing the amount of elementary and secondary revenue raised locally by the number of pupils in the school district. As was the situation with the operating budget per pupil variable, the smallest school districts had the highest mean for district taxation per pupil, while school districts in Group 3 had the lowest mean. These means of $443.63 and $286.02 respectively, compared to a mean of $395.16 for the sample.

The pattern for this variable was the same as the pattern for the operating budget per pupil variable. This was to be expected as these two variables were interdependent, and a change in one variable caused a corresponding change in the other variable.

RELATIONSHIPS BETWEEN FIVE PERSONNEL RATIOS AND EIGHT SELECTED VARIABLES

This section contains a presentation of the relationships which existed between (a) the number of staff per 1,000 pupils, and (b) the percentage of staff, in five staffing components and eight selected variables. Tables 10 and 11 present the correlation coefficients and probabilities for the relationships between the five personnel ratios and eight selected variables. An inter-correlation matrix, which shows the relationships among the eight selected variables, is presented in Table 9.

Due to the extensive similarities of the relationships between (a) the number of staff per 1,000 pupils, and (b) the percentage of staff in the five components, and the eight selected

Table 9

Pearson Product Moment Intercorrelation Matrix
For Eight Selected Variables

Selected Variables	Number of Central Office Departments		Total Number of Staff		Total Number of Pupils		Pupils Per Square Mile		Square Miles per School		Operating Budget per Pupil		District Taxation per Pupil	
	r	p	r	p	r	p	r	p	r	p	r	p	r	p
Mean Teacher Qualifications	0.44	.04	0.47	.03	0.44	.04	0.50	.02	-0.45	.04	0.01	.99	-0.27	.23
Number of Central Office Departments			0.50	.02	0.48	.03	0.38	.08	-0.60	.01	-0.56	.01	-0.25	.26
Total Number of Staff					0.99	.01	0.94	.01	-0.42	.05	-0.17	.45	0.08	.71
Total Number of Pupils							0.93	.01	-0.41	.05	-0.16	.17	0.08	.10
Pupils Per Square Mile									-0.33	.14	-0.05	.83	0.15	.51
Square Miles Per School											0.40	.06	0.46	.03
Operating Budget Per Pupil													0.60	.01
District Taxation Per Pupil														

In all tables involving correlation coefficients, the 0.01 probability level is shown whenever p <0.01.

variables, the discussion which follows focused on the number of staff per 1,000 pupils; however, Table 11 presents the relationships between the eight selected variables and the percentage of staff in the five components. A Pearson r of |0.40| with a probability of 0.05, was considered to indicate a significant relationship between two variables.

Sub-problem A.2

> What relationship exists between the (a) number of staff per 1,000 pupils and (b) percentage of staff, in administrative, support, central office, non-instructional, and instructional positions, and (1) school district size, (2) mean teaching qualifications, (3) number of central office departments, (4) geographic dispersion, (5) operating budget per pupil, and (6) district taxation per pupil in school districts in the sample?

Total administrative staff per 1,000 pupils. The correlation coefficients, as presented in Table 10 between this ratio and (1) number of staff (-0.40), (2) number of pupils (-0.40), (3) mean teaching qualifications (-0.40), (4) number of central office departments (-0.17), (5) pupils per square mile (-0.35), (6) square miles per school (0.44), (7) operating budget per pupil (-.14), and (8) district taxation per pupil (|0.40|), indicated that a significant negative relationship existed between the administrative ratio and total number of staff, total number of pupils, and mean teacher qualifications, while a significant positive or direct relationship existed between the ratio and square miles per school and district taxation per pupil.

These relationships suggested that larger school districts were associated with a smaller number of administrative staff

Table 10

Pearson Correlation Coefficients Between Personnel Ratios and Eight Selected Variables

Selected Variables	Administrative Staff/1,000 Pupils		Support Staff/ 1,000 Pupils		Central Office Staff/1,000 Pupils		Non-instruct- ional Staff/ 1,000 Pupils		Instructional Staff/1,000 Pupils	
	r	p	r	p	r	p	r	p	r	p
Total Number of Staff	-0.40	.05	0.20	.19	-0.30	.15	0.04	.84	-0.37	.08
Total Number of Pupils	-0.40	.05	0.25	.24	-0.29	.17	0.03	.90	-0.39	.06
Mean Teacher Qualifications	-0.40	.05	0.14	.53	-0.38	.07	-0.07	.73	0.07	.76
No. Central Office Depts.	-0.17	.42	0.18	.41	-0.36	.08	0.06	.76	-0.33	.11
Pupils per Square Mile	-0.35	.10	0.25	.24	-0.24	.25	0.04	.84	-0.27	.21
Square Miles per School	0.44	.03	-0.10	.70	0.64	.00	0.14	.52	-0.28	.18
Operating Budget per Pupil	0.14	.51	0.38	.07	0.53	.01	0.40	.05	0.33	.12
District Taxation per Pupil	0.40	.05	0.56	.01	0.70	.01	0.66	.01	0.14	.53

In all tables involving correlation coefficients, the 0.01 probability level is shown whenever $p < 0.01$.

per 1,000 pupils. Also, school districts with a greater number of square miles per school tended to employ a greater proportion of administrative staff, while the number of pupils per square mile was inversely related, although nonsignificantly, to the administrative ratio. Finally, those school districts with the highest district taxation per pupil employed a greater number of administrators per 1,000 pupils. This was reflected in the highest mean district taxation per pupil figures of $433.55 and $443.63 for school districts in Groups 4 and 5, in comparison to a sample mean of $395.16.

Total support staff per 1,000 pupils. Table 10 shows that there was a positive relationship between the total number of support staff per 1,000 pupils and all of the eight selected variables except square miles per school, where a very slight negative relationship (-0.10) existed. Although the correlation coefficients for seven of the selected variables were positive, only the relationship between the support ratio and district taxation per pupil ($r=0.56$) was significant. A tendency existed for larger school districts to be associated with larger numbers of support staff per 1,000 pupils; however, correlation coefficients of (0.28) and (0.25) between the support ratio and number of staff and pupils respectively, suggested that these were less definite relationships.

The relatively high correlation (0.56) between the support ratio and district taxation per pupil further substantiated the finding that school districts, which had higher mean district

taxation per pupil figures, tended to employ greater numbers of support staff per 1,000 pupils.

Total central office staff per 1,000 pupils. The correlation coefficients indicated that a nonsignificant negative relationship existed between the total number of central office staff per 1,000 pupils and, (1) number of staff (-0.30), (2) number of pupils (-0.29), (3) mean teacher qualifications (-0.38), (4) number of central office departments (-0.36), and (5) pupils per square mile (-0.24), while a significant positive relationship existed between the central office ratio and (1) square miles per school (0.64), (2) operating budget per pupil (0.53), and (3) district taxation per pupil (0.70). These relationships indicated that larger school districts, and school districts with higher mean teaching qualifications were associated with smaller numbers of central office staff per 1,000 pupils. Also, the correlation coefficient of (0.64) between the central office ratio and square miles per school indicated that the greater the average number of square miles served by schools, the greater the number of central office staff per 1,000 pupils employed by the school district.

As was the situation with both the administrative and support ratios, the significant correlation (0.70) between the central office ratio and district taxation per pupil indicated that school districts, with higher mean district taxation figures, employed greater numbers of central office staff per 1,000 pupils.

Total non-instructional staff per 1,000 pupils. Although only mean teacher qualifications was negatively correlated (-0.07) with the non-instructional ratio, the only significant positive correlation coefficients were operating budget per pupil (0.40) and district taxation per pupil (0.66). The correlation coefficients for the remaining six selected variables were so low (-0.07 to 0.14) that it was considered that no definite relationship existed between these variables and the non-instructional ratio.

There was a significant positive relationship between the non-instructional ratio and both operating budget per pupil and district taxation per pupil. This indicated that school districts with higher mean operating budget and district taxation per pupil figures employed more non-instructional staff per 1,000 pupils than did school districts with low mean operating budget per pupil and district taxation per pupil figures. This was reflected in the mean non-instructional ratios, as presented in Table 4, where school districts in Groups 1 and 4, which had the highest mean non-instructional ratios 8.82 and 9.32, also had two of the highest figures for operating budget per pupil ($699.62 and $764.88), and district taxation per pupil ($430.32 and $433.55).

Total instructional staff per 1,000 pupils. An examination of Table 10 shows that nonsignificant negative relationships existed, between the instructional ratio and (1) number of staff (r=0.37), (2) number of pupils (-0.39), (3) number of central office departments (-0.33), (4) pupils per square mile (-0.27), and (5) square miles per

Table 11

Pearson Correlation Coefficients Between Five Personnel Ratios and Eight Selected Variables

Selected Variables	Administrative Staff/100 Staff Members		Support Staff/ 100 Staff Members		Central Office Staff/100 Staff Members		Non-instruct- ional Staff/ 100 Staff Members		Instructional Staff/100 Staff Members	
	r	p	r	p	r	p	r	p	r	p
Total Number of Staff	-0.33	.11	0.39	.06	-0.27	.20	0.17	.42	-0.17	.42
Total Number of Pupils	-0.31	.14	0.37	.08	-0.25	.24	0.16	.44	-0.16	.44
Mean Teacher Qualifications	-0.41	05	0 15	.47	-0.39	.06	-0.07	.72	0.07	.72
No. Central Office Depts.	-0.10	.64	0.25	.23	-0.33	.11	0.17	.42	-0.17	.42
Pupils per Square Mile	-0.30	.15	0.33	.11	-0.22	.30	0.14	.52	-0.14	.51
Square Miles per School	0.36	.09	-0.18	.40	0.63	.00	0.03	.89	-0.03	.89
Operating Budget per Pupil	-0.01	.96	0.30	.15	0.47	.02	0.27	.21	-0.27	.21
District Taxation per Pupil	0.24	.24	0.54	.01	0.64	.01	0.58	.01	-0.58	.01

school (-0.28). This indicated that larger school districts tended to employ fewer instructional staff per 1,000 pupils than did smaller school districts. Also, larger school districts tended to be associated with higher pupil-teacher ratios, 24.01 for Group 1, than smaller school districts, 22.16 for Group 5.

The instructional ratio was positively related, although non-significantly, to (1) mean teacher qualifications (r=0.07), (2) operating budget per pupil (0.33), and (3) district taxation per pupil (0.14).

A nonsignificant correlation (0.14) between the instructional ratio and district taxation per pupil, in contrast to the significant correlations of (0.56, 0.70, and 0.66) between district taxation per pupil and central office, support, and non-instructional ratios, suggested that school districts with the highest district taxation per pupil employed additional non-instructional rather than instructional staff.

STEPWISE MULTIPLE REGRESSION ANALYSIS

Results of a stepwise multiple regression analysis in which an attempt was made to determine the best predictor and/or combination of predictors of six staffing ratios are presented and discussed in this section.

Tables 12, 13 and 14 present the results of the multiple regression analysis by indicated (a) the order in which each predictor variable entered the analysis, (b) the cumulative percentage of variance associated with combinations of predictor variables, (c)

probabilities for individual predictor variables, and (d) cumulative probabilities for a combination of these predictor variables. Predictor variables were reported up to the point where the cumulative probability for this combination of predictor variables was 0.05 or less.

The great fluctuations in the probabilities for individual predictor variables was indicative of a variable acting as a 'suppressant' variable in the multiple regression analysis. Quinn McNemar (1962:166) explained suppressant variables in the following manner:

> An interesting paradox of Multiple correlation . . . is that it is possible to increase prediction by utilizing a variable which shows no, or low, correlation with the criterion, provided it correlates well with a variable which does correlate with the criterion . . . Such a variable has been termed a 'suppressant.'

Examples of two sets of variables where a suppressant effect was evidenced were: (1) total number of staff and total number of pupils, and (2) operating budget per pupil and district taxation per pupil.

Sub-problem A.3

> Which of the variables (1) total number of staff, (2) total number of pupils, (3) mean teacher qualifications, (4) number of central office departments, (5) pupils per square mile, (6) square miles per school, (7) operating budget per pupil, and (8) district taxation per pupil, are the best predictors of each of the administrative, support, central office, non-instructional, instructional, and total staff ratios?

Total administrative staff per 1,000 pupils. The best predictor of this ratio, as indicated in Table 12 was square miles per school; however, the percentage of total variance associated with this variable was only 21.13 percent. Square miles per school and total number of staff in combination were associated with 27.12 percent of the variance in this variable, whereas these two variables in combination with district taxation per pupil, number of central office departments, and total number of pupils were associated with 50.56 percent of the total variance.

Total central office staff per 1,000 pupils. District taxation per pupil was associated with 52.63 percent of the variance in this variable. When combined with square miles per school, the two variables in combination were associated with 67.03 percent of the total variance; however, a combination of the eight predictor variables only added 14.56 percent to the variance for this variable.

Total support staff per 1,000 pupils. Prediction of the value of this variable was again best achieved by district taxation per pupil which was associated with 34.29 percent of the total variance. Addition of the variable square miles per school increased this variance to 50.68 percent; however, in comparison the total variance associated with the eight predictor variables was only 76.02 percent.

Table 12

Stepwise Multiple Regression Analysis Using Eight Predictor Variables with Six Personnel Ratios (N=24)

Criterion Variable	Predictor Variables	Cumulative % of Variance	Individual Probability	Cumulative Probability
Total Administrative Staff per 1,000 Pupils	1. Square miles per school	21.13	0.02	0.02
	2. Total number of staff	27.12	0.20	0.03
	3. District taxation per pupil	38.08	0.07	0.02
	4. Operating budget per pupil	44.89	0.14	0.02
	5. Number of central office depts.	46.69	0.44	0.03
	6. Total number of pupils	50.56	0.26	0.04
Total Central Office Staff per 1,000 Pupils	1. District taxation per pupil	52.63	0.01	0.01
	2. Square miles per school	67.03	0.01	0.01
	3. Pupils per square mile	71.75	0.08	0.01
	4. Number of central office depts.	72.14	0.61	0.01
	5. Operating budget per pupil	73.26	0.40	0.01
	6. Total number of staff	73.42	0.75	0.01
	7. Total number of pupils	80.72	0.02	0.01
	8. Mean teacher qualifications	81.59	0.41	0.01

In all tables involving results of the multiple regression analysis, the 0.01 probability level is shown whenever $p < 0.01$.

Table 13

Stepwise Multiple Regression Analysis Using Eight Predictor Variables with Six Personnel Ratios (N=24)

Criterion Variable	Predictor Variables	Cumulative % of Variance	Individual Probability	Cumulative Probability
Total Support Staff per 1,000 Pupils	1. District taxation per pupil	34.29	0.01	0.01
	2. Square miles per school	50.68	0.01	0.01
	3. Mean teacher qualifications	53.48	0.28	0.01
	4. Pupils per square mile	54.52	0.51	0.01
	5. Total number of staff	56.40	0.38	0.01
	6. Total number of pupils	69.24	0.02	0.01
	7. Operating budget per pupil	76.01	0.05	0.01
	8. Number of central office depts.	76.02	0.92	0.01
Total Non-instructional Staff per 1,000 Pupils	1. District taxation per pupil	47.93	0.01	0.01
	2. Number of central office depts.	53.94	0.11	0.01
	3. Total number of pupils	57.42	0.21	0.01
	4. Total number of staff	61.83	0.15	0.01
	5. Square miles per school	63.84	0.33	0.01
	6. Pupils per square miles	64.93	0.47	0.01
	7. Operating budget per pupil	65.73	0.55	0.01
	8. Mean teacher qualifications	66.40	0.59	0.01

Total non-instructional staff per 1,000 pupils. The best predictor of this variable, as indicated in Table 13, was district taxation per pupil which was associated with 47.93 percent of the total variance. Addition of the number of central office departments increased the variance to 53.94 percent, while a combination of seven predictor variables, pupils per square miles excluded, was associated with 66.40 percent of the total variance for this variable.

Total instructional staff per 1,000 pupils. Although total number of pupils first entered the regression analysis, it was associated with only 16.71 percent of the total variance for this variable; however, a combination of this variable, and total number of staff and number of central office departments was associated with 52.24 percent of the variance. The addition of mean teacher qualifications, district taxation per pupil, pupils per square mile, and operating budget per pupil only increased the total variance to 54.01 percent.

Total staff per 1,000 pupils. Operating budget per pupil was associated with 24.58 percent of the variance in this variable. Significant additions, bringing the total variance to 68.47 percent, were made by (1) total number of pupils, (2) total number of staff, and (3) district taxation per pupil. A combination of the eight predictor variables was associated with 72.60 percent of the total variance in this variable. Due to the low percentage of variance

Table 14

Stepwise Multiple Regression Analysis Using Eight Predictor Variables with Six Personnel Ratios (N=24)

Criterion Variable	Predictor Variables	Cumulative % of Variance	Individual Probability	Cumulative Probability
Total Instructional Staff per 1,000 Pupils	1. Total number of pupils	16.71	0.04	0.01
	2. Total number of staff	31.45	0.05	0.02
	3. Number of central office depts.	52.24	0.01	0.01
	4. Mean teacher qualifications	53.09	0.56	0.01
	5. District taxation per pupil	53.98	0.56	0.01
	6. Pupils per square mile	54.00	0.92	0.02
	7. Operating budget per pupil	54.01	0.99	0.05
Total Staff per 1,000 Pupils	1. Operating budget per pupil	24.58	0.01	0.01
	2. Total number of pupils	31.05	0.17	0.02
	3. Total number of staff	60.27	0.01	0.01
	4. District taxation per pupil	68.47	0.04	0.01
	5. Number of central office depts.	71.94	0.15	0.01
	6. Square miles per school	72.38	0.61	0.01
	7. Mean teacher qualifications	72.48	0.82	0.01
	8. Pupils per square mile	72.60	0.83	0.01

associated with operating budget per pupil, it was difficult to state that this one variable was the best predictor of the size of the total staff component. It was perhaps more realistic to state that a combination of (1) operating budget per pupil, (2) total number of pupils, and (3) total number of staff was the best predictor of the size of the total staff component.

Summary of Chapter 4

It was found that school districts in Group 1 had the smallest number of administrative, central office, instructional, and total staff per 1,000 pupils, while school districts in Group 5 had the largest number of central office, instructional, and total staff per 1,000 pupils. Although there was a tendency for larger school districts to be associated with smaller administrative, central office, instructional, and total staff ratios, there were no significant differences between the means for the five groups of school districts. For the support and non-instructional components, a tendency existed for larger school districts to be associated with higher ratios than smaller school districts; however, the pattern was one of inconsistency as the rank order of values did not progress consistently from highest to lowest.

Although the tendencies for the number of staff per 100 staff members were similar to those for the number of staff per 1,000 pupils, for all ratios except the non-instructional ratio, again, a pattern of a decreasing or increasing rank order of values was not in evidence.

Two measures of school district size were negatively correlated with the administrative, central office, and non-instructional ratios, and positively correlated with the support, and instructional ratios; however, the highest correlation coefficient was (0.40), with a probability level of (0.05). Mean teacher qualifications was negatively correlated with the administrative, central office, and non-instructional ratios, while it was positively correlated with the support and instructional ratios. Number of central office departments and pupils per square mile showed low negative correlations with administrative, central office, and instructional ratios, while there was a positive correlation between these two variables and the support and non-instructional ratios. Square miles per school was negatively correlated with the support, and instructional ratios, and positively correlated with the administrative, central office, and non-instructional ratios. The only two variables which were positively correlated with all five staffing ratios were operating budget per pupil and district taxation per pupil. District taxation per pupil was more highly correlated with all the ratios (0.64, 0.53, and 0.70), with the exception of the instructional ratio, than were any of the other seven selected variables. Three of the most significant correlations (0.64, 0.53 and 0.70) existed between the central office ratio and square miles per school, operating budget per pupil, and district taxation per pupil. The only other significant correlation coefficients were between district taxation per pupil and the support and non-instructional ratios.

The best predictor of the administrative ratio was square miles per school which was associated with 21.13 percent of the variance. District taxation per pupil was the best predictor of the support, central office, and non-instructional ratios, being associated with 52.63, 34.29, and 47.93 percent of the total variance respectively. For these three criterion variables, a combination of all eight predictor variables was associated with 81.59, 76.02, and 66.40 percent of the total variance.

The best predictor of the instructional ratio was total number of pupils which was associated with 16.71 percent of the variance; however, this variable in combination with total number of staff, and number of central office departments was associated with 52.24 percent of the total variance. Although operating budget per pupil was the best predictor of the total staff ratio, being associated with 24.58 percent of the total variance, a combination of this variable and number of staff and number of pupils was associated with 60.27 percent of the total variance.

Chapter 5

SALARY COST RATIOS AND SELECTED VARIABLES

Three main sections constitute this chapter. First, salary cost ratios for each of six staffing components are presented. Second, the relationships which existed between the salary cost ratios and eight selected variables are examined, and finally, the results of a multiple regression analysis, which attempted to determine which variables best predicted each of the salary cost ratios, is presented.

MEAN SALARY COST RATIOS FOR SCHOOL DISTRICTS GROUPED BY NUMBER OF PUPILS

Raw data are not presented in this chapter due to the large amount of data which were obtained in the analysis. Tables 36 to 39 of Appendix "E" present data on which the salary cost ratios were based. All salary costs used in the study were for the month of September, 1971.

Salary Costs per Pupil and per Staff Member

Mean salary costs per pupil and per staff member for five groups of school districts are presented in Tables 15 to 18. Analysis of variance was applied to determine if there tended to be any significant differences among the mean salary costs for the groups of school districts. No significant differences, at the 0.10 level of significance (Scheffé test), were found to exist among the mean

salary cost ratios for the five size categories. Mean ratios presented in this section were weighted in terms of the number of pupils in the school district.

Sub-problem B.1

> What are the distributions of the (1) mean salary costs per pupil, and (2) mean salary costs per staff member, in the administrative, central office, support, non-instructional, and instructional components of in groups of school districts of different sizes?

Administrative salary costs per pupil. School districts in Group 1 had the lowest mean salary costs per pupil of $6.00, while Group 4 school districts, with salary costs of $6.87 per pupil, had the highest ratio. Although school districts in Group 5 had a lower ratio of $6.41 than school districts in Groups 2, 3 and 4, there was a tendency for larger school districts to be associated with lower salary cost ratios than smaller school districts. This was consistent with the findings pertaining to the number of staff per 1,000 pupils and per 100 staff members.

The mean salary costs per pupil of $6.16 for the sample school districts was lower than the ratios of all groups of school districts except school districts in Group 1.

Central office salary costs per pupil. The same pattern which existed for the per pupil administrative salary costs existed for the per pupil central office salary costs. Larger school districts tended to have lower mean per pupil central office salary costs than groups of smaller school districts; however, school districts in

Table 15

Means and Ranges of Selected Salary Cost Variables Arranged by Size of School District

Number of Pupils (Size)	N	Total Administrative Salary Costs/Pupil		Total Central Office Salary Costs/Pupil		Total Support Salary Costs/Pupil	
		Mean	Range	Mean	Range	Mean	Range
1. 28,197-73,599	4	$6.00	$5.76-6.48	$2.20	$1.72-$2.47	$2.15	$1.70-$2.38
2. 7,516-15,793	6	$6.42	$5.13-$6.86	$2.75	$2.02-$3.20	$2.13	$1.23-$2.76
3. 4,230-5,469	4	$6.62	$5.83-$6.99	$2.94	$2.12-$3.60	$1.63	$1.27-$2.00
4. 1,966-2,626	5	$6.87	$5.66-$9.42	$3.09	$2.23-$4.65	$2.23	$1.23-$3.07
5. 699-1,168	5	$6.41	$5.27-$8.09	$3.02	$1.22-$4.84	$1.77	$1.15-$2.88
Total Sample	24	$6.16	$5.13-$9.42	$2.43	$1.22-$4.84	$2.10	$1.15-$3.07

No significant differences existed, at the 0.10 level, between the means of the groups of school districts.

Group 5 had a lower salary cost ratio than Group 4 school districts. The mean salary cost ratio for sample school districts was $2.43, as compared with mean salary cost ratios of $2.20 and $3.09 for school districts in Groups 1 and 4. This finding was again consistent with the findings pertaining to the number of staff per 1,000 pupils and per 100 staff members.

Support salary costs per pupil. School districts in Group 4 showed the highest per pupil support salary costs of $2.23, while school districts in Group 3 had the lowest mean ratio of $1.63 per pupil. Although Group 4 school districts had the highest mean salary cost ratio, there was a tendency for larger school districts to be associated with higher mean salary cost ratios. This same pattern tended to exist for the number of staff per 1,000 pupils where Group 3 school districts had the lowest mean support ratio.

School districts in Groups 1, 2, and 4, with ratios of $2.15, $2.13, and $2.23, had higher per pupil support salary costs than the $2.10 mean ratio for the total sample of twenty-four school districts.

Non-instructional salary costs per pupil. With increasing size of school districts, the non-instructional ratios showed values of $8.15, $8.55, $8.26, $9.10, and $8.18. School districts in Group 1 had the lowest salary cost ratio, while school districts in Group 4 had the highest per pupil non-instructional salary costs; however, for the three remaining groups, the pattern was inconsistent. The four largest school districts, which were above the sample mean

Table 16

Means and Ranges of Selected Salary Cost Variables Arranged by Size of School District

Number of Pupils (Size)	N	Total Non-instructional Salary Costs/Pupil		Total Instructional Salary Costs/Pupil		Total Staff Salary Costs/Pupil	
		Mean	Range	Mean	Range	Mean	Range
1. 28,197-73,599	4	$8.15	$7.96-$8.34	$41.84	$39.46-$43.17	$49.99	$47.80-$51.34
2. 7,516-15,793	6	$8.55	$7.34-$9.08	$41.11	$37.85-$45.31	$49.66	$45.19-$54.38
3. 4,230-5,469	4	$8.26	$7.37-$9.00	$40.87	$36.36-$45.67	$49.13	$43.87-$54.58
4. 1,966-2,626	5	$9.10	$7.74-$12.49	$41.80	$38.74-$45.27	$50.97	$46.48-$53.70
5. 699-1,168	5	$8.18	$6.42-$9.87	$41.48	$38.52-$44.95	$49.66	$46.89-$53.14
Total Sample	24	$8.26	$6.42-$12.49	$41.58	$36.36-$45.67	$49.84	$43.87-$54.58

No significant differences existed, at the 0.10 level, between the means of the groups of school districts.

in the support salary cost ratio, were below the mean for the sample in the per pupil non-instructional salary costs.

Instructional salary costs per pupil. Although Group 1 school districts had the highest instructional salary cost ratio of $41.84, and school districts in Group 3 had the lowest ratio, the rank order of values was again inconsistent with Groups 2, 4, and 5, showing salary cost ratios of $41.11, $41.80, and $41.48 respectively. Larger school districts, which had the highest instructional salary cost ratios, showed the lowest instructional staff ratios. This difference might be partly accounted for by the high mean teacher qualifications of the instructional staff in school districts in Group 1, 4.49 as compared with 3.99 for the school districts in the sample. In contrast to the non-instructional salary cost ratio, the four largest school districts were above the sample mean of $41.58 for the per pupil instructional salary costs.

The range of instructional salary cost ratios was not as great as the ranges for the administrative, central office, support, and non-instructional salary cost ratios.

Total salary costs per pupil. The rank order of values for mean total salary cost ratios was similar to the per pupil instructional salary costs; however, school districts in Group 4, rather than school districts in Group 1, had the highest mean per pupil total salary costs. School districts in Group 3 again had the lowest salary ratio, while the rank order of values for the remaining groups

was inconsistent. Although differences among any of the five size categories were not significant, the four largest school districts, as was the case for the instructional salary cost ratio, had a mean value above the sample mean.

Administrative salary costs per staff member. For this ratio, the rank order of values was similar to the administrative salary costs per pupil; however, the mean ratios for Groups 1 and 5, which were $120.2 and $119.6 respectively, were lower than the mean ratios for the other three groups of school districts. School districts in Group 3 had the highest per staff member administrative salary costs, $132.1 as compared with a sample mean ratio of $122.5.

Central office salary costs per staff member. The rank order of values for central office salary costs per staff member was similar to the rank order of values for mean central office per pupil salary costs. School districts in Group 1 had the lowest mean central office salary cost ratio of $44.0, while school districts in Group 4 had the highest mean central office salary costs per staff member. Although the mean salary costs per staff member for school districts in Group 4 were the highest, a range of $54.4 to $58.6 for Groups 2, 3, 4, and 5 indicated that there was little difference among the mean salary cost ratios for these groups of school districts.

Support salary costs per staff member. Group 1 school districts had a mean support salary cost of $43.0 per staff member

Table 17

Means and Ranges of Selected Salary Cost Variables Arranged by Size of School District

Number of Pupils (Size)	N	Total Administrative Salary Costs/Staff Member		Total Central Office Salary Costs/Staff		Total Support Salary Costs/Staff Member	
		Mean	Range	Mean	Range	Mean	Range
1. 28,197-73,599	4	$120.2	$116.3-$122.3	$44.0	$39.9-$51.9	$43.0	$30.5-$50.1
2. 7,516-15,793	6	$126.9	$99.4-$143.4	$54.4	$39.1-$60.5	$41.6	$26.7-$53.5
3. 4,230-5,469	4	$132.1	$118.5-$138.9	$58.5	$45.5-$73.3	$32.6	$27.3-$39.5
4. 1,966-2,626	5	$130.2	$106.5-$174.1	$58.6	$41.9-$86.0	$42.3	$24.6-$56.7
5. 699-1,168	5	$119.6	$99.6-$152.6	$56.3	$24.8-$91.3	$33.0	$33.0-$50.4
Total Sample	24	$122.5	$99.4-$174.1	$48.2	$24.8-$91.3	$41.9	$23.4-$53.5

No significant differences existed, at the 0.10 level, between the means of the groups of school districts.

and school districts in Group 4 had the second highest mean support salary cost ratio of $42.3 per staff member. Mean support salary cost ratios for both Group 1 and 4 school districts were above the sample mean of $41.9 per staff member. The reverse was true for the mean support salary costs per pupil, where Group 4 school districts had the highest mean salary cost ratio while Group 1 school districts had the second highest mean salary ratio.

Non-instructional salary costs per staff member. Mean salary costs per staff member were highest for Group 4 school districts and lowest for school districts in Group 5. The mean salary cost ratios of $152.5 for the smallest districts, and $163.3 for the largest districts were both lower than the sample mean salary cost ratio of $164.4. There were no significant differences among the mean salary cost ratios for Groups 1, 2, and 3, which ranged from $163.3 to $164.7.

Instructional salary costs per staff member. The rank order of values for the mean per staff member instructional salary costs was similar to the rank order of values for instructional salary costs per pupil. Group 1 school districts had the highest per staff member instructional salary costs of $838.7, while school districts in Group 5, with a mean ratio of $773.6, had the lowest instructional salary cost ratio. Mean instructional salary cost

Table 18

Means and Ranges of Selected Salary Cost Variables Arranged by Size of School District

Number of Pupils (Size)	N	Total Non-instructional Salary Costs/Staff Member		Total Instructional Salary Costs/Staff Member	
		Mean	Range	Mean	Range
1. 28,197-73,499	4	$163.3	$146.8-$171.2	$838.7	$775.0-$885.2
2. 7,156-15,793	6	$168.5	$152.8-$185.9	$810.8	$770.9-$855.8
3. 4,230-5,469	4	$164.7	$152.7-$177.5	$815.1	$739.1-$858.3
4. 1,966-2,626	5	$172.5	$148.4-$230.8	$793.6	$739.7-$864.3
5. 699-1,168	5	$152.5	$123.0-$186.1	$773.6	$719.9-$834.3
Total Sample	24	$164.4	$123.0-$230.8	$826.9	$719.9-$885.2

No significant differences existed, at the 0.10 level, between the means of the groups of school districts.

ratios for the five groups of school districts were $838.8, $810.8, $815.1, $793.6, and $773.6, as compared to a mean ratio for the total sample school districts of $826.9. Table 18 shows that larger school districts tended to be associated with higher instructional salary costs per staff member than smaller school districts.

RELATIONSHIPS BETWEEN FIVE SALARY COST RATIOS AND EIGHT SELECTED VARIABLES

This section contains a presentation of the relationships which existed between salary cost ratios for five staffing components and eight selected variables. Tables 20 and 21 present the correlation coefficients and probabilities for the relationships between the staffing ratios and selected variables. An inter-correlation matrix which shows the relationships among the eight selected variables is presented in Table 19.

Due to the similarities of the relationships between the (1) salary costs per pupil, and (2) salary costs per staff member, and the eight selected variables, the discussion which follows focuses on the salary costs per pupil; however, Table 21 presents the relationships between the eight selected variables and the salary costs per staff member for each of the five components. A Pearson r of $|0.40|$, with a probability of 0.05, was considered to indicate a significant relationship between two variables.

Sub-problem B.2

> What relationship exists between the (a) mean salary costs per pupil and (b) mean salary costs per staff member, in the administrative, central office, support, non-instructional,

Table 19

Pearson Product Moment Intercorrelation Matrix
For Eight Selected Variables

Selected Variables	Number of Central Office Departments		Total Number of Staff		Total Number of Pupils		Pupils Per Square Mile		Square Miles per School		Operating Budget per Pupil		District Taxation per Pupil	
	r	p	r	p	r	p	r	p	r	p	r	p	r	p
Mean Teacher Qualifications	0.44	.04	0.47	.03	0.44	.04	0.50	.02	-0.45	.04	0.01	.99	-0.27	.23
Number of Central Office Departments			0.50	.02	0.48	.03	0.38	.08	-0.60	.01	-0.56	.01	-0.25	.26
Total Number of Staff					0.99	.01	0.94	.01	-0.42	.05	-0.17	.45	0.08	.71
Total Number of Pupils							0.93	.01	-0.41	.05	-0.16	.17	0.08	.10
Pupils Per Square Mile									-0.33	.14	-0.05	.83	0.15	.51
Square Miles Per School											0.40	.06	0.46	.03
Operating Budget Per Pupil													0.60	.01
District Taxation Per Pupil														

In all tables involving correlation coefficients, the 0.01 probability level is shown whenever $p < 0.01$.

and instructional components, and (1) school district size, (2) mean teacher qualifications, (3) number of central office departments, (4) geographic dispersion, (5) operating budget per pupil, and (6) district taxation per pupil in school districts in the sample?

Total administrative salary costs per pupil. The correlation coefficients presented in Table 20 shows that a low negative relationship existed between this ratio and (1) number of staff (r=-0.23), (2) number of pupils (-0.23), (3) mean teacher qualifications (-0.21), (4) number of central office departments (-0.23), and (5) pupils per square mile (-0.18), whereas a positive relationship existed between the administrative salary costs per pupil and (1) square miles per school (0.34), (2) operating budget per pupil (0.11) and (3) district taxation per pupil (0.40). As expected, these relationships were similar in both magnitude and direction to the relationships between the administrative staffing ratios and the eight selected variables.

Salary costs per pupil for the administrative component tended to be inversely related to the two measures of size, staff qualifications, central office departmentalization, and one of the measures of geographic dispersion. Although square miles per school, operating budget per pupil, and district taxation per pupil were positively correlated with the administrative salary cost ratio, the coefficients were low, with only the correlation between district taxation per pupil and the ratio being significant.

The existence of these tendencies indicated that larger school districts were associated with lower administrative salary

Table 20

Pearson Correlation Coefficients Between Five Salary Cost Ratios and Eight Selected Variables

Selected Variables	Administrative Salary Costs/ Pupil		Support Salary Costs/Pupil		Central Office Salary Costs/ Pupil		Non-instruct-ional Salary Costs/Pupil		Instructional Salary Costs/ Pupil	
	r	p	r	p	r	p	r	p	r	p
Total Number of Staff	-0.23	.29	0.15	.48	-0.28	.19	-0.10	.62	0.08	.73
Total Number of Pupils	-0.23	.29	0.15	.48	-0.26	.22	-0.11	.61	0.06	.78
Mean Teacher Qualifications	-0.21	.33	-0.14	.52	-0.35	.10	-0.22	.29	0.17	.41
No. Central Office Depts.	-0.23	.29	-0.01	.98	-0.24	.27	-0.02	.92	0.06	.79
Pupils per Square Mile	-0.18	.40	0.08	.72	-0.23	.26	-0.10	.63	0.12	.57
Square Miles per School	0.34	.10	0.01	.95	0.65	.01	0.27	.20	-0.24	.25
Operating Budget per Pupil	0.11	.62	0.38	.07	0.28	.18	0.26	.22	0.11	.60
District Taxation per Pupil	0.40	.05	0.60	.01	0.57	.01	0.57	.01	0.21	.33

costs per pupil while smaller school districts were associated with higher administrative salary costs per pupil. Also, there was a tendency for school districts with larger areas and higher district taxation per pupil figures to be associated with higher administrative salary costs per pupil.

Total support salary costs per pupil. Table 20 shows that a slight negative relationship existed between support salary costs per pupil and mean teacher qualifications (-0.14) while no definite relationships existed between this ratio and (1) number of central office departments, and (2) square miles per school. Positive relationships existed between the support salary cost ratio and the remaining four selected variables; however, only the correlation between the support salary cost ratio and district taxation per pupil (0.60) was significant.

These relationships indicated that larger school districts tended to be associated with higher support salary costs per pupil. The high correlation between support salary costs per pupil and district taxation per pupil (0.60) indicated that smaller school districts, which were associated with higher mean district taxation figures, expended larger amounts for salary costs of support personnel.

Total central office salary costs per pupil. The relationships for this ratio were similar in direction to the relationships for the administrative salary costs per pupil. Central

office salary costs per pupil was negatively related to (1) number of staff (-0.28), (2) number of pupils (-0.26), (3) mean teacher qualifications (-0.35), (4) number of central office departments (-0.24), and (5) pupils per square mile (-0.23) and positively related to (1) square miles per school (0.65), (2) operating budget per pupil (0.28), and (3) district taxation per pupil (0.57). These relationships indicated that there was a tendency for larger school districts and school districts with higher mean teacher qualifications to be associated with lower central office salary costs per pupil.

The high correlation between the central office salary cost ratio and square miles per school (0.65) indicated that school districts with larger areas had higher central office salary costs per staff member. Since smaller school districts had larger values for the square miles per school variable, 404 compared with 0.9 for Group 1 school districts and 67.1 for the sample (as shown in Table 8), the conclusion was drawn that smaller school districts were associated with higher central office salary costs per pupil. Also, school districts with higher district taxation per pupil, which were usually the smaller districts, tended to have higher central office salary costs per pupil.

Total non-instructional salary costs per pupil. Again, the directional relationships which existed for administrative and central office salary costs per pupil existed for the non-instructional salary costs ratio; however, the correlation coefficients were lower than those for the administrative and central office salary cost ratios.

There was a positive relationship between the non-instructional salary costs ratio and (1) square miles per school (0.27), (2) operating budget per pupil (0.26), and (3) district taxation per pupil (0.57). Although the relationships between non-instructional salary costs per pupil and the other selected variables were negative, the correlation coefficients which ranged from (-0.02) to (-0.22) were nonsignificant in all cases. These relationships suggested that larger school districts tended to be associated with lower non-instructional salary costs per pupil. There was also a tendency for school districts with larger areas and higher operating budgets per pupil to have higher per pupil non-instructional salary costs.

As was the case for the other three salary cost ratios, district taxation per pupil was significantly correlated with non-instructional salary costs per pupil. Again, as smaller school districts were associated with larger areas and higher district taxation per pupil figures, they tended to have higher per pupil non-instructional salary costs.

Total instructional salary costs per pupil. An examination of Table 21 indicates that a nonsignificant positive relationship existed between the instructional salary costs per pupil and seven of the eight selected variables; however, the correlation coefficients were low, being between (0.06 and 0.21). The remaining selected variable, square miles per school, was negatively correlated (-0.24) with the per pupil instructional salary costs. These relationships suggested that larger school districts tended to be associated with

Table 21

Pearson Correlation Coefficients Between Five Salary Cost Ratios and Eight Selected Variables

Selected Variables	Administrative Salary Costs/ Staff Member		Support Salary Costs/Staff Member		Central Office Salary Costs/ Staff Member		Non-instruct-ional Salary Costs/Staff		Instructional Salary Costs/ Staff Member	
	r	p	r	p	r	p	r	p	r	p
Total Number of Staff	-0.12	.56	0.25	.23	-0.23	.21	0.02	.93	0.39	.06
Total Number of Pupils	-0.13	.59	0.25	.23	-0.22	.30	0.03	.90	0.40	.05
Mean Teacher Qualifications	-0.22	.30	-0.13	.55	-0.35	.09	-0.24	.25	0.18	.41
No. of Central Office Depts.	0.07	.73	0.06	.78	-0.19	.38	0.09	.67	0.30	.16
Pupils per Square Mile	-0.11	.61	0.15	.47	-0.21	.33	-0.02	.94	0.35	.09
Square Miles per School	0.23	.28	-0.07	.75	0.61	.01	0.16	.47	-0.56	.01
Operating Budget per Pupil	-0.08	.69	0.30	.16	0.20	.36	0.07	.73	-0.33	.11
District Taxation per Pupil	0.21	.33	0.53	.01	0.49	.02	0.42	.04	-0.21	.33

higher instructional salary costs per pupil. Although larger school districts tended to be associated with fewer instructional staff per 1,000 pupils, this difference was partly explained by the fact that larger school districts had more highly qualified staff members, and thus, their salary costs per pupil were higher than those of smaller districts.

The negative correlation between square miles per school and the instructional salary costs ratio suggested that school districts with larger areas tended to have lower per pupil instructional salary costs. This was to be expected as these school districts employed more non-instructional than instructional staff members per 1,000 pupils, and thus had higher per pupil non-instructional salary costs.

There was a nonsignificant positive relationship between this ratio and district taxation per pupil (0.21); however, the correlation coefficient was smaller than the correlation coefficients for the other four ratios and district taxation per pupil. These relationships reflected the relationships which existed between the number of staff per 1,000 pupils, in each of the five components, and district taxation per pupil, where school districts with higher mean district taxation figures tended to have higher non-instructional than instructional staffing ratios.

STEPWISE MULTIPLE REGRESSION ANALYSIS

This section presents and discusses the results of a stepwise multiple regression analysis in which an attempt was made to determine the best predictor and/or combination of predictors of six salary cost ratios.

Tables 22, 23 and 24 present the results of the multiple regression analysis by indicating (a) the order in which each predictor variable entered the analysis, (b) the cumulative percentage of variance associated with combinations of predictor variables, (c) probabilities for individual predictor variables, and (d) cumulative probabilities for a combination of these predictor variables. Predictor variables were reported up to the point where the cumulative probability for this combination of predictor variables was 0.05 or less.

Sub-problem B.3

> Which of the variables (1) total number of staff, (2) total number of pupils, (3) mean teacher qualifications, (4) number of central office departments, (5) pupils per square mile, (6) square miles per school, (7) operating budget per pupil, and (8) district taxation per pupil, are the best predictors of each of the administrative, support, central office, non-instructional, instructional, and total salary cost ratios?

Total administrative salary costs per pupil. The best predictor of this ratio, as shown in Table 22 was district taxation per pupil; however, the percentage of total variance associated with

Table 22

Stepwise Multiple Regression Analysis Using Eight Predictor Variables with Six Salary Cost Ratios (N=24)

Criterion Variable	Predictor Variables	Cumulative % of Variance	Individual Probability	Cumulative Probability
Total Administrative Salary Costs per Pupil	1. District taxation per pupil	16.14	.04	.04
	2. Number of central office depts.	23.82	.16	.05
Total Central Office Salary Costs per Pupil	1. Square miles per school	45.51	.01	.01
	2. District taxation per pupil	55.34	.04	.01
	3. Number of central office depts.	58.63	.22	.01
	4. Pupils per square mile	62.63	.17	.01
	5. Operating budget per pupil	63.02	.67	.01
	6. Total number of staff	63.27	.74	.01
	7. Total number of pupils	69.33	.09	.01
	8. Mean teacher qualifications	72.08	.24	.01

this variable was only 16.14 percent. District taxation per pupil and total number of pupils in combination were associated with 23.83 percent of the variance in this variable.

Total central office salary costs per pupil. Square miles per school was associated with 45.51 percent of the variance in this variable. When combined with district taxation per pupil, the two variables in combination were associated with 55.34 percent of the total variance; however, a combination of the eight predictor variables, which was associated with 72.08 percent of the variance, only added 16.74 percent to the variance for this variable. The best predictor of the salary cost of the central office component in a school district was the variable square miles per school.

Total support salary costs per pupil. Prediction of the value of this variable was again best achieved by district taxation per pupil which was associated with 39.13 percent of the total variance. Addition of the variable square miles per school increased this variance to 48.80 percent; however, in comparison the total variance associated with the eight predictor variables was only 62.96 percent.

Total non-instructional salary costs per pupil. The best predictor of this variable, as shown in Table 23, was district taxation per pupil which was associated with 35.70 percent of the total variance. Addition of pupils per square mile increased the

Table 23

Stepwise Multiple Regression Analysis Using Eight Predictor Variables with Six Salary Cost Ratios (N=24)

Criterion Variable	Predictor Variables	Cumulative % of Variance	Individual Probability	Cumulative Probability
Total Support Salary Costs per Pupil	1. District taxation per pupil	39.13	.01	.01
	2. Square miles per school	48.80	.06	.01
	3. Pupils per square mile	51.69	.28	.01
	4. Total number of staff	57.55	.12	.01
	5. Operating budget per pupil	59.86	.32	.01
	6. Total number of pupils	60.70	.55	.01
	7. Mean teacher qualifications	62.83	.35	.01
	8. Number of central office depts.	62.96	.82	.03
Total Non-instructional Salary Costs per Pupil	1. District taxation per pupil	35.70	.01	.01
	2. Pupils per square miles	39.66	.25	.01
	3. Number of central office depts.	45.24	.17	.01
	4. Total number of pupils	45.36	.83	.02
	5. Operating budget per pupil	45.49	.84	.04

variance to 39.66 percent, while a combination of five predictor variables was associated with 45.49 percent of the total variance for this variable. As was the situation for the total number of central office staff per 1,000 pupils, the best predictor of the salary costs of this component was district taxation per pupil.

Total instructional staff per 1,000 pupils. Although square miles per school first entered the regression analysis, it was only associated with 6.44 percent of the total variance for this variable; however, a combination of all eight predictor variables was only associated with 34 percent of the variance in this variable.

Total staff salary costs per pupil. District taxation per pupil was associated with 19.64 percent of the variance in this variable. Significant additions, bringing the total variance to 43.14 percent, were made by (1) square miles per school, (2) total number of pupils, (3) total number of staff, and (4) number of central office departments. Due to the low percentage of variance which was associated with district taxation per pupil, it was difficult to state that this one variable was the best predictor of the salary costs of the total staff component. It is perhaps more realistic to state that a combination of (1) district taxation per pupil, (2) square miles per school, and (3) total number of pupils was the best predictor of the salary costs of the total staff component.

Table 24

Stepwise Multiple Regression Analysis Using Eight Predictor Variables with Six Salary Cost Ratios (N=24)

Criterion Variable	Predictor Variables	Cumulative % of Variance	Individual Probability	Cumulative Probability
Instructional Salary Costs per Pupil	1. Square miles per school	6.44	.23	.23
Total Staff Salary Costs per Pupil	1. District taxation per pupil	19.64	.03	.03
	2. Square miles per school	32.24	.06	.02
	3. Total number of pupils	38.20	.18	.02
	4. Total number of staff	40.32	.25	.03
	5. Number of central office depts.	43.14	.61	.05

Summary of Chapter 5

The group of largest school districts had the smallest per pupil administrative, central office, and non-instructional salary costs, while the second smallest group of school districts tended to have the highest per pupil administrative, central office, non-instructional, and total staff salary costs. Larger school districts had the highest per pupil instructional salary costs, and tended to have higher per pupil total staff and support salary costs than smaller school districts. For the salary costs of all five components, there was no regular pattern of increase or decrease. There were no significant differences between the mean salary costs for the five groups of school districts. The patterns for the per staff member salary costs of the various staffing components were similar to the per pupil salary costs.

The Pearson product moment correlation coefficients showed that a negative nonsignificant relationship existed between the two measures of size and the per pupil administrative, central office, and non-instructional salary costs, while a positive nonsignificant relationship existed between the measures of school district size and the support and instructional salary costs per pupil. Mean teacher qualifications and number of central office departments were negatively related to all salary cost ratios except per pupil instructional salary costs; however, of the correlation coefficients, which ranged from (-0.01 to -0.35), none were considered significant. Pupils per square mile was negatively related to per pupil

administrative, central office, and non-instructional salary costs, and positively related to the remaining two ratios. A negative relationship existed between square miles per school and per pupil instructional salary costs; however, the remaining four salary cost ratios were directly related to square miles per school.

The only two selected variables which were directly related to all five salary cost ratios were operating budget per pupil and district taxation per pupil. District taxation per pupil was more highly correlated with all ratios, except central office and instructional salary cost ratios, than were any of the other seven selected variables. Square miles per school was significantly correlated ($r=0.65$) with per pupil central office salary costs; however, the only other significant correlation coefficients were for the relationships between district taxation per pupil and per pupil support, central office, and non-instructional salary costs.

The best predictor of the administrative salary cost ratio was district taxation per pupil which was associated with 16.14 percent of the variance. District taxation per pupil was the best predictor of the support, non-instructional, and total staff salary cost ratios being associated with 39.13, 45.49, and 43.14 percent of the total variance respectively, while square miles per school was associated with the greatest percentage of the variance in the central office salary cost ratio.

Chapter 6

INTERVIEWS WITH SUPERINTENDENTS AND/OR OTHER SENIOR OFFICIALS IN TWENTY-FOUR SCHOOL DISTRICTS IN BRITISH COLUMBIA

This chapter presents an anlaysis of the responses of superintendents and/or other senior officials in the school districts in the sample concerning their opinions of perceived staff shortages, changes in staff utilization, priorities for adding instructional and non-instructional staff, and the size of the school district. District superintendents and/or other senior officials in each of the twenty-four school districts in the sample were interviewed and their responses to an opinionnaire (Appendix B) were recorded.

OPINIONS PERTAINING TO SHORTAGES OF CENTRAL OFFICE AND IN-SCHOOL STAFF

A senior official in each school district was asked (1) to select functional areas in which there existed an insufficient number of staff to perform the function, (2) to indicate the additional number of staff they considered essential, and (3) to give reasons for the perceived shortages of staff. Tables 25 and 26 present a tabulation of the responses of these senior officials.

Sub-problem C.1

> What are the perceived shortages of central office and in-school staff, and the priorities for adding additional instructional and non-instructional staff, in school districts in the sample?

Table 25

Opinions of Superintendents Concerning Staff Shortages for Central Office Services

Central Office Services	Number of Districts Indicating a Shortage						Additional Number of Staff Required						Reasons for Shortage of Numbers of Staff					
	Size 1 (N=4)	Size 2 (N=6)	Size 3 (N=4)	Size 4 (N=5)	Size 5 (N=5)	Total (N=24)	Size 1 (N=4)	Size 2 (N=6)	Size 3 (N=4)	Size 4 (N=5)	Size 5 (N=5)	Total (N=24)	Single Salary Schedule	Lack of Financial Resources	School Board Policy	Qualified Staff Shortage	Growth of School District	Size of School District
General Administration	1	3	1	0	0	5	1	3	1	0	0	5	0	2	1	1	1	1
Business Administration	0	1	0	0	0	1	0	1	0	0	0	1	0	0	0	0	1	0
Instructional Media	2	2	0	2	0	6	3	2	0	2	0	7	0	6	1	0	0	2
Psychological	3	3	3	4	3	16	5	5	4	3	3	20	0	16	1	5	0	2
Counselling/Guidance	1	1	1	1	0	4	4	1	4	1	0	10	0	4	1	0	0	0
Special Education	0	2	0	1	0	3	0	2	0	1	0	3	0	1	0	1	1	0
Adult Education	0	1	1	0	1	3	0	1	1	0	1	3	0	3	0	0	0	0
Curriculum (Evaluation, Supervision)	4	4	3	4	3	18	6	4	3	4	4	21	0	16	2	0	0	3
Personnel Evaluation	3	1	0	0	0	4	3	1	0	0	0	4	0	3	2	0	0	0
Staff Development	1	1	0	0	0	2	2	1	0	0	0	3	0	2	1	0	0	0
Maintenance & Operations	0	0	1	1	3	5	0	0	1	1	4	6	0	3	0	0	0	3
Purchasing and Stores	1	0	1	1	0	3	1	0	1	1	0	3	0	3	0	0	0	0
Research and Development	0	1	0	0	0	1	0	1	0	0	0	1	0	1	0	0	0	0
Public Relations	0	1	2	0	0	3	0	1	1	0	0	2	0	2	0	0	0	1
Secretarial and Clerical	0	1	1	3	0	5	0	1	1	2	0	4	1	3	1	0	0	1
Computer Operations	0	2	0	0	0	2	0	1	0	0	0	1	0	2	0	0	0	0
TOTAL						81						94	1	67	10	7	3	13

Central office staff shortages. District superintendents mentioned seventeen areas in which they perceived staff shortages to exist. The areas most commonly mentioned were curriculum and psychological services, where eighteen and sixteen superintendents respectively mentioned staff shortages. In only one of the other areas, instructional media services, did more than five of the superintendents perceive that a shortage of staff existed.

Three of four superintendents in size category 1 suggested a shortage of personnel evaluation staff in their district, and this, in addition to three of six superintendents in size category 2 who suggested shortages of Directors of Instruction, gives some indication of the effect which government regulations can have on staffing patterns. Recent changes pertaining to written reports for teachers transferring from the district, or teachers placed on probation, dictate a need for additional personnel evaluation staff.

Additional number of central office staff required. The most frequent suggestions for staff additions were in the curriculum and psychological services areas, where superintendents indicated a need for twenty-one and twenty additional staff in these areas. District superintendents expressed a need of ten additional staff in the guidance/counselling area. Suggestions for additional staff were very similar to the indications of staff shortages, thus, the perceived shortages frequently consisted of adding only one person in each service area. This is in direct contrast to in-school

services, where the total number of additional staff required in all categories was five times as large as the perceived shortages of staff.

Reasons for central office shortages. Lack of financial resources (N=67) was mentioned most commonly as a reason for central office staff shortages. Size of the school district and school board policy were given as reasons for staff shortages thirteen and ten times respectively. Lack of qualified personnel was mentioned seven times; however, of this total, five responses were for the psychological services area. District superintendents of smaller school districts mentioned size as a factor much more frequently than did superintendents of larger school districts, especially in the areas of curriculum supervision, and maintenance and operations services.

In-school staff shortages. The most commonly mentioned staff shortage was in the area of teacher aides, where sixteen of the superintendents perceived an inadequate number of staff. Diagnostic and remedial, clerical-secretarial, and fine arts were the next most commonly mentioned areas, where thirteen, eleven, and ten of the superintendents perceived that a staff shortage existed. In a majority of in-school service areas, the shortages of staff appeared to be generally uniform among the five size categories.

Additional number of in-school staff required. Superintendents indicated that a need existed to add 131 teacher aides, with the next

Table 26

Opinions of Superintendents Concerning Staff Shortages for In-School Services

In-School Services	Number of Districts Indicating a Shortage						Additional Number of Staff Required						Reasons for Shortages of Numbers of Staff					
	Size 1 (N=4)	Size 2 (N=6)	Size 3 (N=4)	Size 4 (N=5)	Size 5 (N=5)	Total (N=24)	Size 1 (N=4)	Size 2 (N=6)	Size 3 (N=4)	Size 4 (N=5)	Size 5 (N=5)	Total (N=24)	Single Salary Schedule	Lack of Financial Resources	School Board Policy	Qualified Staff Shortage	Growth of School District	Size of School District
General Administration	1	1	1	1	0	5	4	3	2	1	0	10	0	4	1	0	0	0
Fine Arts Teachers	0	1	3	4	2	10	0	2	8	5	2	17	0	8	0	8	0	1
Home Economics Teachers	0	0	1	0	0	1	0	0	3	0	0	3	0	0	0	1	0	0
Diagnostic & Remedial	3	1	3	3	3	13	28	1	17	10	4	60	0	11	3	3	0	1
Guidance/Counselling	0	2	2	0	1	5	0	5	16	0	2	23	0	4	0	3	0	0
Library	0	0	2	0	0	2	0	0	6	0	0	6	0	1	0	1	1	0
Audio-Visual Media	3	1	0	0	0	4	34	1	0	0	0	36	0	2	2	0	0	1
Special Education	2	0	2	3	1	8	4	0	4	4	1	13	0	6	0	2	0	1
Teacher Aides	3	5	2	4	2	16	50	38	14	24	5	131	0	13	2	1	0	1
Clerical-Secretarial	3	2	1	3	2	11	56	10	2	6	2	76	0	10	1	2	0	0
Teacher Interns	0	0	0	1	0	1	0	0	0	8½	0	8½	0	1	0	0	0	0
TOTAL						75						383½	0	60	9	21	1	5

highest need for staff additions being clerical and secretarial personnel where the number of suggested additions was seventy-six. The next most common suggestions for staff additions were in the diagnostic and remedial, and audio-visual areas, where the suggested additions were sixty and thirty-six respectively. Although superintendents suggested that additions be made in areas which they identified as having an inadequate number of staff, the rankings were considerably different.

Reasons for in-school shortages. A lack of financial resources was perceived by superintendents as being mainly responsible for shortages of staff in their school districts. It was mentioned sixty times in comparison to the twenty-one times superintendents suggested that a lack of qualified personnel was the main factor in shortages of staff in specific areas. School board policy and size of the school district were mentioned nine and five times respectively.

Changes in Personnel Utilization Suggested by Superintendents

Table 27 lists the frequency of mention of changes in utilization of personnel as suggested by the superintendents. Suggested changes are not mutually exclusive, as the nineteen suggestions to provide more paraprofessional services for teachers could also include differentiated staffing which was mentioned fifteen times. A considerable number of superintendents suggested that department heads be replaced by team leaders, and the position of assistant principal be eliminated. Some superintendents

Table 27

Changes in Personnel Utilization Suggested by Superintendents

Changes Suggested by Superintendents	Number of Times Mentioned					
	Size 1	Size 2	Size 3	Size 4	Size 5	Total
Provide more paid paraprofessionals	3	5	3	5	3	19
Introduce differentiated staffing	3	4	3	5	0	15
Replace department heads with team leaders	2	2	1	1	0	6
Provide more clerical-secretarial assistance	0	0	1	2	3	6
Provide more in-school curricular assistance	0	0	1	2	3	6
Have fewer assistant principals	1	2	1	2	0	6
Consolidate school personnel into larger units	0	0	0	1	2	3
Fewer area counsellors (more in schools)	1	1	0	0	0	2
Business administrators in lieu of vice principals	0	1	1	0	0	2
Replace vice-principals with curricular personnel	0	1	0	1	0	2

emphasized a reorganization of personnel so as to provide more in-school curriculum services by providing more clerical assistance and business managers.

The three smallest groups of school districts, where a shortage of central office supervisory staff was reported, are the districts which suggested more in-school clerical assistance and curriculum services.

Priorities for Adding Non-instructional Staff

As shown in Table 28, the greatest priorities for adding non-instructional staff were in the areas of teacher aides, mentioned eighteen times, and secretarial-clerical services, which was mentioned thirteen times. Curricular supervisory and consultative personnel were mentioned eighteen times; however, of the total, eight were central office consultative staff and ten were central office supervisory staff. Seven of the superintendents would employ additional instructional media staff, while four would add maintenance personnel.

Priorities for Adding Instructional Staff

Table 29 shows that the superintendents' priorities for addition instructional staff were in the areas of remedial services, special education, and psychological services, which were mentioned fifteen, fourteen, and eleven times respectively. Other instructional priorities mentioned more than three times were counselling services, mentioned eight times, and fine arts teachers, which were

Table 28

Priorities of Superintendents for Adding Non-instructional Staff

Priorities for Adding Non-instructional Staff	Number Reporting a Priority					
	Size 1	Size 2	Size 3	Size 4	Size 5	Total
Paraprofessionals	3	6	1	4	4	18
Secretarial and Clerical Assistance	2	3	0	4	4	13
Curricular Consultative Personnel	2	1	1	3	1	8
Instructional Materials Center Personnel	2	2	2	1	0	7
Supervisors of Instruction	0	0	1	1	3	5
Buildings and Maintenance Personnel	0	0	1	1	2	4
Directors of Instruction	0	3	0	0	0	3
Supervisor of Special Education	0	1	0	0	1	2
Computer Assistance Personnel	0	1	0	0	0	1
Staff Development Personnel	1	0	0	0	0	1
Budget Specialist (P.P.B.S.)	1	0	0	0	0	1

Table 29

Priorities of Superintendents for Adding Instructional Staff

Priorities for Adding Instructional Staff	Number Reporting a Priority					
	Size 1	Size 2	Size 3	Size 4	Size 5	Total
Remedial and Diagnostic Personnel	4	2	1	3	5	15
Special Education Personnel	3	4	2	3	2	14
Psychological Personnel	1	2	1	3	4	11
Counsellors and Guidance Personnel	2	3	1	0	2	8
Fine Arts Teachers	0	1	1	3	1	6
In-school Curricular Service Personnel	1	0	1	1	0	3
Library Personnel	1	0	1	0	0	2
Lower Pupil Teacher Ratios	0	2	0	0	0	2
Adult Education Personnel	0	0	1	0	0	1
Kindergarten Personnel	0	0	0	1	0	1
Language Arts Specialists	0	1	0	0	0	1

mentioned six times. This indicates that the services which would be increased by superintendents, if they had a 10 percent increase in their staffing budget, would be in the areas of diagnostic, remedial, special education, and psychological services. This is consistent with the most frequently mentioned areas in which superintendents perceived shortages of staff to exist.

Opinions Concerning the Size of the School District

Although none of the respondents indicated that the school district was too large in terms of the number of pupils, three superintendents suggested that the school district was too large geographically.

Twelve of the superintendents indicated that the school district did not have a sufficient number of pupils in order to offer an adequate program and services. Of this total, ten were superintendents of school districts in the smallest two size categories. The remaining twelve superintendents, nine of whom were in school districts in the two largest size categories, indicated that their school district was about the "right size" in terms of both number of pupils and geographically.

At least six superintendents expressed the opinion that a school district with between 10,000 and 15,000 pupils is large enough to provide a sufficiently wide variety of programs and services.

Summary of Chapter 7

The in-school shortages most frequently mentioned by the respondents were teacher aide services, diagnostic, and remedial services, clerical-secretarial services, and fine arts teachers, while central office staff shortages most frequently mentioned were curriculum and psychological services. Superintendents expressed the greatest priorities for in-school staff additions in the areas of teacher aides, clerical-secretarial, and psychological services, while in central office, curricular personnel and psychological personnel would constitute the greatest number of additions.

For both in-school and central office shortages of staff, superintendents indicated that the major factor was a lack of financial resources; however, of secondary importance in central office staff shortages was size of the school district, whereas, the secondary factor in the in-school staff shortages was a lack of qualified personnel.

Superintendents generally suggested the implementation of differentiated staffing, with the associated addition of teacher aides and clerical-secretarial services; however, a considerable number of superintendents suggested the addition of curricular services personnel and the replacement of department heads with team leaders. A major item of concern was the utilization of personnel in such a manner as to improve classroom instruction.

The highest priorities for adding non-instructional staff were in the areas of teacher aides, clerical-secretarial services, and curricular consultants and supervisors. Instructional priorities for adding staff were in the areas of remedial, special education, and psychological services.

One-half of the superintendents felt that their school districts were too small to provide adequate educational services, while the other half indicated that the size of the school district permitted a wide variety of programs and services. A number of superintendents expressed the opinion that the ideal size of a school district would be between 10,000 and 15,000 pupils.

Chapter 7

SUMMARY, DISCUSSION, IMPLICATIONS, AND SUGGESTIONS FOR FURTHER RESEARCH

This chapter presents a summary of the major findings of the research, along with an assessment of some of their implications and suggestions for further research in the area.

SUMMARY

This study examined the relationships between the size and salary costs of five staffing ratios and (1) school district size, (2) staff qualifications, (3) central office departmentalization, (4) geographic dispersion, (5) operating budget per pupil, and (6) district taxation per pupil in a sample of twenty-four school districts in British Columbia. The study attempted to determine which of the above mentioned variables or combination of variables were associated with the greatest percentage of variance in each of the staffing ratios.

District superintendents for each school district in the sample were asked to provide data pertaining to the number and salary costs of personnel in their school districts.

Personnel and salary cost ratios for five groups of school districts were derived from the raw data and an analysis of variance was applied to determine if there tended to be any significant differences among the means for each of the five size categories.

Pearson product moment correlations were used to examine the relationships between the numbers and salary costs of five staffing components and eight selected variables. Multiple regression analysis was applied in order to ascertain which selected variable or combination of variables was associated with the greatest percentage of variance for each of the staffing ratios.

Personal interviews were conducted with the district superintendents to solicit their opinions pertaining to perceived staff shortages and possible reasons for these shortages. The responses of the superintendents, pertaining to perceived staff shortages, were tabulated and presented as frequency distributions.

DISCUSSION OF THE FINDINGS

Personnel ratios. Although there were no significant differences, at the 0.10 level, between the mean personnel and salary cost ratios for any of the five size categories, there was a tendency for larger school districts to have smaller numbers of staff per 1,000 pupils in the administrative, central office, instructional, and total staff components. Also, a tendency existed for larger school districts to be associated with larger numbers of staff per 1,000 pupils in the support component.

Despite slightly different definitions of administrative staff, the findings of this study, pertaining to larger school districts being associated with smaller administrative ratios, supported the findings of studies by Gill (1967), Carter (1968), Vithayathil (1969), Blowers (1969), Lepatski (1970), and Holdaway (1971). The

tendency for larger school districts to be associated with smaller central office ratios did not support the findings of Lepatski (1970) and Holdaway (1971). This difference may partially be explained by the definitional differences among the three studies. Lepatski (1970) and Holdaway (1971) included central office auxiliary staff in the central office component, whereas, this study excluded all auxiliary staff, except those who performed supervisory and/or administrative functions, from the central office component. Carter (1968), Lepatski (1970), and Holdaway (1971) found that larger school districts tended to have smaller instructional ratios, but reported larger non-instructional ratios for the larger school districts. The findings of this study, despite slightly different definitions of the instructional and non-instructional components, tended to support the findings of Carter (1968), Lepatski (1970), and Holdaway (1971).

Haire (1959) reported that the total number of clerical workers increased as the size of the organization increased. The findings of research conducted by Carter (1968), Duboyce (1970), Lepatski (1970), and Holdaway (1971) tended to support the Haire hypothesis. In the present study, the findings also provided support for the Haire hypothesis, as a tendency existed for larger school districts to be associated with larger support staff ratios. Support staff in this study, which included central office and in-school secretarial and clerical staff and teacher aides, closely approximated clerical staff included in the Haire (1959) study.

Relationships between staffing ratios and selected variables. The two measures of school district size were negatively correlated with the administrative, central office, and instructional ratios, and positively correlated with the support and non-instructional ratios; however, the correlations were nonsignificant in most cases. The relationship between size and the administrative ratio provided supportive evidence for similar findings by Anderson and Warkov (1961), Gill (1967), Tosi and Patt (1967), Indik (1964), Blowers (1969), Vithayathil (1969), and Lepatski (1970); however, they provided non-supportive evidence for findings of studies by Terrien and Mills (1955), Haas, Hall, and Johnson (1963), and Welensky (1957).

The findings of this study, pertaining to a negative correlation between size and the central office and instructional ratios, did not support the findings of Lepatski; however, the positive correlations between size and support and non-instructional ratios provided supportive evidence for Lepatski's findings.

A significant negative correlation existed between mean teacher qualifications and the administrative ratio; however, the remaining correlations were all nonsignificant. Correlations between the number of central office departments and the five ratios were all nonsignificant, with the highest coefficient being (-0.38) between this variable and the central office ratio. Significant positive correlations existed between square miles per school and the administrative and central office ratios, while there were

Salary cost ratios. In this study, larger school districts tended to have the smallest per pupil administrative and central office salary costs, while smaller school districts tended to have the highest salary cost ratios for these same components. School districts in the larger size categories had higher per pupil support salary costs than smaller school districts. For the non-instructional, instructional, and total staff salary ratios there was no regular pattern of increase or decrease of the ratios for the five size groups.

The findings of this study, pertaining to larger school districts having higher support salary costs per pupil, supported the findings of Lepatski (1970) and Holdaway (1971); however, the tendency for larger school districts to have lower per pupil central office salary costs did not support the findings of Lepatski and Holdaway. Several factors may account for these differences. First, the inclusion of only secretarial, clerical, and teacher aide personnel in the support component of this study may have influenced the findings pertaining to total central office and non-instructional salary costs, and second, the exclusion of central office auxiliary personnel, who are highly paid staff, may have affected the salary costs of both of these components. Administrative per pupil salary costs in this study, which associated lower administrative salary cost ratios with larger school districts, tended to be supportive of the findings of Lepatski (1970).

significant positive correlations between operating budget per pupil and the central office and non-instructional ratios.

District taxation per pupil was positively correlated with all five ratios, and the correlations between all ratios and this variable, except the instructional ratio, were considered significant. This nonsignificant positive correlation between district taxation per pupil and the instructional ratio suggested that school districts with the highest district taxation tended to have more non-instructional than instructional staff per 1,000 pupils.

Relationships between salary costs ratios and selected variables. A negative relationship occurred between the two measures of school district size and the administrative, central office, and non-instructional ratios, while a positive relationship existed between the size measures and the support and instructional salary cost ratios. Although larger school districts tended to be associated with smaller instructional staff ratios, they tended to have higher per pupil instructional salary costs. This difference was partly due to the higher mean teacher qualifications which were associated with larger school districts, and may have been partly caused by the number of years of experience of the instructional staff.

The relationships between (1) mean teacher qualifications, number of central office departments, and pupils per square mile and (2) the five salary cost ratios were nonsignificant in all cases. Central office salary costs per pupil was significantly correlated with square miles per school; however, the correlations for the

remaining four ratios were nonsignificant. The significant positive correlations between district taxation per pupil and the support, central office, and non-instructional salary cost ratios indicated that the salary costs of these three ratios were directly related to the amount of revenue per pupil which was raised through district taxation. This finding indicated that school districts with higher district taxation per pupil tended to expend a relatively higher proportion of salary costs on non-instructional, central office, and support staff than did school districts with lower district taxation per pupil.

Results of the multiple regression analysis. One of the major conclusions which could be drawn from the findings of this study was that size of a school district was not as significant in predicting the size of the various staffing components as previous studies had suggested. The relatively low correlations between the size measures and the staffing ratios, along with the results of the multiple regression analysis, showed that square miles per school and district taxation per pupil were much more significant than size in predicting the size of the various staffing ratios.

For the central office, support, and non-instructional ratios, district taxation per pupil was associated with the highest percentage of the variation in each of the staffing ratios. Square miles per school and operating budget per pupil were associated with the highest percentage of variance in the administrative and total

staff ratios, while the two size measures were associated with the highest percentage of the variance in the instructional staff ratio.

These findings suggested that variables, other than measures of size, were more important in attempting to predict the size of certain staffing components by using various organizational variables.

Opinions pertaining to staff shortages. District superintendents indicated that curricular supervisory and consultative services and psychological services were the central office areas in which the greatest staff shortage existed.

In-school staff shortages existed in the areas of paraprofessionals, diagnostic and remedial services, and secretarial-clerical services. The reasons for these staff shortages, which were mentioned most frequently by the superintendents, were a lack of financial resources, factors associated with size of the school district, and a lack of qualified personnel. If given additional staff, superintendents indicated that they would add remedial and diagnostic, special education, and psychological personnel in the instructional area, and paraprofessionals and clerical staff in the non-instructional area.

IMPLICATIONS OF THE FINDINGS

One of the findings of the study that has implications for school district organization was that larger school districts tended to be associated with lower administrative ratios than smaller

school districts. In light of the current trend towards amalgamation of school districts in British Columbia, this finding may be particularly relevant. Another finding which may also be relevant, and in effect counteract the relationship between the size of a school district and the administrative ratio, was the direct relationship between square miles per school and the central office ratio. Perhaps school districts which become too large geographically lose some of the economies of scale, and thus require additional administrative personnel to provide coordinative functions.

Another finding of importance was that larger school districts had higher support and non-instructional ratios than did smaller school districts. Thus the question arises of whether or not the advantages that larger school districts have pertaining to administrative staff are lost due to the larger proportion of support and non-instructional staff which they employ. Also, the question arises of whether or not large school districts employ non-instructional staff at the expense of instructional staff. Perhaps, as school districts increase in size, more supervisory and consultative services are required and thus, the number of non-instructional staff is increased.

In assessing the findings of studies of staffing ratios, considerable caution should be exercised, as actual ratios may not reflect the same levels of effectiveness and/or efficiency. School districts which have lower staffing ratios may not provide the same variety of educational services which are provided by school

districts with higher staffing ratios. Also, the possibility exists that larger school districts may require additional staff in certain service areas. Thus, an examination of the numbers of personnel employed by a school district may not be too revealing in relation to the types of services which are provided by the school district. Although data pertaining to staffing ratios may assist school districts in assessing the implications of increases in size, an examination of the numbers and types of services which are required in a school district of a particular size is essential.

School districts with higher mean district taxation per pupil employed a greater number of non-instructional staff per 1,000 pupils than did school districts with lower district taxation per pupil figures. This indicated that with increased local taxation revenue, school districts tended to employ more non-instructional than instructional staff per 1,000 pupils. This finding may have implications for examining the staffing priorities of school districts.

The finding pertaining to the perceived shortage of staff in curricular supervisory and consultative areas was important as it reflected the effects of policy and regulations on staffing priorities in school districts. The indication that superintendents would add diagnostic and remedial, special education, and psychological personnel, if the resources were available, may have some implications for changes in the cost sharing of salaries for certain types of personnel in school districts.

Also, the perceived shortages of both central office and in-school staff, especially the curricular, diagnostic-remedial, special education, and psychological areas, reflected the evolving educational needs in school districts. As educational needs evolve within a school district, additional services become essential, and without the availability of specialist personnel school districts are not able to provide special services and programs. In terms of the consistency of responses of the district superintendents pertaining to staff shortages, the findings indicated that an in-depth survey which would assess the educational needs of school districts in the remedial-diagnostic, special education, psychological, and curricular consultative areas would be warranted.

Along with implications for the administration and organization of school districts in British Columbia, the findings of this study may add to a body of literature and research which exists in the area of organizational size and those variables which may be related to the size of various organizational components. Starbuck (1965) stressed the need for more data on every aspect of organizational growth and development, while Woodward (1965), Klatsky (1970), and Blau and Schoenher (1971) have suggested that variables, other than organizational size, may be more important in determining the size of various organizational components. As this study examined a number of variables in addition to organizational size, it provided the type of data to which Starbuck and the other writers referred.

In attempting to assess the conceptual implications of the findings, caution must be exercised as the selected variables were

not independent, but were in a number of cases highly interdependent. The high correlations between and among some of the selected variables restricted discussion in terms of the relationships between these selected variables and the staffing and salary ratios.

The finding that a significant inverse relationship (r=-0.40) existed between organizational size and the size of the administrative component provided supportive evidence for a majority of studies which were reported in Chapter 2. In addition, a number of findings provided data pertaining to variables which have received little empirical examination.

The square miles per school variable, which was similar to the dispersion variable in several studies reviewed in Chapter 2, was significantly correlated (r=0.64 and 0.44) with both the central office and administrative ratios. This finding suggested that decentralization, in terms of the number and dispersion of places in which work is conducted, may be associated with greater numbers of administrative and central office staff relative to the total staff in the organization. As the number and dispersion of places in which work is conducted increases, administration, supervision, and coordination of the production activities may necessitate additional administrative and central office staff.

Financial variables, district taxation per pupil and operating budget per pupil, were significantly correlated (range of r was 0.40-0.70) with both the central office and non-instructional ratios. This finding suggested that the availability of financial resources and not organizational size, may be most influential in

determining the relative size of non-production components of organizations. Thus, it may be that in times of financial stringency, increases in organization size may be associated with proportionately smaller staff increases in the non-production components.

SUGGESTIONS FOR FURTHER RESEARCH

Since a number of variables which were more important than size in determining the size of the staffing components were isolated by this study, an in-depth investigation of possible relationships between these variables and the staffing ratios should be conducted.

This study was quantitative in nature and no attempt was made to examine the qualitative aspects of school districts. An extension of the present study might be to examine the relationships between the size of various components and some measure(s) of effectiveness of the school district. Perhaps those districts with the highest non-instructional ratios would be highly related to some measure(s) of school district effectiveness.

Since the percentage of variance associated with the staffing ratios by the selected variables was low for some of the ratios, variables not identified in this study may account for a fairly large percentage of the variance in the staffing ratios. An extension of the present study to include additional organizational and environmental variables might identify relationships which to this point have not been examined.

As some rather significant changes have taken place in the structure of school districts and the financing of education in British Columbia during the past three years, a longitudinal study might reveal the effects which these changes have had on the staffing components during the three year period. Since this study was cross-sectional in nature, these changes would not become apparent in the analysis. This may help to explain some of the differences between the findings of this study and those conducted earlier.

Also, as there is every indication that the amalgamation of school districts will be extended, and the availability of financial resources will continue to pose problems, the commencement of a longitudinal study which could be conducted over a period of years might provide some relevant information.

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APPENDIX A

LETTERS SENT TO DISTRICT SUPERINTENDENTS

FACULTY OF EDUCATION
DEPARTMENT OF EDUCATIONAL ADMINISTRATION

THE UNIVERSITY OF ALBERTA
EDMONTON 7, CANADA

November 18, 1971.

On October 12, 1971 a questionnaire was mailed to you pertaining to a study of total non-instructional proportions of staff and salary costs in a sample of 24 school districts and the Department of Education in British Columbia. This study, which will form the basis of Mr. Uhlman's thesis, is part of a larger Canada Council research project to compare total non-instructional proportions of staff and salary costs in two Canadian provinces and two Australian states.

At the present time, 14 school districts have indicated their willingness to participate in the study, and have either returned completed questionnaires or have indicated that the questionnaires are in the process of being completed. Also, the Deputy Minister of Education has provided us with the number of personnel and salary costs for the Department of Education.

To date, you have not indicated whether or not your school district will provide the requested data. I appreciate the amount of work involved in completing the questionnaire; however, it is very important that data be obtained from all school districts in the sample, as the sample was selected on a representative basis. Would you please inform me, at your earliest convenience, if your school district will be able to provide the requested data by December 20, 1971.

As mentioned in an earlier letter, Mr. Uhlman will be available for interviews and data extraction between December 6th and December 17th, 1971. If you wish assistance with data extraction, please let me know so that Mr. Uhlman can make appropriate plans for his visists to school districts during December.

Thank you for your cooperation,

E.A. Holdaway
Associate Professor

EAH/dr

FACULTY OF EDUCATION
DEPARTMENT OF EDUCATIONAL ADMINISTRATION

THE UNIVERSITY OF ALBERTA
EDMONTON 7, CANADA

Since 1969 a series of studies on staffing ratios and salary costs in Western Canadian school systems have been conducted by the Department of Educational Administration at The University of Alberta. These studies have examined staffing ratios and salary costs in large metropolitan areas of Western Canada. Recently, the Canada Council provided assistance for a research project to study the total non-instructional proportions of staff and salary costs in the school districts and Department of Education in British Columbia. From the data of a sample of 24 selected school districts, a projected total for all school districts in the province will be added to the Department of Education data to provide total non-instructional proportions of staff and salary costs. The British Columbia portion of the project, which is being conducted by Mr. Charles Uhlman, will form the basis of his Ph.D. thesis at The University of Alberta.

The findings of this study should provide school districts with detailed information pertaining to proportions of staff and salary costs in both the non-instructional and instructional areas. Since the 24 school districts will be divided into six size categories, the findings of the study will permit comparisons of school districts of similar size. Also, the findings will indicate the numbers and types of staff which are required as school districts increase in size. This aspect of the findings should be particularly relevant in light of the current move towards amalgamation of school districts in some areas of British Columbia. Finally, the findings should provide an overall analysis of the instructional and non-instructional proportions of staff and salary costs for the entire province, including the Department of Education. The enclosed letter from Mr. Phillipson, who has already provided the Department of Education data, indicates that the results of the study will be of particular interest to the Department of Education.

For your information, a copy of the Canadian Administrator is enclosed which reports the findings of a similar study which was conducted in the seven large metropolitan areas of the four Western provinces. Analysis for this study will be virtually the same as for the one conducted in the seven large metropolitan areas. Data will be analyzed and reported for groups of school districts in six size categories, and not on the basis of individual school districts so as to ensure confidentiality of the data.

Your assistance is requested in completing the enclosed questionnaire. The data should describe the situation in your school district for the month of September, 1971, or as close to October 1, 1971 as possible. We appreciate the amount of work involved in completing the questionnaire, but hope that you will be able to return it in the self-addressed, stamped envelope by December 20, 1971. Would you please inform us, as soon as possible, if we can expect your school district to participate in the research project.

A copy of the findings will be forwarded to your district upon completion of the research project.

Thank you for your cooperation,

E.A. Holdaway, Associate Professor

C.C. Uhlman, Research Assistant

encl.
EAH/ib

APPENDIX B

COPY OF SCHOOL DISTRICT QUESTIONNAIRE

SCHOOL SYSTEM PERSONNEL QUESTIONNAIRE

Name of school system: _____

Province: Alberta _____ British Columbia _____

PLEASE NOTE:

1. This questionnaires is divided into two sections as follows:

   SECTION A - concerns numbers, positions, and salaries of central office personnel only;

   SECTION B - concerns numbers, positions, and salaries of in-school personnel only.

2. Please read through both sections before completing the questionnaire.

3. Please provide the requested data for the month of September, 1971, or as of October 1, 1971, whichever is appropriate.

4. Please report numbers of all personnel in full-time equivalents.

Return to:

Dr. E.A. Holdaway
Associate Professor
Department of Educational Administration
Faculty of Education
University of Alberta
Edmonton 7, Alberta

SECTION A: CENTRAL OFFICE PERSONNEL

PART I: POSITIONS, NUMBERS, AND SALARIES OF ADMINISTRATIVE AND SUPERVISORY PERSONNEL LOCATED IN THE CENTRAL OFFICE

INSTRUCTIONS: State in Column B the number of central office personnel in each position listed in Column A. In Column C state the total gross salaries paid to all personnel in each position for the month of September 1971.

Column A	Column B	Column C	Column D
ADMINISTRATIVE AND SUPERVISORY POSITIONS	TOTAL NUMBER OF PERSONNEL IN EACH POSITION	GROSS SALARIES FOR SEPTEMBER OF ALL PERSONNEL IN EACH POSITION	NUMBER OF PERSONNEL IN EACH POSITION WITH A TEACHING CERTIFICATE
Superintendent			
Assistant, Associate, Deputy, and/or Area Superintendents			
Administrative Assistants			
Secretary-Treasurer, Assistant Secretary-Treasurer			
Directors and Assistant Directors of Instruction, Curriculum Officers			
Subject Supervisors, Consultants, Coordinators, and/or Specialists			
Directors of Pupil Personnel Services, Guidance, and/or Special Education			
Directors and Supervisors of Library, Instructional Materials Centre, and/or Educational Television			
Adult Education and/or Extension Services Officers			

PART 1 CONTINUED: POSITIONS, NUMBERS, AND SALARIES OF ADMINISTRATIVE AND SUPERVISORY PERSONNEL LOCATED IN THE CENTRAL OFFICE

Column A	Column B	Column C	Column D
ADMINISTRATIVE AND SUPERVISORY POSITIONS	TOTAL NUMBER OF PERSONNEL IN EACH POSITION	GROSS SALARIES FOR SEPTEMBER OF ALL PERSONNEL IN EACH POSITION	NUMBER OF PERSONNEL IN EACH POSITION WITH A TEACHING CERTIFICATE
Directors and Supervisors of Buildings, Maintenance, and Operations			
Architects, Engineers			
Directors of Planning, Construction and/or Design			
Urban Planners			
Facilities and Maintenance Coordinators			
Building Inspectors			
Personnel and Staffing Officers			
Staff Development Officers			
Directors and Supervisors of Computer Operations and/or Information Systems			
Systems Programmer/Analysts, Computer Programmer/Analysts			
Information and Public Relations Officers			
Research and Development Officers			
Directors of Accounting, Accountants			
Director of Purchasing and Stores			

PART 1 CONTINUED: POSITIONS, NUMBERS, AND SALARIES OF ADMINISTRATIVE AND SUPERVISORY PERSONNEL LOCATED IN THE CENTRAL OFFICE

Column A	Column B	Column C	Column D
ADMINISTRATIVE AND SUPERVISORY POSITIONS	TOTAL NUMBER OF PERSONNEL IN EACH POSITION	GROSS SALARIES FOR SEPTEMBER OF ALL PERSONNEL IN EACH POSITION	NUMBER OF PERSONNEL IN EACH POSITION WITH A TEACHING CERTIFICATE
Purchasing Agents and Buyers			
Supervisor of Payroll			
Warehouse Manager			
Office Manager			
Other (Please specify)			

PART 2: POSITIONS, NUMBERS, AND SALARIES OF PUPIL-ORIENTED, PROFESSIONAL, CONSULTATIVE PERSONNEL LOCATED IN THE CENTRAL OFFICE

INSTRUCTIONS: State in Column B the number of central office personnel in your school system in each of the positions listed in Column A. In Column C state the total gross salaries paid to all personnel in each position in Column A for the month of September, 1971.

Column A	Column B	Column C	Column D
PUPIL-ORIENTED, PROFESSIONAL, CONSULTATIVE POSITIONS	TOTAL NUMBER OF PERSONNEL IN EACH POSITION IN FULL-TIME EQUIVALENTS	GROSS SALARIES FOR SEPTEMBER OF ALL PERSONNEL IN EACH POSITION IN COLUMN A	NUMBER OF PERSONNEL IN EACH POSITION WITH A TEACHING CERTIFICATE
Psychometricians			
Psychologists			
Psychiatrists			
Medical Consultants			
Social Workers			
Speech Therapists			
Remedial Specialists			
Reading Clinicians/Specialists			
Guidance Counsellors			
Other (Please specify)			

PART 3: POSITIONS, NUMBERS, AND SALARIES OF SUPPORT STAFF LOCATED IN THE CENTRAL OFFICE

INSTRUCTIONS: State in Column B the number of central office support personnel in each position listed in Column A. In Column C state the total gross salaries of all personnel in each position for the month of September, 1971.

Column A	Column B	Column C
NAMES OF SUPPORT STAFF POSITIONS	NUMBER OF PERSONNEL IN EACH POSITION IN FULL-TIME EQUIVALENTS	GROSS SALARIES FOR SEPTEMBER OF ALL PERSONNEL IN EACH POSITION
Secretarial Personnel (Secretary, Stenographer, and/or Typist)		
Clerical Personnel (Chief Clerk, Payroll Clerk, Other Clerical Personnel)		
Instructional Materials Centre Personnel (Those involved in the construction, cataloguing, and/or issuing of audio-visual aids.		
Plant Operation and Maintenance Personnel (Please include carpenters, electricians, painters who maintain schools).		
Transportation Personnel (Including Drivers and Chauffeurs).		
Warehouse worker, storekeeper		
Computer operator		
Keypunch operator		
Switchboard operator		
Graphic Artist		
Draftsman		

PART 3 CONTINUED: POSITIONS, NUMBERS, AND SALARIES OF SUPPORT STAFF LOCATED IN THE CENTRAL OFFICE

Column A	Column B	Column C
NAMES OF SUPPORT STAFF POSITIONS	NUMBER OF PERSONNEL IN EACH POSITION IN FULL-TIME EQUIVALENTS	GROSS SALARIES FOR SEPTEMBER OF ALL PERSONNEL IN EACH POSITION
Photographer		
Other (Please specify)		

SECTION B: IN-SCHOOL PERSONNEL

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PART 1: POSITIONS, NUMBERS, AND SALARIES OF ADMINISTRATIVE AND SUPERVISORY PERSONNEL LOCATED IN SCHOOLS

INSTRUCTIONS:

Column A In this column are listed several administrative and supervisory positions.

Column B State the number of personnel in each position in your school system.

Column C Provide an estimate of the average percentage of working time allotted to each position for administrative and supervisory purposes only.

Column D State the total salaries (excluding administrative and supervisory allowances) paid to all personnel in each administrative or supervisory position listed in Column A, for the month of September, 1971.

Column E State the total administrative and supervisory allowance paid to personnel in the respective administrative category for the month of September, 1971. If no such allowance is granted, please leave the space blank.

Column F State the total gross salaries paid to all personnel in each administrative or supervisory position listed in Column A for the month of September, 1971.

NOTE - Please do not include as administrative and supervisory positions those of counsellors, librarians, transportation or cafeteria personnel.

Column A	Column B	Column C	Column D	Column E	Column F
ADMINISTRATIVE AND SUPERVISORY POSITIONS	TOTAL NUMBER IN SCHOOL SYSTEM	ESTIMATED AVERAGE PERCENTAGE OF TIME SPENT IN ADMINISTRATION AND STAFF SUPERVISION	TOTAL SEPTEMBER SALARY OF ALL IN EACH POSITION (EXCLUDING ADMINISTRATIVE AND SUPERVISORY ALLOWANCES)	TOTAL SEPTEMBER ADMINISTRATIVE AND SUPERVISORY ALLOWANCE	SEPTEMBER GROSS SALARY (TOTAL COLUMN D AND E)
1. ELEMENTARY SCHOOLS					
Principal					
Assistant or Vice-Principal					
Department head, Coordinator, Curricular Associate, etc., (and Assistants in these positions)					
Other (Please specify)					

PART 1 CONTINUED: POSITIONS, NUMBERS, AND SALARIES OF ADMINISTRATIVE AND SUPERVISORY PERSONNEL LOCATED IN SCHOOLS

Column A	Column B	Column C	Column D	Column E	Column F
ADMINISTRATIVE AND SUPERVISORY POSITIONS	TOTAL NUMBER IN SCHOOL SYSTEM	ESTIMATED AVERAGE PERCENTAGE OF TIME SPENT IN ADMINISTRATION AND STAFF SUPERVISION	TOTAL SEPTEMBER SALARY OF ALL IN EACH POSITION (EXCLUDING ADMINISTRATIVE AND SUPERVISORY ALLOWANCES)	TOTAL SEPTEMBER ADMINISTRATIVE AND SUPERVISORY ALLOWANCE	SEPTEMBER GROSS SALARY (TOTAL COLUMN D AND E)
2. JUNIOR HIGH					
Principal					
Assistant or Vice-Principal					
Department head, Coordinator, Curricular Associate, etc., (and Assistants in these positions)					
Other (Please specify)					
3. SENIOR HIGH					
Principal					
Assistant or Vice-Principal					
Department head, Coordinator, Curricular Associate, etc., (and Assistants in these positions)					
Other (Please specify)					

PART 1 CONTINUED: POSITIONS, NUMBERS, AND SALARIES OF ADMINISTRATIVE AND SUPERVISORY PERSONNEL LOCATED IN SCHOOLS

Column A	Column B	Column C	Column D	Column E	Column F
ADMINISTRATIVE AND SUPERVISORY POSITIONS	TOTAL NUMBER IN SCHOOL SYSTEM	ESTIMATED AVERAGE PERCENTAGE OF TIME SPENT IN ADMINISTRATION AND STAFF SUPERVISION	TOTAL SEPTEMBER SALARY OF ALL IN EACH POSITION (EXCLUDING ADMINISTRATIVE AND SUPERVISORY ALLOWANCES)	TOTAL SEPTEMBER ADMINISTRATIVE AND SUPERVISORY ALLOWANCE	SEPTEMBER GROSS SALARY (TOTAL COLUMN D AND E)
4. ELEMENTARY-JUNIOR HIGH					
Principal					
Assistant or Vice-Principal					
Department head, Coordinator, Curricular Associate, etc., (and Assistants in these positions)					
Other (Please specify)					
5. JUNIOR-SENIOR HIGH					
Principal					
Assistant or Vice-Principal					
Department head, Coordinator, Curricular Associate, etc., (and Assistants in these positions)					
Other (Please specify)					

PART 1 CONTINUED: POSITIONS, NUMBERS, AND SALARIES OF ADMINISTRATIVE AND SUPERVISORY PERSONNEL LOCATED IN SCHOOLS

Column A	Column B	Column C	Column D	Column E	Column F
ADMINISTRATIVE AND SUPERVISORY POSITIONS	TOTAL NUMBER IN SCHOOL SYSTEM	ESTIMATED AVERAGE PERCENTAGE OF TIME SPENT IN ADMINISTRATION AND STAFF SUPERVISION	TOTAL SEPTEMBER SALARY OF ALL IN EACH POSITION (EXCLUDING ADMINISTRATIVE AND SUPERVISORY ALLOWANCES)	TOTAL SEPTEMBER ADMINISTRATIVE AND SUPERVISORY ALLOWANCE	SEPTEMBER GROSS SALARY (TOTAL COLUMN D AND E)
6. ELEMENTARY-JUNIOR-SENIOR HIGH					
Principal					
Assistant or Vice-Principal					
Department head, Coordinator, Curricular Associate, etc., (and Assistants in these positions)					
Other (Please specify)					

PART 2: POSITIONS, NUMBERS, AND SALARIES OF SUPPORT STAFF LOCATED IN SCHOOLS

INSTRUCTIONS: State in Column B the number of in-school support personnel in each position in Column A. In Column C state the total gross salaries of all personnel in each position for the month of September, 1971.

Column A	Column B	Column C
NAMES OF SUPPORT STAFF POSITIONS	TOTAL NUMBER IN ALL SCHOOLS IN FULL-TIME EQUIVALENTS	TOTAL GROSS SALARIES OF ALL PERSONNEL IN EACH POSITION FOR SEPTEMBER 1971
Secretarial Personnel - Secretaries, Typists		
Clerical Personnel-Clerks, Assistant Clerks		
Stores and Equipment Personnel		
Plant Operation and Maintenance Personnel		
Transportation Personnel		
Cafeteria Personnel		
Teacher Aides		
Laboratory Assistants		
Subject Markers		
Technical Aide, Technician		
Other (Please specify)		

PART 3: NUMBERS, POSITIONS, AND SALARIES OF PUPIL-ORIENTED STAFF LOCATED IN SCHOOLS

NAMES OF PUPIL-ORIENTED POSITIONS IN SCHOOLS	TOTAL NUMBER IN ALL SCHOOLS IN FULL-TIME EQUIVALENTS	GROSS SALARIES FOR SEPTEMBER OF ALL PERSONNEL IN EACH POSITION
Guidance Counsellors		
Social Workers		
Psychologists		
Librarians		
Reading Specialists		
Classroom Teachers (not identified in any of the above categories)		
Other (Please specify)		

(1) Indicate the number of personnel listed directly above who are based in one school, but work in more than one school _____ .

(2) Indicate the estimated average percentage of time these personnel spend working in schools other than the one in which they are based _____ .

PART 4: TOTAL NUMBERS OF SCHOOLS AND STUDENTS

INSTRUCTIONS: List the total number of pupils and schools in your school system in each of the categories below. Do not include students attending evening or Saturday classes.

TOTAL NUMBER OF PUPILS

Grades	1-6	7-9	10-12

TOTAL NUMBER OF SCHOOLS

G 1-6	G 7-9	G 10-12	G 1-9	G 7-12	G 1-12	Other (Specify)

PART 5: APPROXIMATE AREA OF SCHOOL SYSTEM IN SQUARE MILES

_____ sq. ml.

PART 6: TEACHER QUALIFICATIONS

INSTRUCTIONS: List the number of in-school personnel in each category in your school system who hold a teaching certificate (include all principals, vice-principals, consultants, coordinators, teachers, etc. who hold a teaching certificate). Report the number of years of training as you use them for salary purposes.

NUMBER OF YEARS OF PROFESSIONAL AND ACADEMIC PREPARATION BEYOND HIGH SCHOOL	TOTAL NUMBER OF PERSONNEL IN EACH CATEGORY
Less than 1 year	
1 Year	
2 Years	
3 Years	
4 Years	
5 Years	
6 or more Years	

PART 7: NUMBERS AND HONORARIA OF SCHOOL BOARD MEMBERS

INSTRUCTIONS: Please provide the following information:

A. The total number of school board members _____

B. The total gross annual honoraria/salaries of all school board members _____

PART 8: SCHOOL SYSTEM ORGANIZATION

PLEASE PROVIDE A COPY OF THE ORGANIZATION CHART OF YOUR SCHOOL SYSTEM.

PART 9: SALARY AGREEMENTS

PLEASE PROVIDE A COPY OF THE CURRENT SALARY AGREEMENT FOR THE INSTRUCTIONAL AND ADMINISTRATIVE STAFF FOR YOUR SCHOOL SYSTEM.

- - - - - - - - -

THANK YOU VERY MUCH FOR YOUR COOPERATION

APPENDIX C

NUMBERS OF SCHOOLS, TEACHERS, AND PUPILS IN SCHOOL DISTRICTS IN BRITISH COLUMBIA AS OF JUNE, 1971

Appendix C

Numbers of Schools, Teachers, and Pupils in School Districts in British Columbia as of June, 1971

District Name and Number	Number of Schools	Number of Teachers	Number of Pupils
1. Fernie	10	110.0	2,838
2. Cranbrook	10	168.0	4,060
3. Kimberley	10	102.3	2,406
4. Windermere	10	64.9	1,406
7. Nelson	25	218.3	4,914
9. Castlegar	14	124.6	2,800
10. Arrow Lakes	9	52.0	1,100
11. Trail	16	259.7	5,701
12. Grand Forks	4	62.5	1,571
13. Kettle Valley	7	33.5	714
14. Southern Okanagan	6	100.2	2,370
15. Penticton	15	223.5	5,105
16. Keremeos	4	30.5	692
17. Princeton	4	36.9	899
18. Golden	7	77.0	1,726
19. Revelstoke	8	101.7	2,421
21. Armstrong Spallumcheen	3	47.5	1,154
22. Vernon	17	283.0	6,639
23. Central Okanagan	40	491.8	12,181
24. Kamloops	43	648.0	15,166
26. Birch Island	7	40.1	944
27. Williams Lake	35	250.5	6,090
28. Quesnel	24	187.7	4,748
29. Lillooet	7	52.5	1,097
30. South Cariboo	12	101.2	2,312
31. Merritt	8	101.1	2,482
32. Hope	6	78.5	1,868
33. Chilliwack	33	393.6	9,860
34. Abbotsford	34	326.6	8,364
35. Langley	30	293.8	7,368
36. Surrey	74	1,164.7	28,392
37. Delta	25	481.0	11,906
38. Richmond	42	683.7	16,671
39. Vancouver	111	3,011.7	75,080
40. New Westminster	10	265.5	6,828
41. Burnaby	50	1,255.3	29,653
42. Maple Ridge	23	295.5	7,118
43. Coquitlam	48	1,048.8	25,301
44. North Vancouver	45	938.6	22,478

Appendix C (continued)

District Name and Number	Number of Schools	Number of Teachers	Number of Pupils
45. West Vancouver	16	350.7	8,872
46. Sechelt	12	106.7	2,454
47. Powell River	17	212.5	4,981
48. Howe Sound	11	117.8	2,660
49. Ocean Falls	7	55.0	958
50. Queen Charlotte	7	56.2	1,174
52. Prince Rupert	11	183.0	4,533
54. Smithers	9	108.7	2,648
55. Burns Lake	10	70.6	1,685
56. Vanderhoof	13	113.5	2,882
57. Prince George	55	721.4	17,687
59. Peace River South	24	282.6	6,662
60. Peace River North	20	201.2	4,952
61. Greater Victoria	58	1,300.4	32,646
62. Sooke	20	251.0	6,812
63. Saanich	18	227.7	5,383
64. Gulf Islands	6	38.1	851
65. Cowichan	28	265.7	6,226
66. Lake Cowichan	8	76.4	1,738
67. Ladysmith	12	116.3	2,660
68. Nanaimo	35	442.0	10,857
69. Qualicum	10	89.0	1,971
70. Alberni	25	376.8	9,031
71. Courtenay	22	309.9	7,659
72. Campbell River	21	215.6	5,229
75. Mission	18	158.9	3,545
76. Agassiz	7	50.0	1,041
77. Summerland	3	54.6	1,302
80. Kitimat	6	145.2	3,604
81. Fort Nelson	5	41.5	1,034
82. Chilcotin	6	9.0	169
83. Portage Mountain*	2	21.5	552
84. Vancouver Island West	8	49.2	996
85. Vancouver Island North	18	126.8	2,741
86. Creston-Kaslo	13	131.0	3,132
87. Stikine	6	19.0	401
88. Skeena-Cassiar	25	226.0	5,673
89. Shuswap	29	228.9	5,312
TOTALS	1,507	21,755.6	527,106

* Amalgamated with Peace River North during the 1971-72 school year.

APPENDIX D

COPY OF THE INTERVIEW SCHEDULE

INTERVIEW SCHEDULE: CENTRAL OFFICE STAFFING ADEQUACY

I. CENTRAL OFFICE SERVICES	DO YOU CONSIDER THIS SERVICE ESSENTIAL YES NO	IN WHICH AREAS DO YOU HAVE INSUFFICIENT NUMBERS OF STAFF?	NUMBER OF ADDITIONAL PERSONNEL REQUIRED TO PROVIDE ADEQUATE SERVICE	REASON FOR CURRENT SHORTAGE OF PERSONNEL TO OPERATE SERVICE				
				Single Salary Schedule	Gov't Financial Policy	School Board Policy	Lack of Qualified Personnel	Other (Please Specify) _____
1. GENERAL ADMINISTRATION SERVICES Systems Level-Supt., Planning, Organization Design & Control, Etc.								
2. BUSINESS & FINANCIAL ADMIN. SERVICES Secretary-Treasurer, Payroll, Etc.								
3. CURRICULUM & INSTRUCTION SERVICES A-V Media Services								
Library Services								
Community School								
Psychological Services								
Counselling/Guidance Services								
Special Education								
Adult Education/Extension Services								
Curriculum Development/Evaluation								
Curriculum Supervision Services								
Curriculum Consultation Services								
4. PERSONNEL SERVICES Personnel Recruitment/Placement								
Personnel Evaluation								
Staff Development								
5. BUILDING, MAINTENANCE & OPERATIONS SERVICES								
6. PURCHASING & STORES SERVICES								
7. RESEARCH & DEVELOPMENT SERVICES								
8. PUBLIC RELATIONS SERVICES								
9. SECRETARIAL & CLERICAL SERVICES								
10. COMPUTER OPERATIONS/INFORMATION SYSTEMS								
11. OTHER (PLEASE SPECIFY)								

INTERVIEW SCHEDULE: IN-SCHOOL STAFFING ADEQUACY

II. IN-SCHOOL SERVICES	DO YOU CONSIDER THIS SERVICE ESSENTIAL YES	NO	IN WHICH AREAS DO YOU HAVE INSUFFICIENT NUMBERS OF STAFF?	NUMBER OF ADDITIONAL PERSONNEL REQUIRED TO PROVIDE ADEQUATE SERVICE	REASON FOR CURRENT SHORTAGE OF PERSONNEL TO OPERATE SERVICE: Single Salary Schedule	Gov't Financial Policy	School Board Policy	Lack of Qualified Personnel	Other (Please Specify)
1. GENERAL ADMINISTRATION SERVICES (Principal/Asst. Principal/Business Mgr.)									
2. CURRICULUM & INSTRUCTION SERVICES									
Classroom Teaching Services									
-Social Sciences									
-Physical Sciences									
-Languages									
-Fine Arts									
-Vocational Ed./Industrial Arts									
-Business Education									
-Other									
Diagnostic/Remedial/Psychological Serv.									
Guidance/Counselling Services									
Library Services									
A-V Media Services									
Special Education Services (Opportunity, Hard of Hearing, etc. Classes)									
Teacher Assistance Services									
-Teacher Aides									
-Laboratory Assistants									
-Markers									
Curriculum Development/Evaluation									
Curriculum Supervision									
Other (Please Specify)									
3. COMMUNITY SCHOOL SERVICES (Adult Education/Recreation/Etc.									
4. CLERICAL & SECRETARIAL SERVICES									
5. OTHER (PLEASE SPECIFY)									

GENERAL QUESTIONS

1. What services not mentioned above do you consider to be essential to the operation of your system?

Services	Number of Personnel Required for Each
_____	_____
_____	_____

2. What changes in personnel utilization do you consider most desirable? (e.g. Differentiated Staffing, Team Teaching, Increased use of Paraprofessional Personnel). (You may include trade-offs here. e.g. Fewer assistant principals; More Team Leaders; or More clerical assistance for teachers).

_____

_____

3. What personnel/services now based in central office could be more effectively/efficiently performed if they were based in schools? Why? (e.g. psychologists, reading specialists, social workers, etc.).

_____

_____

4. What personnel/services now based in schools could be more effectively/efficiently performed if they were based in central office? Why?

_____

_____

5. Have you any general comments on how local school system staffing practices and personnel utilization could be improved to enable students to learn more, better, faster?

_____

_____

6. SIZE OF SCHOOL UNIT-Is your school system (a) too small, (b) about the right size, or (c) too large, (1) geographically and (2) in terms of the number of pupils, to offer adequate educational services?

_____

_____

7. If you were given a 10% increase in staffing budget, in which <u>three non-instructional areas</u> would you add staff?

1. _____
2. _____ OR NONE _____
3. _____

8. If you were given a 10% increase in staffing budget, in which <u>three instructional areas</u> would you add staff?

1. _____
2. _____ OR NONE _____
3. _____

9. <u>Additional Comments</u>

_____

_____

APPENDIX E

MEANS OF PERSONNEL AND SALARY COST VARIABLES FOR SCHOOL DISTRICTS GROUPED BY NUMBER OF PUPILS

Table 30

Mean Numbers of Central Office Administrative Staff for Groups of School Districts in Five Size Categories

Number of Pupils (Size)	N	Mean Numbers of Central Office Administrative Staff				
		Senior	Intermediate	Supervisory	Service	Total Staff
1. 28,197-73,599	4	7.0	5.5	16.9	12.5	41.9
2. 7,516-15,793	6	3.3	1.8	7.0	4.0	16.2
3. 4,230-5,469	4	2.3	1.0	3.4	3.0	9.7
4. 1,966-2,626	5	1.7	0.8	1.2	1.3	5.0
5. 699-1,168	5	1.5	0	0.4	0	1.9
Total Sample	24	3.0	1.7	5.5	3.9	14.1

Table 31

Mean Numbers of Central Office Staff for Groups of School Districts in Five Size Categories

Number of Pupils (Size)	N	Mean Numbers of Central Office Staff		
		Administrative	Support	Total Staff
1. 28,197-73,599	4	41.9	55.8	97.6
2. 7,516-15,793	6	16.2	16.4	32.6
3. 4,230-5,469	4	9.7	5.2	14.9
4. 1,966-2,626	5	5.0	3.2	8.2
5. 699-1,168	5	1.9	1.9	3.8
Total Sample	24	14.1	15.3	29.4

Table 32

Mean Numbers of In-School Staff for Groups of School Districts in Five Size Categories

Number of Pupils (Size)	N	Mean Numbers of In-School Staff			
		Clerical Staff	Teacher Aides	Administrative F.T.E.	Administrative P.T.C.
1. 28,197-73,599	4	103.0	68.6	91.2	184.3
2. 7,516-15,793	6	27.9	9.8	25.5	48.7
3. 4,230-5,469	4	13.0	0.5	11.2	18.3
4. 1,966-2,626	5	6.0	2.5	5.3	9.1
5. 966-1,168	5	2.3	0.2	2.1	4.5
Total Sample	24	28.0	14.5	25.0	48.8

F.T.E. - Prorated portion of administrator's time spent in administration and supervision.

P.T.C. - Prorated portion of administrator's time spent in classroom instruction.

Table 33

Mean Numbers of Total Staff in Five Components for Groups of School Districts in Five Size Categories

Number of Pupils (Size)	N	Mean Numbers of Total Staff in Five Components				
		Administrative	Support Staff	Instructional	Non-Instructional	Total Staff
1. 28,197-73,599	4	133.1	227.3	1661.1	360.4	2021.5
2. 7,516-15,793	6	41.7	54.2	454.2	95.8	550.0
3. 4,230-5,469	4	20.9	18.8	209.0	39.7	248.6
4. 1,966-2,626	5	10.3	11.7	102.4	22.0	124.4
5. 699-1,168	5	3.9	4.4	44.7	8.4	53.1
Total Sample	24	39.0	57.9	455.9	97.0	552.8

Table 34

Mean Salary Costs of Central Office Administrative Staff for Groups of School Districts in Five Size Categories

Number of Pupils (Size)	N	Mean Salary Costs of Central Office Administrative Staff				
		Senior	Intermediate	Supervisory	Service	Total Staff
1. 28,197-73,599	4	$14,777	$7,135	$26,397	$13,620	$61,929
2. 7,516-15,793	6	$ 6,026	$1,749	$ 9,712	$ 3,727	$21,213
3. 4,230-5,469	4	$ 3,931	$ 727	$ 4,851	$ 2,478	$11,987
4. 1,966-2,626	5	$ 2,379	$ 588	$ 1,698	$ 952	$ 5,616
5. 699-1,168	5	$ 1,611	$ 0	$ 567	$ 0	$ 2,178
Total Sample	24	$ 5,456	$1,870	$ 8,108	$ 3,813	$19,246

Salary costs were for the month of September, 1971.

Table 35

Mean Salary Costs of Central Office Staff for Groups of School Districts in Five Size Categories

Number of Pupils (Size)	N	Mean Salary Costs of Central Office Staff		
		Administrative	Support	Total Staff
1. 28,197-73,599	4	$61,929	$27,049	$88,978
2. 7,516-15,793	6	$21,213	$ 7,873	$29,086
3. 4,320-5,469	4	$11,987	$ 2,568	$14,555
4. 1,966-2,626	5	$ 5,616	$ 1,665	$ 7,281
5. 699-1,168	5	$ 2,178	$ 811	$ 2,989
Total Sample	24	$19,246	$ 7,420	$26,667

Salary costs were for the month of September, 1971.

Table 36

Mean Salary Costs of In-School Staff for Groups of School Districts in Five Size Categories

Number of Pupils (Size)	N	Mean Salary Costs of In-School Staff			
		Clerical Staff	Teacher Aides	Administrative F.T.E.	Administrative P.T.C.
1. 28,197-73,599	4	$39,545	$20,425	$181,154	$230,238
2. 7,516-15,793	6	$12,233	$ 3,196	$ 46,918	$ 56,441
3. 4,230-5,469	4	$ 5,390	$ 148	$ 20,853	$ 20,883
4. 1,966-2,626	5	$ 2,955	$ 645	$ 10,587	$ 11,221
5. 699-1,168	5	$ 918	$ 99	$ 4,167	$ 5,101
Total Sample	24	$11,354	$ 4,367	$ 48,471	$ 59,364

F.T.E. - Prorated portion of administrator's time spent in administration and supervision.

P.T.C. - Prorated portion of administrator's time spent in classroom instruction.

Table 37

Mean Salary Costs of Total Staff in Five Components for Groups of School Districts in Five Size Categories

Number of Pupils (Size)	N	Mean Salary Costs of Total Staff in Five Components				
		Administrative	Support Staff	Instructional	Non-Instructional	Total Staff
1. 28,197-73,599	4	$243,083	$87,091	$1,695,367	$330,102	$2,025,469
2. 7,516-15,793	6	$ 68,131	$23,302	$ 466.797	$ 91,434	$ 538.230
3. 4,230-5,469	4	$ 32,840	$ 8,107	$ 202,686	$ 40,946	$ 243,633
4. 1,966-2,626	5	$ 16,203	$ 5,264	$ 98,739	$ 21,467	$ 120,206
5. 699-1,168	5	$ 6,344	$ 1,749	$ 41,045	$ 8,093	$ 49,138
Total Sample	24	$ 67,717	$23,141	$ 457,163	$ 90,858	$ 548,021

Salary costs were for the month of September, 1971.