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PERSONNEL UTILIZATION IN ELEMENTARY AND SECONDARY EDUCATION IN ALBERTA

by

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The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies and Research, for acceptance, a thesis entitled "Personnel Utilization in Elementary and Secondary Education in Alberta" submitted by Thomas Anthony Blowers in partial fulfilment of the requirements for the degree of Doctor of Philosophy.

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ABSTRACT

The major purpose of the study was to examine a number of the relationships among selected personnel and salary ratios, and selected organizational variables, in all 139 operating school systems in Alberta. The minor purposes of the study were: (1) to compare the means of personnel and salary ratios in groups of school systems of different sizes and different types of jurisdiction; (2) to describe the numbers, salary costs, and functions of the personnel employed in operating elementary and secondary education in school systems and in the central and regional offices of the Department of Education of Alberta; (3) to survey the opinions of superintendents and other central office officials in school systems concerning the adequacy of the numbers of personnel, priorities for instructional and non-instructional staff, and suggested changes in personnel utilization; and (4) to describe the organizational structures of the Department of Education and a representative sample of the central offices of school systems in Alberta.

The data were collected by questionnaire, interviews, and visits to the Department of Education and school systems in Alberta.

At least one of the eight variables other than size was more highly correlated with every one of the 32 personnel and salary ratios than were any of the three measures of system size. Thus, system size appeared to be a relatively less important factor in the explanation of the variation of the sizes of the various personnel and salary ratios in Alberta school systems than did at least one of the other eight

variables considered. However, the majority of the correlation coefficients were quite low.

In the regression analyses, neither system size alone, nor system size in combination with the other predictor variables used, accounted for sufficiently high enough cumulative percentages of variance in the criterion variables to be considered as good predictors of the sizes of personnel ratios in Alberta school systems.

The group of school divisions had the highest mean ratios of personnel and salaries for the majority of the calculated non-instructional components, and the group of separate districts had the lowest. Mean ratios for groups of counties and public districts were generally lower than those for divisions and higher than those for separate districts. There were slight tendencies toward increasing mean size of most of the personnel and salary ratios with increases in system size.

The highest instructional staff priorities of the respondents were for additional personnel to provide (a) in-school psychological, remedial and counselling services, (b) in-school curricular services, and (c) in-school library/audio-visual media services. The three highest non-instructional staff priorities were for teacher aides, in-school clerical personnel, and buildings and maintenance personnel.

Of the total number of personnel employed in operating the elementary and secondary education system in Alberta, 2.78% were Department of Education and 97.22% were local school system personnel; and 7.77% were "central office" and 92.23% were "in-school" personnel.

Relatively little variation was noted in the central office organizational structures of Alberta school systems.

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THE PROBLEM AND DEFINITION OF TERMS

> By almost every measure, education now is Canada's biggest "industry." There are about 6.5 million full-time students and teachers--nearly a third of Canada's population--involved in education. . . . Expenditures on formal education and vocational training now account for 8 per cent of the Gross National Product. Education is the largest category (over 20 per cent) of total government spending in Canada and now exceeds $6 billion. Moreover, such expenditures are expected to increase at an average annual rate of 8.5 per cent in constant dollars over the eight-year period 1967-75. This rate of increase is expected to be exceeded only in the case of government spending on health care. (Economic Council of Canada, 1970:55)

The rapidly rising costs of education in Canada, which have exceeded rates of increase in the Gross National Product (Hanson, 1971:20; Wisenthal, 1970:1; Economic Council of Canada, 1970:55-73), have resulted in pressures for more efficient use of the resources allocated to education. This, in turn, is forcing educators to examine present practices more closely. For example, the Economic Council of Canada (1970:67) has stated that there is a growing consciousness among administrators in both educational institutions and in government, that they are responsible not merely for "producing education" but also for systematic management and efficient use of the resources involved. Pressures for more efficient use of resources are also being felt in the elementary and secondary school sector because of the changing allocation of funds within the education system. Hanson (1971:57) calculated that while expenditure on elementary and secondary education in Canada nearly tripled between 1961 and 1969, such expenditure fell

relative to the total expenditure on all education from 80 per cent in 1961 to 61 per cent in 1969 as the expenditure on post-secondary education increased more rapidly.

The results of studies conducted by Reller (1952:359), Davis et al. (1968:17), Hanson (1971:57), Myroon (1969:76), Phimester (1970:39), and Eurchuk (1970:42), suggested that concern about the expenditure of educational funds leads quickly to consideration of personnel because a major part of operating expenditures (usually about 70 per cent) is used for the salaries of instructional and non-instructional personnel.

As well as the factors mentioned above, the growth in size of educational organizations has been a major factor influencing the employment of educational personnel. The Canadian Education Association (1971:1-8), Hanson (1971:1-4), and Warner, Unwalla and Trimm (1967:508-531) have emphasized that with increased urbanization and consolidation of districts, individual schools and individual school systems have grown bigger and fewer in number. In addition to the increase in numbers of persons employed, Davis et al. (1968:37), Castetter (1962:108), Chandler et al. (1955:42), and Olivero (1970:14) have pointed out that there has been a dramatic increase in the number of new types of positions which have been added to school systems as they have increased in size. According to Olivero (1970:14), these new positions range from teacher and clerical aides to psychologists, systems analysts and media technicians. Byrne (1969:8) has noted that the development of "central office bureaucracies" has paralleled the increase in size of school systems.

Greenfield, House, Hickcox and Buchanan (1969:52), supported by Gill and Friesen (1968:1) and Blau and Scott (1962:7), stated that

increasing the size of school systems results in greater specialization of responsibilities, greater complexity, and greater need for the overall coordination of activities. Blau and Scott (1962:7), Boyan (1963:6-7), and Griffiths et al. (1962:189) suggested that as organizations grow, they require an especially elaborate administrative apparatus. Boyan (1963:6-7) suggested that the growth of specialization, differentiation, and division of labour in the larger school systems requires larger and more complex administrative staffs in both the central office and in individual schools. Griffiths et al. (1962:189) noted that the increase in size of school systems has been accompanied by rapid growth of knowledge in each body of subject matter taught in the school, by new areas added to the curriculum, and by a demand that each child should be educated to achieve his full potential. Griffiths et al. suggested that these trends tend to make the education system more complex and require more specialists.

In addition to the above considerations, Pondy (1969:47), Davis et al. (1968:49), and Miklos (1971:1-19) have implied that administrative discretion may play an important part in staffing patterns and the allocation of educational personnel resources. Castetter (1962:111) noted, "the extent of non-instructional service in the final analysis, is a matter of judgement." Apparently there are alternative organizational structures and staff deployments which may make the proliferation of personnel in the central offices of school systems highly questionable. (Davis et al., 1968:49; Miklos, 1971:17). In particular Miklos (1971:17) suggested that the current allocation of functions between central offices and schools needs reexamination if educational personnel are to be more efficiently utilized. Further, Olivero (1970:17) stated that:

". . . dissatisfaction with the status quo, money, new and different types of supportive personnel, technology, and new and more individualized curricula . . . ." are additional factors affecting the utilization of educational personnel.

However, as is noted in the review of literature in Chapter 2 and as Klatsky (1970:428) has stated:

> 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 the comparative organizational research. As the literature on this topic grows, however, the inconsistencies in the findings make it increasingly evident that the issues are more complex than they originally appeared to be.

According to Reiss (1970:3), the obvious lack of agreement associated with the research conducted on the subject of the relationship between organizational size and the relative size of the administrative component ". . . suggested that unidentified factors in organizations influence the size of the administrative component; when these factors are identified, the different results can be explained." The problem, simply stated, is to account for the variability among organizations and over time in the sizes of the administrative and other personnel ratios in organizations. The present concerns about the increasing costs of education suggested that this question could usefully be asked concerning salary ratios.

Some of the researchers on this topic have asked the question: Is organizational size alone a predictor of the relative size of the administrative or overhead personnel component? Other investigators have queried: Is organizational size in combination with other variables a predictor of the relative size of the administrative component? Consideration of the above factors, particularly the

inconsistencies in the results of the research, the paucity of research on the topic in educational organizations, and the apparent complexity of the relationships involved, suggested that an examination of personnel and salary ratios in Alberta school systems would be a useful contribution to the research.

THE PROBLEM

Statement of the Problem

The major purpose of the study was to examine the relationships between the sizes of each of the administrative, central office, support, instructional, and non-instructional personnel and salary ratios and (1) the size of the school system in terms of the numbers of pupils, teachers, and schools, (2) mean teacher qualifications, (3) geographic dispersion of pupils, (4) geographic dispersion of schools, (5) the number of central office departments, (6) operating budget per pupil, (7) supplementary requisition per pupil, (8) supplementary requisition mill rate, and (9) mean school size, in all 139 operating school systems in Alberta. A fundamental question guided the research: To what extent, individually and collectively, are organizational size and the variables numbered (2) to (8) above associated with each of the personnel ratios in Alberta school systems?

The minor purposes of the study were:

(1) To describe the numbers, salary costs, and functions of the personnel employed in operating elementary and secondary education in school systems and in the central and regional offices of the Department of Education of Alberta;

(2) To compare the mean values of personnel and salary ratios in

groups of school systems arranged according to (a) size and (b) type of administrative jurisdiction;

(3) To survey the opinions of superintendents and other central office officials in school systems concerning the adequacy of the numbers of personnel, priorities for instructional and non-instructional staff, and suggested changes in personnel utilization;

(4) To describe the organizational structures of the Department of Education and a representative sample of the central offices of school systems in Alberta.

Subproblems

A. Personnel ratios.

1. What are the distributions of the mean numbers of personnel (a) per 1,000 pupils and (b) per 100 staff members, in the administrative, central office, support, instructional, and non-instructional personnel components in groups of school systems arranged by (1) size and (2) type of administrative jurisdiction?

2. What relationships exist between the ratios of personnel in (a) administrative, (b) central office, (c) support, (d) instructional, and (e) non-instructional positions, and (1) the total number of pupils, (2) the total number of staff, (3) the total number of schools, (4) mean teacher qualifications, (5) geographic dispersion of pupils, (6) geographic dispersion of schools, (7) the number of central office departments, (8) operating budget per pupil, (9) supplementary requisition per pupil, (10) supplementary requisition mill rate, and (11) mean

school size, in school systems in Alberta?

3. What percentage of the variance of each of the administrative, central office, support, instructional, and non-instructional personnel ratios in Alberta school systems is related to the following variables, when these variables are examined collectively: (1) the total number of pupils, (2) the total number of staff, (3) mean teacher qualifications, (4) geographic dispersion of pupils, (5) geographic dispersion of schools, (6) the number of central office departments, (7) operating budget per pupil, (8) supplementary requisition per pupil, and (9) the supplementary requisition mill rate? That is, when examined collectively, which of the variables numbered (1) to (9) above are the best predictors of each of the personnel ratios?

4. What percentage of the total staff involved in operating the elementary and secondary education system in Alberta is represented by Department of Education personnel?

B. Salary ratios.

1. What are the distributions of the mean salary costs (a) per pupil and (b) per staff member, of the administrative, central office, support, instructional, and non-instructional personnel components in groups of school systems arranged by (1) size, and (2) type of administrative jurisdiction?

2. What relationships exist between the ratios of the salaries of the personnel in (a) administrative, (b) central office, (c) support, (d) instructional, and (e) non-instructional positions, and (1) the total number of pupils, (2) the total number of

staff, (3) the total number of schools, (4) mean teacher qualifications, (5) geographic dispersion of pupils, (6) geographic dispersion of schools, (7) the number of central office departments, (8) operating budget per pupil, (9) supplementary requisition per pupil, (10) supplementary requisition mill rate, and (11) mean school size, in school systems in Alberta?

3. What percentage of the total salaries paid to staff involved in operating the elementary and secondary education system in Alberta is represented by the salaries of Department of Education personnel?

C. Staffing adequacy.

1. What are the views of superintendents and other central office officials in school systems in Alberta concerning: (a) the adequacy of the numbers of personnel, (b) priorities for instructional and non-instructional staff, and (c) suggested changes in personnel utilization?

D. Organizational structure.

1. What organizational structures are used in the central offices of school systems and the Department of Education in Alberta?

Justification of the Study

Starbuck (1965:519-520), Klatsky (1970:428), and Reiss (1970:3) identified a need and a rationale for further exploratory and/or descriptive studies of factors which may affect the relative sizes of administrative and other overhead personnel components in organizations.

They noted the obvious lack of agreement associated with the relationship between organizational size and the relative size of the administrative component. Starbuck (1965:519-520) stated that the paucity of research in this area increases the hazards of drawing conclusions regarding organizational size and its relationship to the administrative (non-instructional) component. In addition, Starbuck (1965:20) stressed the need for more data "on nearly every aspect of organizational growth and development."

The present research may contribute to an explanation of the variability of the sizes of administrative and other overhead personnel ratios in organizations of different sizes by examining, individually and collectively, the relationship of a number of variables--organizational size, mean teacher qualifications, geographic variables, financial variables, and the number of central office departments--to the sizes of personnel ratios in school systems in Alberta.

In addition, a number of practical justifications exist for the study. The rapidly rising costs of education combined with considerable public pressures to justify both procedures and expenditures are requiring administrators to examine the practices of our educational institutions more carefully than ever before. For example, Hanson (1971:20) stated:

> 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 which is becoming devoted to this function.

As personnel salaries are the largest single item of expenditure in school system operating budgets, a review of personnel and salary ratios appeared particularly relevant. The Economic Council of Canada (1970:69)

stated that the efficient utilization of manpower is one of the fundamental issues in the achievement of efficiencies and economies in education.

In making decisions concerning the allocation of resources, school trustees, administrators, and government officials require comparative data. However, Holdaway (1971:30) noted that comparative data appears to be lacking in (1) numbers and salaries of instructional personnel, and (2) numbers and salaries of the various categories of non-instructional personnel. According to Castetter (1962:102-113), a survey of instructional and non-instructional personnel is a necessary first step in the planning and decision-making processes in any attempt to improve present staffing practices. Olivero (1970:26) observed that, "What is needed in education is an assessment of how educational manpower is utilized."

This study has implications for the organization and administration of school systems. School officials may find the data useful in forecasting the numbers and specialties of non-instructional personnel required in the various categories as school systems grow. Carter (1968:52) noted, ". . . there are few areas of greater disagreement between a superintendent and board members than the numbers of personnel required for carrying on central office operations." The information collected on organizational structure may provide useful comparative data for school systems considering reorganization or reallocation of functions within their jurisdictions.

The data may be useful in explaining and predicting the variability in the sizes of the administrative and other overhead personnel and salary components in school systems of different sizes.

Tosi and Patt (1967:162) mentioned that the size relationship between the administrative component and the "production component" of a system is important in terms of cost, use of resources, and efficiency. They stated (1967:162): "It remains for the administrative unit to justify its cost of operation by the addition of benefits, services, relief and assistance it provides operating units."

The present study is a continuation and extension of a series of interrelated studies of personnel and salary ratios, and organizational size, conducted in western Canadian school systems by Gill (1967), Blowers (1969), Vithayathil (1969), Duboyce (1970), Lepatski (1970), and Gregory (1972). The present research extended these studies by including: (1) some new variables in addition to organizational size, which might influence the sizes of personnel and salary ratios; (2) Department of Education personnel responsible for elementary and secondary education in Alberta; (3) an examination of the administrative structures of the central offices of school systems; and (4) an examination of the opinions of the superintendents of school systems concerning the adequacy of the numbers of staff, staffing priorities, and suggested changes in personnel utilization.

Further, no extensive study of personnel and salary ratios has been conducted in Alberta since the introduction in 1970 of the new School Act, the new Foundation Program, the decentralization of the Department of Education into regional offices, and the governmental decision to require local plebiscites for increases in school expenditures that exceed a certain minimum. In view of these recent marked environmental changes for elementary and secondary education in Alberta, information in the study may provide relevant base-line data

for policy decisions at both the provincial and local school system levels of operation.

DEFINITION OF TERMS

The personnel classification outlined below was developed and progressively refined in a series of integrated research studies conducted at The University of Alberta. The use of this categorization enabled the present research to be compared with the earlier studies in the series, and with companion studies by Holdaway and Uhlman. The classification closely approximates the one suggested by Gibson and Hunt (1965:160-163).

Administrative Personnel/Component

The administrative component was defined to include all central office and in-school personnel who:

i) plan, organize, direct, coordinate and/or control the activities and personnel of the school system;

ii) make key organizational decisions;

iii) supervise the work of other personnel; and

iv) do not work directly with students or their instruction.

Central Office Administrative Personnel/Component

The central office administrative component was subdivided into the following four categories:

i) the "senior" administrative staff which included the superintendent, associate/assistant/deputy and/or area superintendents, and the secretary-treasurer;

ii) the "intermediate" administrative staff which included positions

such as directors, assistant directors, assistant/deputy secretary-treasurers, administrative assistants, personnel and staffing officers, staff development officers, and research and development officers;

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

iv) the "service" administrative staff which included all administrative officers involved with the functions of buildings and maintenance, purchasing and stores, and computer operations. Purchasing agents, warehouse and office managers, supervisors and directors of maintenance/buildings and grounds, systems/computer programmer/analysts and information officers were included in this category.

In-school Administrative Personnel/Component

Following the approach used by Lepatski (1970:13) and Holdaway (1971:13), in this study, all principals, assistant principals, department heads, assistant department heads, subject coordinators, and business managers located in schools were included on a prorated basis as "in-school administrators." For example, if an administrator used 60 per cent of his time for administration and 40 per cent for classroom instruction, then 0.6 full-time equivalents (FTE) were allocated to in-school administration and 0.4 FTE to the instructional component.

Support Personnel/Component

In this study, the central office support component consisted of all central office secretarial and clerical personnel. In-school support

personnel consisted of all in-school secretarial and clerical personnel and teacher aides. The central office and in-school support components were added to obtain the total support component.

Central Office Personnel/Component

The "central office component" consisted of all central office personnel in the administrative and support components.

Non-instructional Personnel/Component

Following the approach used by Castetter (1962:108), "Non-instructional personnel include those personnel who render services, which, for the most part, are indirectly related to the instructional process." That is, in this study, the non-instructional component consisted of all central office and in-school administrative and support personnel.

Instructional Personnel/Component

The instructional component included all classroom teachers, guidance counsellors, librarians, reading specialists, social workers, psychologists, and psychiatrists in the school system. Following the approach used by Gibson and Hunt (1965:162), instructional positions were defined as all positions requiring the rendering of direct and personnel services to children in the teaching-learning situation. The prorated portion of in-school administrators' time spent in classroom instruction was included in the instructional component.

Central Office Auxiliary Personnel/Component

When this study was originally designed, the intention was to divide the instructional component into central office and in-school

subcomponents. However, when the data were gathered, only 8 of 132 school systems reported any instructional personnel, as defined above, in central offices. In addition, the 8 systems which reported central office instructional staff indicated that these personnel spent over 90 per cent of their time in schools with children. For these two reasons the central office auxiliary component was deleted and the personnel added to the instructional component.

Administrative Salary Cost

The administrative salary cost consisted of the total gross salaries and allowances (hereafter referred to as "salaries") paid to central office administrative personnel and to in-school administrators on a prorated basis. Fringe benefits were excluded from the calculation of the salaries.

Support Salary Cost

The support salary cost included the total gross salaries paid to central office and in-school support personnel.

Central Office Salary Cost

The central office salary cost consisted of the total gross salaries paid to all central office administrative and support personnel.

Non-instructional Salary Cost

The non-instructional salary cost consisted of the total gross salaries paid to all non-instructional personnel.

Instructional Salary Cost

The instructional salary cost consisted of the total gross

salaries paid to all instructional personnel.

September, 1971 Salaries

All of the salaries reported in this thesis were for the month of September, 1971 only. That is, the total gross salaries reported for each of the administrative, central office, support, instructional, non-instructional, and total staff components included only those salaries paid to the personnel in each of the components for the month of September, 1971.

Size of School System

The following three separate measures of school system size were used: (a) the total number of pupils in the system, (b) the total number of staff in the system, and (c) the total number of schools in the system. Measure (b) included the total numbers of instructional and non-instructional personnel in a system as defined above.

Personnel Ratios

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

$$\frac{\text{Total number of personnel in the category}}{\text{Size of school system}} .$$

Salary Ratios

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

$$\frac{\text{Total gross salaries of all personnel in the category}}{\text{Size of school system}} .$$

Proration Formula

The administrative proportion of the salaries of in-school personnel was calculated according to the following formula: administrative salary cost = (administrative allowance) + (administrative percentage X basic salary). For example, for a principal with 60 per cent time allocated for administration, a monthly grid salary of $1,000. and a monthly administrative allowance of $300., the administrative salary cost = $300. + (60% of $1,000.) = $900.

Teacher Qualifications

Following the approach used by Ratsoy (1970:15), teacher qualifications were described in terms of the number of years of professional and academic preparation beyond grade 12.

Geographic Dispersion

In the school systems in the study, geographic dispersion was measured in terms of (a) the number of pupils per square mile, and (b) the number of schools per square mile.

Administrative Jurisdiction

This referred to the type of organization of school systems in Alberta, namely, counties, school divisions, public school districts, and separate school districts.

Operating School System

This was defined as a school system which operates at least one school which provides instruction for students.

The Number of Central Office Departments

Following the approach used by Klatsky (1970:432), the number of central office departments was described in terms of the number of major organizational subdivisions the heads of which reported to the superintendent of schools.

Operating Budget Per Pupil

This variable was obtained by dividing the 1971 operating budget for a school system by the total number of pupils enrolled in the system.

Supplementary Requisition Per Pupil

This variable was obtained by dividing the 1971 supplementary requisition for a school system by the total number of pupils enrolled in the system. "Supplementary requisition" represented that portion of a school system's revenue, in excess of Foundation Program grants, which was raised through a direct local levy on property assessment.

Supplementary Requisition Mill Rate

The supplementary requisition mill rate was the local mill rate levied on property assessment by a municipal government to raise the supplementary requisition revenue requested by a school system.

Organizational Structure

The administrative or organizational structures of the Department of Education and a representative sample of the central offices of school systems in Alberta were examined and described as evidenced in formal organizational charts, interviews with chief superintendents, and as revealed in the study data.

After noting that small organizations have relatively the same functional requirements as larger organizations, Greenfield et al. (1969:52) suggested that, "the specific grouping of functions under executive officers will of necessity vary with the size and complexity of the organization." They stated that the following are the major functional requirements of school systems:

1. Operations: the development, implementation, maintenance and evaluation of educational programs;
2. Internal Relations: personnel selection, evaluation and development;
3. Logistical Support Services: finance, transportation, purchasing and maintenance;
4. Development: research and development on new programs, facilities and technology;
5. Administrative Affairs: planning and organizational control;
6. School District Relations: relations with external educational, governmental and community groups.

Representative examples of the specific grouping of functions under executive officers in the Department of Education and the central offices of Alberta school systems were described. In addition, following the approach used by Hickcox and Ducharme (1971), the organizational structures of the central offices of Alberta school systems were classified into four categories.

A SUMMARY OF THE CURRENT ORGANIZATION OF EDUCATION IN ALBERTA

At the time the data for this study were collected, major organizational changes were occurring in the Alberta education system. The summary outlined below describes the organization of education in Alberta as it existed on October 1, 1971.

The Provincial Education System

Figure 1 outlines the organization of the Alberta education system and illustrates how elementary and secondary (K-12) education, the concern of this study, fit into the larger education system. A recent, major change in the organization of education in Alberta was the creation of positions for two Ministers of Education: the Minister of Education is responsible to the Provincial Cabinet for elementary and secondary education, while the Minister of Advanced Education is responsible for post-secondary education. In addition, there are now two Departments of Education, one with responsibility for elementary and secondary education, and the other with responsibility for post-secondary education, as shown in Figure 1. The two Departments of Education share the following services in common: legislation, statistics and financial administration, communications, personnel and research services, and the services provided by the School Book Branch.

Units of Local School Administration

The independent school district. The Alberta Department of Education (1940:7, 1945:7) described the school district, the basic unit of rural school administration, as follows:

> When the Province of Alberta was formed in 1905, there were within its boundaries, and in actual operation, 476 school districts most of which were rural. These districts continued to function, and, as time went on, the settled rural parts of the Province were organized into similar districts each from sixteen to twenty square miles in extent, each with its own school board and each with an autonomous unit of administration.

As of October 1, 1971 the Department of Education (1971:151-153) reported the following independent school districts in existence in Alberta: 19 city school districts (9 public and 10 separate), 45 town

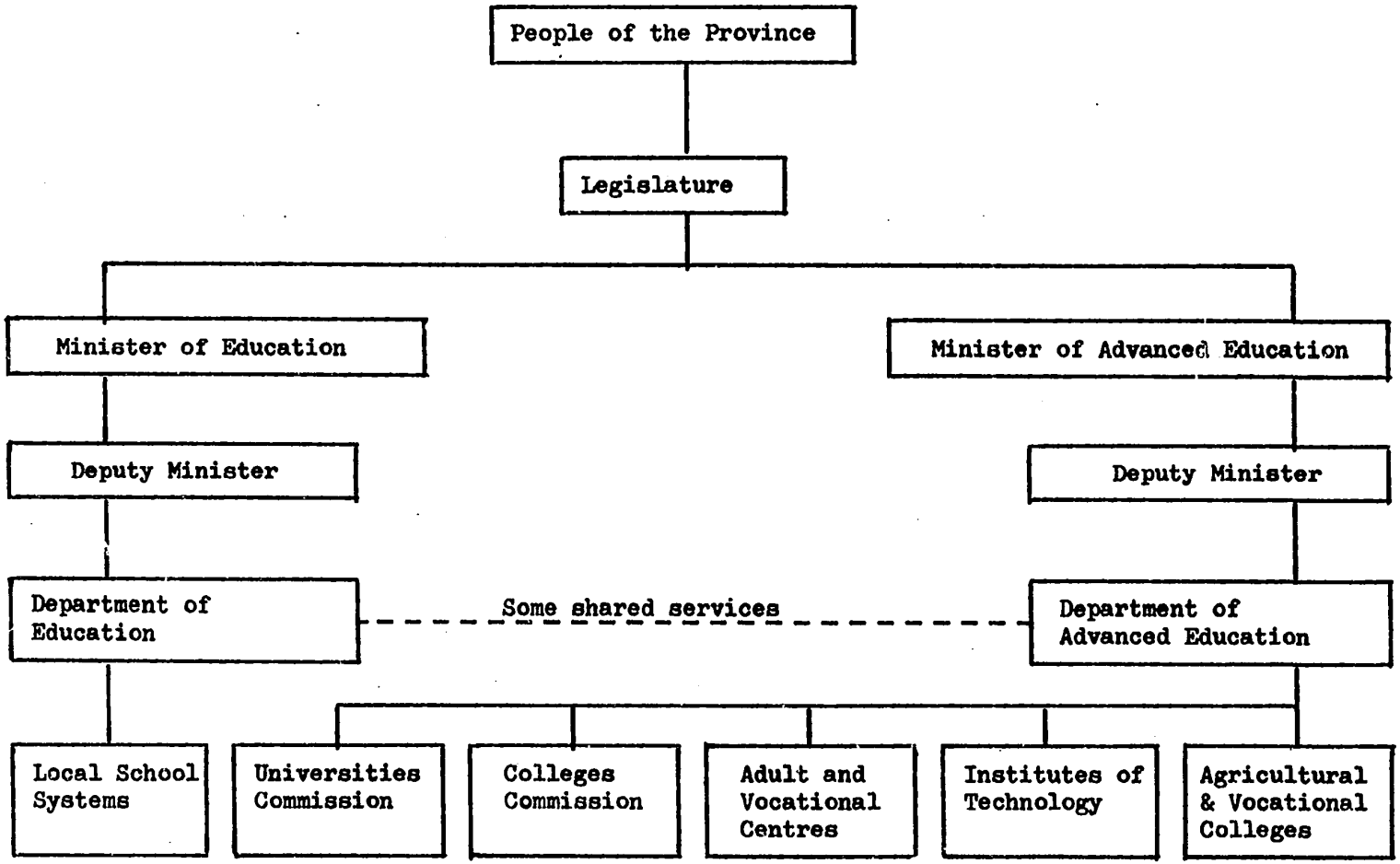

FIGURE 1: THE ORGANIZATION OF EDUCATION IN ALBERTA

school districts (13 public and 32 separate), 7 village school districts (2 public and 5 separate), 67 rural school districts (25 public and 42 separate), and 3 consolidated school districts (all 3 public). In all of the varieties of independent school districts listed above, the municipal administration and school administration (Board of Trustees) are elected separately and function separately.

Consolidated school districts. Loken (1970:210) noted that in 1913, the Alberta Government provided legislation which enabled two or more contiguous school districts to vote voluntarily to establish a consolidated school district. Between 1914 and 1923 76 such districts were formed. In 1971, however, only three consolidations remain in operation and these have been included under independent districts.

School divisions. The Department of Education (1945:7-9) described the characteristics of the school division as follows:

> School divisions are set up by Ministerial Order. Each consists of from sixty to eighty districts. . . . The affairs of a division are administered by a [divisional] Board of Trustees. . . . Only rural districts comprise a division when it is originally organized. Subsequently towns and villages may join it by mutual agreement. . . . Local school districts, although part of a division, continue to elect Boards of Trustees. Their powers are limited, but, when active, they render valuable service. . . .

The Board of Trustees of a school division are elected separately and function separately from the corresponding municipal administration. As of October 1, 1971, 30 school divisions existed in Alberta.

Counties. The Alberta Department of Municipal Affairs (1971:13) described the characteristics of the county as follows:

> Rural counties now average forty townships in size. They are single government, multi-purpose units and are formed with the amalgamation of a municipal district and a school division by the Lieutenant-

> Governor-in-Council upon request of the local authorities concerned. The boundaries of the school division and municipality are generally coterminous, and an elected council appoints committees to administer school and municipal matters.

As of October 1, 1971 there were 30 counties in Alberta.

Figure 2 is a map of the larger units of local school administration, the school divisions and counties. In addition, Figure 2 illustrates the six zones or "inspectorates" that have been set up by the Department of Education.

Table 1 summarizes the units of local school administration in Alberta as of October 1, 1971. On that date, 30 school divisions, 30 counties, and 85 independent school districts actually operated schools, giving a total of 145 operating units of local school administration.

ORGANIZATION OF THE STUDY

A review of the research on a number of organizational and environmental variables related to the sizes of personnel and salary ratios in industrial, governmental and educational organizations is presented in Chapter 2.

Chapter 3 contains descriptions of the sample and sub-sample, the assumptions and limitations of the study, the methods and instruments used for data collection, and a summary of the statistical procedures used to analyze the data.

Chapter 4 contains a comparison of mean ratios of personnel and "other" variables in groups of school systems arranged according to (a) size and (b) type of administrative jurisdiction. In addition, Chapter 4 contains an examination of the relationships among selected personnel ratios and selected organizational variables in 132 school systems.

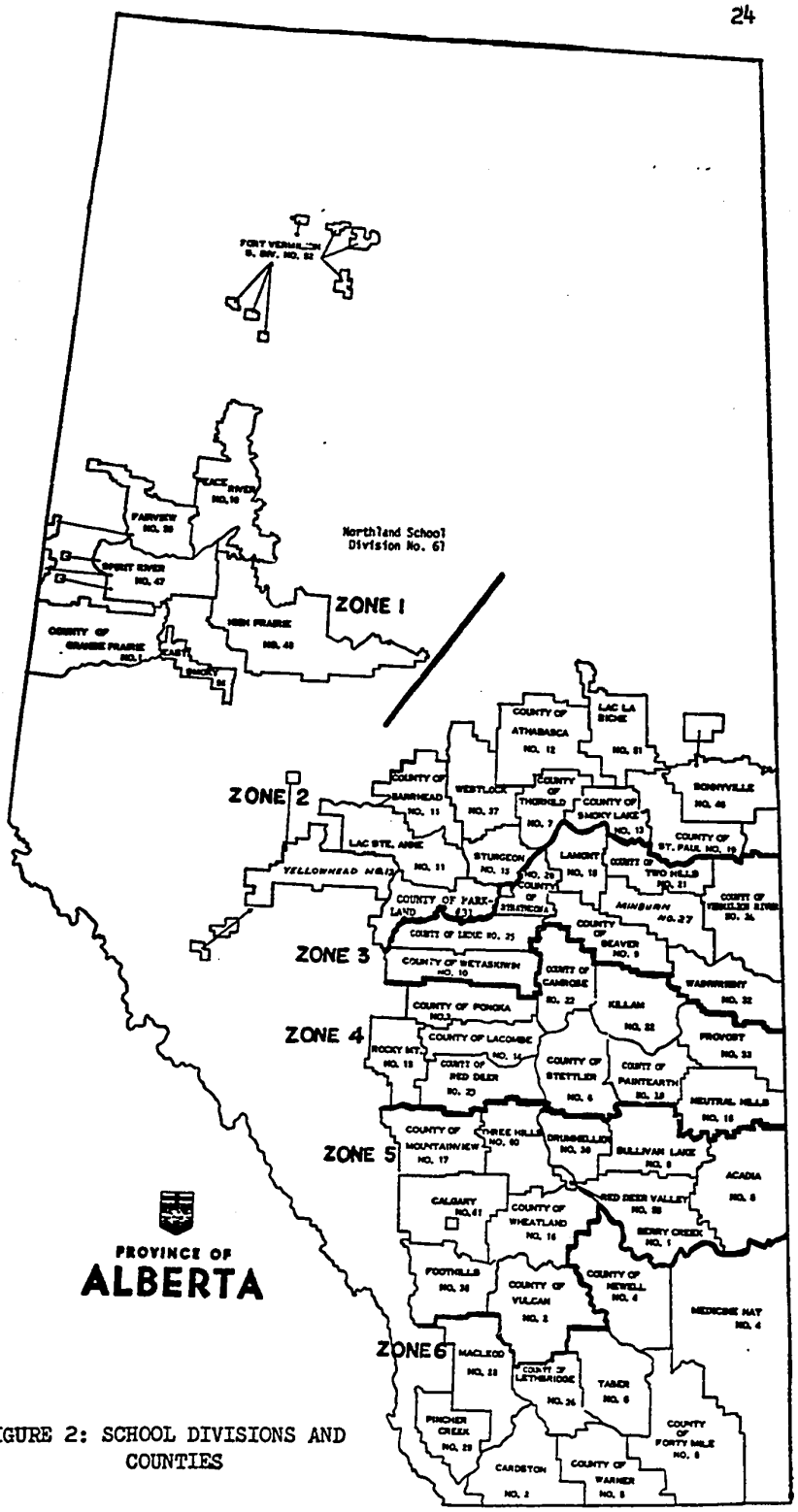

FIGURE 2: SCHOOL DIVISIONS AND COUNTIES

TABLE 1

UNITS OF LOCAL SCHOOL ADMINISTRATION IN ALBERTA

Type	Number	Public	Separate
A. County	30	N/A	N/A
B. School Division	30	N/A	N/A
C. Independent School Districts			
(i) city school districts	19 (17)*	9 (8)*	10 (9)*
(ii) town school districts	45	13	32
(iii) village school districts	7 (5)	2	5 (3)
(iv) rural school districts	67 (15)+	25 (14)+	42 (1)+
(v) consolidated school dist.	3	3	0
Total Number of School Systems	201	52	89
Total Systems Operating Schools	145	40	45

*Numbers in brackets are the number of units actually operating schools, if different from the number indicated. Included in C (i) above are the Lloydminster public and separate school systems, the Alberta portion of which are contracted out to the Province of Saskatchewan as the interprovincial boundary runs down this community's main street.

+Of the 15 rural districts which operate schools, 4 are Department of National Defence Districts, and 2 are located on Federal Experimental Stations.

Sources: Alberta Department of Education: School Division and County List No. 1, March, 1971.

Alberta Department of Education: Sixty-Fifth Annual Report, Table R, 1971, pp. 151-153.

Chapter 5 contains a comparison of mean ratios of salary and other financial variables in groups of school systems arranged according to (a) size and (b) type of administrative jurisdiction. The individual relationships between each of sixteen salary ratios and selected organizational variables in 132 school systems are also examined in Chapter 5.

The numbers and salary costs of the personnel employed in operating elementary and secondary education in the central and regional offices of the Department of Education are presented in Chapter 6. In addition, school system and Department of Education personnel are added to provide estimates of the numbers of personnel in the various staffing components in the elementary and secondary education system in Alberta.

The answers given by school system officials to the "Staffing Adequacy Opinionnaire" concerning central office and in-school staff shortages, priorities for instructional and non-instructional staff, and suggested changes in personnel utilization, are reported in Chapter 7.

Chapter 8 contains representative examples of the organizational structures of the central offices of Alberta school systems of different sizes.

The summary, conclusions and recommendations for further study are presented in Chapter 9.

Chapter 2

REVIEW OF THE LITERATURE

While the relationship between the size of organizations and the relative size of their administrative and other overhead personnel components has received a great deal of attention in comparative organizational studies (Klatsky, 1970:428), it is a relatively new field in the area of educational research. The problem, simply stated, is to account for the variability among organizations and over time in the sizes of the administrative and other overhead personnel ratios in organizations. According to Noel and Heydebrand (1971:890), the solution to the problem lies in testing hypotheses concerning organizational and non-organizational or environmental variables that could affect the administrative and other overhead personnel ratios.

The authors reported below in the review of the literature, have suggested that, in addition to size, the following organizational variables may influence the sizes of administrative and other staffing ratios: ownership and management, administrative discretion, complexity of task structure, administrative style of leaders, departmentalization, professionalization, type of coordination used, number of operating locations, location of staff (central offices or in-school), increases or decreases in services, quality of services offered, changes in organizational structure, school system reorganization, organizational budget, and geographic dispersion. The suggested non-organizational or environmental variables which may influence the size of staffing ratios

have included, among others; professional negotiations, changes in technology, changes in the economy, changes in public support for or community needs for services, changes in or in the relationships with other organizations in the larger system, and changes in government policy such as the new School Act or the new Foundation Program.

Administrative Ratios and Organizational Size

Boulding (1953:329), Haire (1959:273), and Litterer (1965:430) have suggested that as organizations become larger, relationships between their parts begin to differ and new structures are required to support the changed form of organization. According to Starbuck (1965:496), theorists have developed various aspects of the complexity assumption, and have pointed to the probable need for proportionately heavier structure, that is, increased administrative staffs, as organizations grow. Tosi and Patt (1967:161) noted that there have been conflicting thoughts and suggestions on the relationship between the size of the administrative component and the size of the containing organization--some authors suggest a positive and some a negative relationship. For example, much of the interest in administrative ratios stems from Parkinson's statistics (1957:15-29) on the British Navy and British Colonial Office which enabled him to formulate his partially humourous, partially serious "law" that the administrative component of an organization increases over time irrespective of any variation in the amount of work to be done. Both Blau and Scott (1962: 226) and Caplow (1957:502) pointed out that it is widely assumed that large organizations tend to be over-bureaucratized, that is, an increase in organizational size is accompanied by a disproportionate increase in

administrative staff. However, while Blau and Scott (1962:226) stated firmly that the research evidence does not support this assumption, Caplow (1957:502) suggested that remarkably few studies bear directly on this point and that most of the evidence is largely indirect and based on case studies of particular plants. Starbuck (1965:509) cautioned that the paucity of research increases the hazards of drawing conclusions regarding organizational size and its relationship to the administrative component.

Research Studies

The research reviewed below presents information from business, industrial, governmental, and educational organizations concerning the relationships between the sizes of personnel and salary ratios in organizations and organizational size, mean teacher qualifications, the number of central office departments, and geographic and financial variables.

In a longitudinal study of American manufacturing industries, Melman (1951:62-112) found an inverse relationship between organizational size and the component of administrative officials. He studied the administrative component in relation to organizational size, industry size, corporate organization, concentration of control, and operating characteristics, and concluded that differences in the administrative component were independent of all variables except size. A study of German industries by Bendix (1956:221) produced results closely approximating those of the Melman (1951) study. In contrast, Baker and Davis (1954:14-15) in a study of manufacturing industries in Ohio, found no relation between size of organization and proportion of administrators.

After reviewing a number of such studies, Blau and Scott (1962:226) suggested that administrative ratio increases during early growth, and that further growth is not accompanied by increases in administrative overhead. In addition, Blau and Scott (1962:266) stated that Parkinson's data concerning the disproportionate peacetime growth of the British Admiralty was misleading because this increase could have been expected in view of technological advances and the need for a peacetime elite to handle future emergencies.

Haire (1959:296-297), in a longitudinal study of four manufacturing firms, concluded that, "management grows in size as the total grows, but more slowly than the total, and is an increasingly smaller part of the whole." Apparently the span of control of supervisors increased with organizational growth as each supervisor was responsible for more men. Further, Haire (1959:292) divided the administrative component into line and staff functions and concluded that during the early stages of growth more staff than line specialists were added, while during later stages of growth staff and line personnel increased at a similar rate.

The Terrien and Mills study (1955:11-13) of California school systems attempted to determine the relationship between the administrative component of school systems and the total size of the systems. The three types of school system studied--elementary districts, high school districts, and unified-city districts--were subdivided into categories of small, medium, and large. The results indicated that for all three types of system examined the size of the administrative component increased as the size of the district increased.

A study by Anderson and Warkov (1961:26-27) of 49 American

veterans hospitals produced results which differ from those of Terrien and Mills (1955). In their study, Anderson and Warkov related administrative ratios to both organizational size and complexity and concluded (1961:26), "the larger the hospital the smaller the per cent of personnel in administration." In an attempt to reconcile the findings of these two studies, Anderson and Warkov (1961:27) suggested that as size increases, the relative size of the administrative component decreases, but that "the relative size of the administrative component increases as the number of places at which work is performed increases," or as roles become increasingly specialized and differentiated.

Tosi and Patt (1967:164-168) studied administrative ratios in 36 American Army hospitals and concluded that administrative ratio decreases with increases in organizational size. They suggested that the economies and diseconomies of scale may apply in administrative support units. That is, as organizational size increase, 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. Tosi and Patt (1967:168) suggested that as the organization grows in size and more specialties are required, that a greater number of administrative and support units may be needed.

In an analysis of 30 different types of organizations, Haas, Hall and Johnson (1963:9-17) concluded that both organizational size and the number of operating locations appeared to be inversely related to the administrative component. The finding that the administrative component decreased as the number of operating locations increased appears to negate Anderson and Warkov's (1961) opposite suggestion relative to the

results of the Terrien and Mills (1955) study.

Indik (1964:301-312) examined the relationship between supervisory ratios and organizational size in five different types of organization and concluded that the relationship between organizational size and supervision ratio is logarithmic in form, curvilinear in shape and negative in slope. This negative, curvilinear relationship between organizational size and administrative ratio has been found in numerous other studies such as those by Haas et al. (1963), Hawley (1965), Klatsky (1970), Blau (1970), and Holdaway and Blowers (1971). In an attempt to reconcile his findings with those of Terrien and Mills (1955), Indik suggested that the discrepancy between the results may be due to the fact that Terrien and Mills included non-supervisory personnel in their administrative component. This comment has implications for the present study as the non-instructional ratios developed included support personnel in their calculation. If Indik's assumption is correct, the non-instructional ratios in the present study may support the findings of Terrien and Mills (1955).

In a study of 97 institutes of higher education, Hawley, Boland and Boland (1965:252-255) found that the number of full-time administrators per 100 faculty members tended to decrease with increasing organizational size, and that faculty size was far more important in determining this ratio than were budget, complexity (numbers of departments and schools), or quality (per cent of faculty with a Ph. D. degree). Contrary to the suggestion of Anderson and Warkov (1961:27), and lending support to the findings of Haas et al. (1963) outlined above, Hawley et al. found that the administrative ratio decreased as the number of places at which work is carried on increased.

In a longitudinal study of the very large school systems of New York, Chicago, Detroit, St. Louis, Baltimore and Philadelphia, Gittell and Hollander (1968:53-55) found that the number of administrators per 1,000 pupils and per 100 staff members doubled for New York between 1955 and 1965, and rose by slightly less than one-third for Detroit. For all other cities the ratios remained approximately the same.

Rushing (1966:100-108) introduced the "problem of heterogeneous category" to the administrative ratio studies. That is, he criticized many of the earlier studies because they used a heterogeneous category to measure the relative size of the administrative component. His own research suggests that organizational size has quite different effects on different components of administrative personnel. In a study of 64 manufacturing industries, Rushing (1966:100-108) used six administrative ratios (managerial, clerical, professional, sales, service, and total administrative personnel) and two measures of organizational size (production personnel and total personnel). The managerial and sales ratios were both negatively correlated with firm size, the clerical and professional personnel ratios were both positively correlated with firm size, and the relationship of service personnel to size was unclear.

In a study of 156 American and Canadian public personnel agencies, Blau, Heydebrand and Stauffer (1966:179-191) examined the division of labour (number of occupational titles), professionalization (proportion of operating staff with a university degree), managerial hierarchy (ratio of managers to non-supervisors excluding clerks), and administrative apparatus (proportion of clerks to total staff). They found that size had no effect on the managerial ratio or the clerical percentage. However, the organizations in their study were very small

(median size 17) and they suggested that the clerical percentage decreased with size only after a certain size had been reached.

In a study of 45 manufacturing industries, Pondy (1969:47-59), concluded that administrative intensity (ratio) decreases with organizational size, and increases with functional complexity and the separation of ownership and management. Administrative intensity was defined as the ratio of administrative personnel (managers, professionals, and clerks) per 100 production workers (craftsmen, operators, and labourers) in a given industry. Administrative personnel included the central headquarters staff as well as those located at operating plants. The major difference in Pondy's study (1967:47) is that:

> The relative size of the administrative component is treated as a variable subject to administrative discretion. . . . that is, the number of administrative personnel employed in an organization is chosen so as to maximize the achievement of goals of the dominant managerial coalition.

Further, upon noting from his data a wide variation in the relative size of the administrative component across organizations in different industries--the number of administrative personnel per 100 production workers varied from 8.7 for the logging industry to 131.1 for the drug industry--Pondy (1969:47) suggested that there may be an optimum administrative intensity for a given organization; that is, optimum in terms of maximum efficiency or profit for a given level of operations. Commenting on the above study, Klatsky (1970:429) stated that the negative relationship between the administrative component and organizational size was due to assuming control losses across hierarchical levels, rather than to economies of scale with larger size. Klatsky (1970:429) added:

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 numbers 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 number of levels than between administrative ratio and size.

In a study of 53 state employment agencies, each with a headquarters and a number of local offices, Klatsky (1970:428-438) tested the suggestion outlined above. He concluded that the staff component (administrative ratio) was negatively correlated with both organizational size (total personnel employed) and functional differentiation (the number of major organizational subdivisions the heads of which reported to the agency director). Further, the administrative ratio was more highly correlated with organizational size than it was with functional differentiation. In Klatsky's study the administrative component included personnel providing legal, fiscal, personnel, information, office, training, organization, methods, planning, computer, and auditor services. 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 coordinating 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 within this range.

This latter statement may explain the higher than mean ratios in the two large urban Alberta centres in Holdaway's (1971) study.

In a study of 53 American employment security agencies and their subunits, Blau (1970:201-218) concluded that administrative ratio decreases at a declining rate as organizational size increases. On the basis of this research Blau (1970:201) suggested that:

> The expanding size of organizations gives rise to increasing subdivisions of responsibilities, facilitates supervision and widens the span of control of supervisors, 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 an economy of scale in supervision, and raising it indirectly because of the differentiation in large organizations.

The Alberta Education Studies

An integrated series of studies on staffing ratios in educational organizations has been conducted at The University of Alberta. Studies have been undertaken by Gill (1967), Blowers (1969), Vithayathil (1969), Lepatski (1970), Duboyce (1970), and Gregory (1972). Each of these studies has shown refinements in methodology. For example, whereas Gill used one definition of the administrative ratio, in all of the other studies multiple definitions were used. In addition, the staffing ratios have gradually been extended from a consideration of only full-time professionals to the inclusion of all personnel employed by local school systems except for transportation and maintenance personnel. Further refinements have included the proration of in-school administrative time, and the aspect of salaries and proportional salary costs of various components.

In the first study in the series, a cross-sectional study of 38 school systems in western Canada, Gill and Friesen (1968:1-4) concluded that the relative size of the administrative component decreased as the size of the school system increased. A similar result was obtained by

Holdaway and Vithayathil (1970:15-19) in a study which included 108 school systems in Alberta.

In a study of the administrative components of 41 urban school systems in western Canada for a five-year period: 1964-65 through 1968-69, (Holdaway and Blowers, 1971:278-286), cross-sectional analysis, using multiple definitions of administrative ratio, showed that larger system size tended to be associated with a smaller administrative ratio. The only exception was provided by the ratios on professional staff, such as psychologists, social workers and consultants, which showed increases with system size increases. However, the 41 graphs of the change in administrative ratio in each system showed no consistent tendency to rise or fall over the five-year period. Longitudinal analysis of individual systems therefore did not seem to support the general cross-sectional inference of this and other studies. That is, while the relationship between administrative ratio and size appears to be negative, the relationship between administrative ratio and time appears to be inconsistent. Only central office, university-trained or equivalent personnel plus principals were used by Gill and by Blowers in their definitions of the administrative component, whereas Vithayathil extended the ratios by including vice-principals.

The growth of the administrative component of the Edmonton Public School District was examined by Duboyce (1970). He extended the definition of the administrative component used by Blowers (1969) to include central office support staff (clerical, secretarial, and custodial). Thus the administrative component included the central office administrative staff, central office specialist non-administrative staff, central office support staff, and the principals of schools.

Further, the central office administrative staff was divided into the four categories of senior, intermediate, supervisory, and service. Duboyce (1970) noted that the ratio of central office administrative staff to number of teachers had undergone cyclical changes, but that increases were noted in the specialist non-administrative and support ratios.

A study of staffing and salary ratios of the various personnel components in the 29 school systems which make up the seven major metropolitan areas of western Canada--Winnipeg, Regina, Saskatoon, Calgary, Edmonton, Vancouver, and Victoria--were examined by Holdaway (1971:29-33). The study extended and refined the definition of the administrative component used by Duboyce by (1) including assistant principals, department heads, subject coordinators and business managers as part of the in-school administrative staff, and, (2) including secretaries, clerks, teacher aides, and custodians as part of the in-school support staff. Further, the study introduced (1) the concept of prorating in-school administrative time, and, (2) the aspects of salaries and proportional salary costs of various staff components. The major findings of the Holdaway (1971:30-32) study, shown in Tables 2-4, were: (1) larger school systems tended to have proportionately more staff in areas other than administration; (2) the larger systems tended to have larger percentages of their staff in (a) central office, (b) support, and (c) total non-instructional components; (3) the larger systems tended to have higher percentages of their total salaries allotted to central office support staff and to non-instructional staff; and (4) the larger systems tended to spend higher amounts per pupil on the salaries of both instructional and non-instructional components than did the

TABLE 2

MEAN NUMBERS OF CENTRAL OFFICE STAFF IN VARIOUS CATEGORIES[a]

Number of Pupils	N	Administrative				Auxiliary		Support		
		Senior	Inter-mediate	Super-visory	Service	Pupil-oriented	Other	Clerical	Plant Operation	Other
72,950-75,502	3	9	27	52	21	34	15	163	249	27
19,208-48,106	11	4	8	15	7	15[b]	2	34	49	5
8,024-15,853	7	3	3	4	3	4	1	10	14	6[c]
3,034-7,016	8	2	2	5	2	3	0.3	5	7	3

a Numbers have been rounded to nearest whole number.
b Inflated by one system which had 55 in this category.
c Inflated by one system which had 32 in this category.

TABLE 3

PROPORTION OF TOTAL STAFF IN EACH COMPONENT, AND CORRELATION BETWEEN PROPORTIONAL SIZE OF COMPONENT AND NUMBER OF TOTAL STAFF

Group	N	Mean Percentage of Staff in Each Component				
		Instructional	Non-Instructional			
			Central Office	Administration	Support	Total
1[a]	3	65.4%	12.3%	6.5%	27.1%	34.6%
2	11	70.6	8.1	6.1	22.4	29.4
3	7	72.0	8.8	6.7	20.4	28.0
4	9	72.6	8.7	7.6	19.0	27.4
Mean		71.0	8.9	6.7	21.4	29.0
Range		64.6-79.6	4.6-13.0	4.7-9.4	11.7-28.4	20.4-35.4
Pearson r		—.61	.49	—.25	.55	.61

a Arranged in order of pupil enrolments from largest to smallest.

TABLE 4

PER PUPIL SALARY COSTS OF THE VARIOUS STAFF COMPONENTS

Group	N	Salary Cost Per Pupil					
		Instructional	Non-Instructional				All Staff
			Central Office	Administrative	Support	Total	
1[a]	3	$416	$62	$66	$91	$164	$580
2	11	362	42	55	71	133	495
3	7	344	37	54	57	116	460
4	8	339	38	56	51	111	450
Mean		$357	$52	$56	$64	$126	$483
Range		$281-482	$22-73	$44-76	$23-104	$80-184	$367-659

a Arranged in order of pupil enrolments from largest to smallest.
b The central office, administrative and support sections of the non-instructional component are not mutually exclusive.

Tables 2, 3, and 4 reproduced from Holdaway (1971:30-31).

smaller systems. Holdaway (1971:29) also attempted to determine the association between the number of school jurisdictions administering education within a single metropolitan area and personnel and salary ratios for that particular area. Metropolitan Winnipeg and Vancouver, each with nine school jurisdictions within its boundaries, had lower mean percentages of staff in central office administration, total administration, central office support and total support, than did the large public school districts in Calgary and Edmonton. Holdaway (1971:29) concluded that, "Metropolitan school systems in western Canada do not appear to support the contention that proliferation of non-overlapping jursidictions adds substantially, if at all, to the employment of non-instructional staff." Holdaway (1971:23) suggested that other factors such as financial resources, policies on pupil-teacher ratio, location of administrative and consultative personnel (central office or in-school), might be more important contributing influences to the relative sizes of the various staffing components, than the number of school systems in an area.

Recent American Educational Studies

In an examination of 45 Oregon school systems, Reiss (1970:27) concluded that neither organizational size nor complexity was significantly related to the relative size of the administrative component. In the interpretation of the Reiss (1970) study, care should be taken to note that it did not include any very large systems: the school systems ranged in size from 122 to 22,257 pupils. Reiss (1970:28) listed four suggestions that may account for differences in administrative ratio among 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 responsibilites are subdivided.

In an examination of the central office staffs of 741 American school systems, Carter (1968:51-57) concluded that there is no consistent pattern of highest-to-lowest sequence of ratios by position classification (general administration, curriculum and instruction, personnel administration, research, government relations, data processing, business administration, and clerical) among the five enrolment categories used. Carter (1968:55) also noted that:

> . . . the total number of central office personnel per 1,000 students in districts with enrolments in excess of 75,000 is higher-by at least 0.5 than the number in districts in other enrolment categories with more than 6,000 students.

These ratios have been reproduced in Table 5. Further analysis of the data indicated that districts with enrolments in excess of 75,000 had the lowest ratios of general administrators, and curriculum, instruction and special services personnel, and the highest ratios of data processing, clerical and secretarial personnel. Carter suggests that districts with enrolments in excess of 75,000 make more use of support resources such as data processing and clerical personnel, thus reducing the needs for and greater costs of additional administrative personnel.

In a recent survey of 186 school systems of various sizes, the American Association of School Administrators (1971:16-28) reported that decreases in the size of central office staffs have been rare during the last five years. The most prevalent reasons for the few reported decreases were financial stringencies, changes in organizational structure, and decentralization of central office staffs. The eleven

TABLE 5

CENTRAL OFFICE PERSONNEL RATIOS*

Category of District by Number of Students	Number of Central Office Personnel per 1,000 Students
More than 75,000	3.275
50,000-75,000	2.605
25,001-50,000	2.763
12,001-25,000	2.611
6,001-12,000	2.392
3,001-6,000	3.443
1,201-3,000	4.639
1,200 or fewer	9.883

*Reproduced from Carter (1968:53).

reasons given for the more frequently mentioned increases in the size of central office staffs, in descending order of reported importance were: (a) an increase in educational services for all pupils; (b) an increase in compensatory programs; (c) larger school enrolments due to population growth; (d) changes in organizational structure; (e) school district reorganization; (f) professional negotiations; (g) changes in school and community needs; (h) strenthening of several departments; (i) decentralization of responsibility; (j) an increase in maintenance services; and (k) the introduction of data processing. Further, the American Association of School Administrators stated: "When size of system is taken into account, it is difficult to point to any one cause for the increased number of central office personnel."

Summary of Administrative Ratio Studies

The conclusions of the research reviewed above tended to support Rushings' (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 23 studies of business, industrial, government, and educational organizations reviewed above, despite slightly different definitions of administrative component and organizational size, only two studies showed a positive relationship (Terrien and Mills 1955; Gittell and Hollander 1968), three showed no relationship (Baker and Davis 1954; Blau et al. 1966; Reiss 1970), two showed a "cyclical" relationship (Duboyce 1970; Carter 1968), while sixteen reported a negative relationship, between the relative 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 ten studies of educational organizations which were reviewed above, two showed a positive relationship (Terrien and Mills 1955; Gittell and Hollander 1968), two showed a "cyclical" relationship (Duboyce 1970; Carter 1968), one showed no significant relationship (Reiss 1970), and five showed a negative relationship (Hawley et al. 1965; Gill 1967; Blowers 1969; Vithayathil 1969; and Lepatski 1970), between the relative size of the administrative component and organizational size.

Support Staff Studies

One of the difficulties of attempting to determine the effect of organizational size on the size and cost of the support component is that few of the studies to date have shown these personnel as a separate ratio. The few studies which have been completed have yielded conflicting results.

No uniformity of terminology exists in the literature with respect to in-school paraprofessional staff who comprise part of the support component. Some of the studies reviewed below describe personnel commonly referred to as paraprofessionals (Furno and Cuneo 1971), auxiliary school personnel (British Columbia Teachers' Federation 1969), supplementary education personnel (Folsom 1968), and teacher aides (Ferver 1968; Friesen 1968). However, despite the different terminology, all of the terms refer to the growing number of "non-professionals" who are appearing in various and diverse roles in public schools.

In a nation-wide survey of the employment of clerical workers in

58 school systems, the Canadian Education Association (1964:2-9) calculated ratios of clerical workers to teachers and of clerical workers to pupils. On the average, one clerical worker was employed for every 25.2 teachers and 641.1 pupils respectively. On the basis of ratios calculated for individual systems and categories of systems organized by size and geographic region, the Canadian Education Association (1964:2-9) concluded that: (1) size of school system appeared to have little effect upon the clerical assistance ratios; (2) there were major differences among Canadian regions in the provision of clerical assistance; (3) there were very noticeable differences among boards in the amounts of clerical assistance provided for elementary and secondary schools.

The British Columbia Teachers' Federation (1969:1) has noted a recent rapid increase in the numbers of auxiliary school personnel employed in schools in that province--from less than 200 in 1967 to 1,000 in 1969. The Federation (1969:1) observed that in the United States a tremendous increase in the use of non-professionals in school systems began in 1969 as the direct result of Federal Government financial support. According to the Federation (1969:1), three factors have contributed to a slower pattern of development in British Columbia:

1. Federal grants have not been available.
2. The cost of employing ASP's under the 'old' finance formula was not considered a shareable expense by the Department of Education.
3. School trustees and senior education officials have been reluctant to recognize or accept the fact that using highly trained teachers to perform clerical, technical, or housekeeping duties represented both an educational and economic waste.

The Federation (1969:2) attributed the recent increase in auxiliary school personnel in British Columbia to the new Foundation Program in

that province:

> Indeed, the introduction of the 'total operating grant package'- unrelated to teachers' certification or experience-may well encourage trustees and superintendents to experiment with different personnel utilization patterns for both professional and non-professional staff.

The situation described above applies equally to Alberta, particularly since this province also adopted a new Foundation Program on August 1, 1970, which includes a school support staff grant.

In this same study, which surveyed all public schools in the province, the Federation (1969:5,13) noted that volunteer aides have not been used extensively in British Columbia schools. In addition, the Federation (1969:5) categorized auxiliary school personnel employed in British Columbia as follows: theme markers, laboratory assistants, library assistants, supervision assistants, school aides, and teacher aides.

In a study involving 18,074 Alberta teachers, Ratsoy (1970:48) noted that three-quarters of the elementary and secondary teachers surveyed reported that clerical assistance was available for their use in the schools. Further, Ratsoy (1970:51) noted that whereas 83.9 per cent of city teachers reported that clerical assistance was available for their use, and 72.8 per cent of teachers in school divisions and counties reported the availability of such assistance, only 60.8 per cent of teachers in independent districts made a similar claim. Ratsoy (1970:54) also asked the teachers to report on teacher aides, which were defined as "non-certificated teachers' assistants other than clerical assistants." Fully 78 per cent of the province's teachers indicated either that their were no teacher aides in their schools or that the question did not apply to them. Ratsoy's data were gathered before the

new Foundation Program was introduced in Alberta.

Furno and Cuneo (1971:16), in their study of 1,181 American school systems, reported that the number of secretaries and clerks working in both administration and instruction has increased from 4.42 per 1,000 students in 1968-69 to 4.81 last year, and 5.05 in 1970-71. In addition, they noted that expenditures for the use of instructional clerks, secretaries and aides have increased 21 per cent in the past year--from $11.85 per pupil in 1969-70 to $14.28 per pupil in 1970-71. Furno and Cuneo (1971:63) identified a trend toward increasing use of paraprofessionals:

> The use of instructional clerks and secretaries-'para-professionals'-is increasing very rapidly: there are many more of them in classrooms: the rate of increase of paraprofessionals is climbing fast (indicating that the trend could pick up more speed next year); and they take up a larger portion of this year's budget. Possible reason behind this phenomenon: Teacher demands for more real teaching time and less involvement with 'non-professional' activities.

Ferver (1969:3) reported the following results of a survey of American school systems: (1) The use of aides is rapidly expanding in most states; (2) A major concern is with the training of aides; (3) A second major concern is with role definitions and relationships with professional teachers.

Commenting upon the development of non-professional roles in American schools, Anderson (1966:113) stated that a variety of functions formerly assigned to teachers is now being considered for reassignment or delegation to people who have not been trained as teachers. This development may represent a significant change in the way schools will be staffed.

Friesen (1968:5) noted that non-professional roles have been

introduced in schools to improve staff utilization and to make the teacher's job more manageable. He added that the implicit assumption is that if teachers have a reduced load of non-professional tasks, they can devote more time to professional duties.

In a longitudinal study of administrative ratios in the Edmonton Public School District, Duboyce (1970:96) concluded that the central office support staff, which included personnel performing clerical, secretarial or custodial functions, "increased substantially in relation to the various measures of growth of the whole district over the twenty-five years examined." In-school paraprofessional support staff were not included in the study by Duboyce.

In a study of staffing ratios in 21 school systems in three metropolitan areas of western Canada, Lepatski (1970:128-130) noted tendencies for both mean ratios and mean costs of in-school support, in-school clerical, in-school aides, central office clerical and central office support components to be larger for groups of larger school systems.

A number of studies previously mentioned in the section on administrative ratios have also examined clerical ratios in industrial and educational organizations. In a study of 64 industries, Rushing (1966:105) noted that the relationship between organizational size and clerical ratios was positive. That is, the number of clerical personnel increased as the total number of staff employed increased. In a study of American public personnel agencies, Blau et al. (1966:179-191) found that organizational size had no effect on the clerical percentage. Haire (1959:297), concerned with the rise of the clerical function, tabulated the number of people in his study who were "primarily paper

handlers of one sort or another." He concluded that (1965:297), "The total number of clerical workers does increase as the company increases . . . as the companies went from forty to eighty employees, the clerical staff doubled . . . ." Carter (1968:55) concluded from a study of American school districts that systems with pupil enrolments in excess of 75,000 had the highest clerical ratios, while districts with enrolments of 6,000-12,000 had the lowest clerical ratios.

Summary of Support Staff Studies

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 tend to increase as organizational size increases. However, studies by the Canadian Education Association (1964), and Blau et al. (1966) suggested that organizational size little effect upon the clerical assistance ratios. American studies such as the one by Furno and Cuneo (1971) reported trends toward increasing utilization and increasing costs of in-school support staff. The Ratsoy (1970) study of Alberta school systems reported increasing use of clerical assistance in schools but little use of teacher aides. The British Columbia Teachers' Federation (1969) suggested that the introduction of the new Foundation Program may permit trial of different staffing patterns.

Salary Studies-Educational Organizations

Evidence from Canadian studies conducted by Myroon (1969), Eurchuk (1970), Phimester (1970), Duke (1970), and Lepatski (1970) suggested that instructional and non-instructional salaries constitute the largest single item of expenditure in the operating budgets of

educational organizations. Data from the above studies showed that school systems spend an average of approximately 77 per cent of their operating budgets on salaries, and that the expenditures of individual school systems range from about 69 to 88 per cent for this purpose.

Instructional Salaries

Unit cost analyses of individual school units for single school terms completed in Thorhild County (Myroon, 1969:76), Peace River School Division (Phimester, 1970:39), and Grande Prairie School District (Eurchuk, 1970:42) showed that, on the average, approximately 59 per cent of operating budgets were spent on instructional salaries. In a study of 21 Canadian school systems, Lepatski (1970:101) noted that instructional salaries ranged from 51 to 64 per cent of the total operating budgets of the school systems studied. Furno and Cuneo (1971:18), in a study of 1,181 American school systems, concluded that 60.6 per cent of the median school district's budget was spent on instructional salaries. When the data in a study of 29 western Canadian school systems were separated into groups of systems of different sizes, Holdaway (1971:32) noted a tendency for mean instructional salary costs per pupil to increase consistently as the size of the school system increased.

Non-instructional Salaries

A series of related studies of administrative salaries and costs in selected Alberta school systems was undertaken by Percevault (1964), Ward (1964), and Small (1967). Percevault (1964) attempted to determine the costs of services of certificated administrative personnel, both in-school and in central offices in ten rural Alberta school systems. Of

the five factors which Percevault (1964:36-54) analyzed in his attempt to explain variations in per pupil administrative costs, salary schedules and qualifications of administrative staff were found to be least significant, whereas size and type of school, administrative time provided, and number of administrative staff employed were found to be most significant.

In a companion study in the same ten school systems, Ward (1964) attempted to determine the costs of four categories of non-certificated, non-instructional personnel, namely, elected personnel, office staff, plant operation and maintenance and transportation personnel. He noted (1964:iv) a strong tendency for per pupil administrative costs to vary inversely with enrolments. Administrative costs ranged from highest to lowest for personnel engaged in the following activities: pupil transportation, plant operation and maintenance, office staff, and elected personnel. This order applied to both total and per pupil administrative costs.

Combining the definitions of the administrative component used by Percevault (1964) and Ward (1964), Small (1967) attempted to determine the total costs of both central office and in-school administrative personnel in the Edmonton Public School District. Any remuneration paid to personnel for services other than classroom teaching was defined as the administrative service cost. By comparing total administrative service costs to total current expenditures, Small (1967:56) established Edmonton's administrative service index at 23.1 per cent; that is 23.1 per cent of current expenditures were spent in the form of salaries, wages and expenses of non-instructional personnel. Further, by supplementing the data gathered by Percevault and Ward, Small constructed

administrative service indexes for six of the ten rural school systems studied by them. Small (1967:57) concluded that Edmonton spent a greater proportion of its current expenditures on administration than did any of the six rural systems. The school systems studied by Ward and Percevault all had less than 5,000 pupils, whereas Edmonton had 65,000.

In combination, data from unit cost analyses studies completed by Myroon (1969), Phimester (1970), Palethorpe (1970), Eurchuk (1970) and Duke (1970), suggested that, on the average, approximately 22 per cent of the operating costs of the school systems studied were expended for the salaries on non-instructional personnel. In his study of western Canadian school systems, Lepatski (1970:101) reported that non-instructional salaries, as a percentage of total operating expenditures, ranged from 17 to 26 per cent, with a mean of 21.9 per cent. In a study of 29 western Canadian school systems, Holdaway (1971:32) noted a tendency for mean non-instructional salary costs per pupil to increase consistently as the size of the school system increased. In American school systems, Furno and Cuneo (1971:14-15) reported that 21.3 per cent of net current expenditures are allocated for non-instructional salaries in the 1,186 school systems studied. Furno and Cuneo (1971:26) also noted that, "Size is an important factor in administrative costs. The smaller a district, the more it must pay for administration."

Sabulao and Hickrod (1971) used the "concept of economies and diseconomies of scale" to determine the optimum size of school districts relative to selected costs. In their study, which examined the relationship between district size (number of pupils) and school expenditures (current expenditures per pupil) in 300 American school

systems, Sabulao and Hickrod (1971:187-192) concluded that:

> (1) The "economy and diseconomy of scale" concept, as it applies to school operation was fully supported . . . .; (2) . . . . Size of district in terms of pupil enrolment influences per pupil cost . . . .; and (3) About 58 per cent of the variation in administrative cost per pupil is explained by the size of the unit [combined elementary and secondary] district . . . ."

The administrative cost per pupil included that, "part of the current operating expenditure that pertains to administration." Further, Sabulao and Hickrod (1971:191) stated that, because of the observed diseconomies of scale in their operations, ". . . there are small unit districts which should be reorganized into larger units . . . ." With respected to the observed diseconomies of scale in larger systems, Sabulao and Hickrod (1971:191) cautioned:

> It is possible that the increased costs in these larger schools are buying a much different mix of services than in smaller schools . . . . If the services and perhaps even the output are greatly different at the upper end of the size continuum then it would be misleading to label increased costs associated with a greater variety of courses as "diseconomies" . . . . only a complex set of cost-size, service-size and output-size functions can shed light on the subject.

Summary of Salary Studies

Salaries comprise the major proportion of school system operating budgets. Data from the study by Holdaway (1971), when separated into groups of systems of different sizes, revealed tendencies for mean instructional, central office, support, non-instructional, and total salary costs per pupil to increase consistently as the size of the school system increased. The mean administrative salary costs per pupil remained approximately the same in the three smaller groups and then increased for the groups of the largest school systems in the Holdaway (1971) research. Insofar as non-instructional salary costs are 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 descriptions of the sample and sub-sample, the assumptions and limitations of the study, the methods and instruments used for data collection, and a summary of the statistical procedures used to analyze the data.

The Sample

The population for the study consisted of (1) all of the personnel employed in elementary and secondary education in the Alberta Department of Education, and (2) the instructional and non-instructional personnel employed in all 139 operating school systems in Alberta.[1] Of the 139 questionnaires sent to school systems, 135 or 97.1 per cent were returned completed. However, the returns from one school division, and two separate school districts were received too late to be included in the data analysis. No returns were received from one county, two public school districts and one separate school district. The final sample included 132 or 95.0 per cent of the school systems approached for information. The 29 counties, 29 school divisions, 30 public school districts, and 44 separate school districts whose data were analyzed

[1]The population of 201 school systems in Alberta was reduced to 139 when systems not operating schools and the four Department of National Defence Districts and two Federal Experimental Stations were excluded. The latter exclusions were justified on the basis of Federal government involvement.

included 98.1 per cent of the pupils in Alberta, excluding those under Federal jurisdictions, in private schools, and in schools operated by the Department of Education.

The sample could be considered a population with respect to Alberta, for it included almost all the available school systems in the province. However, with respect to school systems in general, it was a sample, and has been referred to as such in this report.

Interviews To Assess Staffing Adequacy

The superintendents and/or other officials of 43 Alberta school systems--8 counties, 13 divisions, 12 public districts, and 10 separate districts--were interviewed to obtain their opinions on the adequacy of numbers of staff in their school systems.

The sub-sample of 43 school systems were deliberately chosen from the population of 139 Alberta school systems on the basis of: (a) size in terms of number of pupils; (b) type of administrative jurisdiction--county, division, public district, and separate district; (c) geographic location in Alberta; and (d) availability of an official for interview.

Within the four categories of administrative jurisdiction, the school systems were deliberately chosen on the basis of size because of the distribution of pupils among school systems in Alberta. For example, the four urban school systems in Calgary and Edmonton were included in the sub-sample because (1) they contained approximately 50 per cent of the pupil population of the province, and (2) they were substantially larger than any of the other school systems in Alberta.

Assumptions and Limitations

The validity of this study was dependent upon the accuracy and the completeness of the data provided by the Department of Education and by school systems in Alberta. Two assumptions were made: (1) that the officials in the Department of Education and in the school systems correctly understood the nature of the information required and that they supplied complete and accurate data; (2) that the officials who supplied the data interpreted the questionnaire items in a similar manner.

School systems were asked to report the actual total gross salaries paid to personnel in the various staffing components in their jurisdictions for the month of September, 1971. In some instances, salary negotiations, particularly those for instructional personnel, had not been completed for the 1971-72 school year when the data for this study were collected. In such cases the salaries reported for September, 1971 were underestimated by whatever percentage salary increase was obtained by school system personnel in their salary negotiations.

Some school systems contract services, rather than hire their own staff. School systems could not easily estimate the number of personnel they would have needed to hire if they were to employ personnel to provide services that were presently contracted out. Therefore, no practical and fair basis existed for comparing the numbers of personnel needed to supply services which were provided by staff in some school systems and contracted out in others. For this reason, plant operation and maintenance personnel (carpenters, electricians, painters, janitors, and groundskeepers), transportation personnel (drivers, chauffeurs, and transportation supervisors), warehouse workers and storekeepers, and cafeteria personnel, were excluded from this study. As a result, for the

school systems in the study, the central office support personnel component was limited to secretarial and clerical personnel, and the in-school support personnel component was limited to secretarial and clerical personnel and teacher aides. For similar reasons, architects, engineers, and urban planners were excluded from the central office administrative component in this study.

Some approximations were made in order to obtain data. Ideally the exact percentage of time spent on administration and staff supervision by every in-school administrator should have been obtained, but as this was not feasible, approximate mean percentages were supplied by the respondents.

The availability of information, the costs of data collection and analysis, and the practical limitations upon the amounts of information that field administrators could be reasonably asked to supply, made it necessary to limit the study to a selected number of the organizational and environmental variables that the review of the literature suggested might be associated with the sizes of the personnel and salary ratios in organizations.

The study was limited to school systems in Alberta and to the personnel employed in elementary and secondary education in the central and regional offices of the Alberta Department of Education.

Methods Used for Data Collection

The data for this study were collected by questionnaire, personal interview, and visits to the Department of Education and to school systems in Alberta.

The superintendent of each school system in the study was sent a

questionnaire and explanatory letter (Appendices A and D) which requested the following information as of October 1, 1971: (1) the numbers of pupils and schools; (2) the positions, numbers, and total gross salaries of all instructional personnel; (3) the positions, numbers, and total gross salaries of administrative personnel located in central office and in-schools; (4) the positions, numbers, and total gross salaries of support personnel located in central office and in schools; (5) the positions, numbers, and total gross salaries of auxiliary personnel located in the central office; (6) the number and honoraria of school board members; (7) the area of the school system in square miles; (7) the qualifications of the teaching staff; and (8) an organizational chart of the school system.

The Deputy Minister of Education of Alberta was asked to supply the following information: (1) the 1971 operating budget, supplementary requisition, and supplementary requisition mill rate for each school system in the study; (2) the positions, numbers, and total gross salaries of administrative, support, auxiliary, and instructional personnel employed in elementary and secondary education in the central and regional offices of the Department of Education; and (3) an organization chart of the Department of Education.

Personal interviews were conducted with superintendents and/or other officials in 43 school systems to: (1) discuss the research; (2) obtain further elaboration of the administrative structure described in the organizational charts; (3) assist in the extraction of data; (4) to clarify any problems pertaining to terminology and/or classification of personnel; and (5) to administer the "Staffing Adequacy Interview Schedule" (Appendix E). The information collected from the

administration of the "Staffing Adequacy Interview Schedule" provided the data for the sub-sample.

Follow-up letters and telephone calls were used to request action from some school systems, to obtain missing information, and to clarify some of the supplied data.

Instruments Used for Data Collection

Two instruments were used for the data collection in this study.

The "School System Personnel Questionnaire" (Appendix D), based on information from the literature and including questions similar to those in related studies, was the instrument used to obtain the necessary information from the school systems in the study.

The "Staffing Adequacy Interview Schedule" (Appendix E) served as the basis for the personal interviews conducted with officials in the sub-sample of 43 school systems.

Both the questionnaire and the interview schedule were submitted to graduate students and professors in the Department of Educational Administration, The University of Alberta, and to officials of the Alberta Teachers' Association, the Alberta School Trustees' Association, and the Alberta Department of Education for suggestions. As a result the instruments were modified.

Analysis of the Data

From the raw data received from the Department of Education and the school systems, the administrative, central office, support, instructional, and non-instructional personnel and salary components were identified and the size of each school system determined. All personnel and salary ratios defined in Chapter 1 were then computed for

each school system.

Pearson product-moment correlation coefficients were used to examine the relationships between (1) 32 personnel and salary variables, and (2) selected organizational variables. All correlations were tested for significance at the 0.05 level. In addition, the rank order of the correlation coefficients was discussed.

Stepwise multiple regression analyses were applied to (1) the raw data and (2) the data converted to logarithms, with the administrative, central office, support, instructional, and non-instructional personnel ratios as the criterion variables, and selected organization variables as the predictor variables. The acceptance and rejection levels for adding and deleting variables in the regression analyses were $p=0.05$.

The sample of school systems was twice categorized into subgroups according to (1) size, and then (2) type of administrative jurisdiction, and, in both cases, the mean values of the personnel and salary ratios for the administrative, central office, support, instructional, and non-instructional components were computed for each subgroup. In addition, the mean numbers of personnel per 1,000 pupils and per 100 staff members, and the mean salary costs per pupil and per staff member were calculated for each subgroup of both the size and administrative jurisdiction categorizations. Analysis of variance, (Scheffé method, $p \leqslant 0.10$) was used to determine whether or not significant differences existed in these mean ratios of personnel and salaries. The rank order of the mean values of the personnel and salary ratios was also discussed for both the size and jurisdictions categorizations.

Department of Education and school system data were added to

provide estimates of the numbers of personnel in, and the salary costs of the various personnel components in the elementary and secondary education system of Alberta. These combined data were expressed as percentages of the total numbers and salary costs of the personnel in each of the major staffing components. In addition, the numbers and salary costs of the personnel employed in elementary and secondary education in the central and regional offices of the Alberta Department of Education were expressed as percentages of the estimated totals for the province.

The answers given by school officials to the staffing adequacy opinionnaire concerning central office and in school staff shortages, priorities for instructional and non-instructional staff, and suggested changes in personnel utilization, were developed into simple frequency counts.

The organizational structures of the Department of Education and a representative sample of the central offices of school systems in Alberta were briefly described.

Chapter 4

PERSONNEL RATIOS AND SELECTED ORGANIZATIONAL VARIABLES

This chapter contains a comparison of mean ratios of personnel and "other" variables in groups of school systems arranged according to (a) size and (b) type of administrative jurisdiction. In addition, Chapter 4 contains an examination of the individual and collective relationships among selected personnel ratios and selected organizational variables in 132 Alberta school systems.

PRESENTATION AND ANALYSIS OF THE DATA

The raw data collected for the 132 school systems were organized into 99 variables and from these a further 85 variables were generated, giving the study a total of 184 variables. For convenience, throughout this report, variables are referred to by their computer printout identification numbers. For example, Variable 100 (V100), always refers to the total number of central office administrative staff.

MEANS OF PERSONNEL VARIABLES ARRANGED BY (1) TYPE OF ADMINISTRATIVE JURISDICTION AND (2) SIZE OF SCHOOL SYSTEM

Problem A1

What are the distributions of the mean numbers of personnel (a) per 1,000 pupils and (b) per 100 staff members, in the administrative, central office, support, instructional, and non-instructional personnel components in groups of school systems arranged by (1) size and (2) type

of administrative jurisdiction?

The (unweighted) means of selected personnel variables for 132 Alberta school systems grouped by (1) type of jurisdiction (counties, school divisions, public school districts, and separate school districts) and (2) size of school system (number of pupils) are presented in this section. The mean numbers of personnel are presented first, followed by ratios of personnel per 1,000 pupils and per 100 staff members.

The four large urban systems in Calgary and Edmonton collectively contained fifty per cent of the elementary and secondary pupils. Calgary and Edmonton Public School Districts formed the group of the largest school systems, and Calgary and Edmonton Separate School Districts formed the group of the second largest school systems. The groups of school systems in the 3,000-8,673 and 1,036-2,970 pupil size ranges were largely composed of counties and divisions, while the group of smallest school systems contained 37 separate districts, 17 public districts, and 5 school divisions.

Because of the large amounts of data, comments are restricted to the more important variables. In discussing the differences among groups of school systems, reference is sometimes made to Tables 29 to 33 in Appendix G, which contain the ranges, standard deviations, and weighted provincial means for the major variables which are presented in this section. Table 29 contains the ranges, standard deviations and weighted provincial means for selected variables for all 132 school systems. Tables 30 to 33 present the ranges and standard deviations for selected variables for different types of administrative jurisdiction as follows: Table 30-counties, Table 31-school divisions, Table 32-public school districts, and Table 33-separate school districts. Wide variations in

the values of the variables within both the jurisdiction and size categorizations can be readily discerned from these tables. The weighted provincial means reported in Appendix G were weighted for the number of pupils in each system for each of the reported variables except for V98 Mean Teacher Qualifications, which was weighted for the number of instructional staff in each system.

Mean Numbers of Personnel

Table 6 lists the mean numbers of personnel in the various personnel categories in 132 Alberta school systems grouped by (1) type of jurisdiction and (2) size of school system. As the mean numbers of personnel received less emphasis in this study than mean ratios, the mean numbers of personnel in the various categories are not discussed in detail in the text. Instead, only the major trends are reported.

The group of public districts had the highest mean numbers of total instructional and total staff, and the highest mean numbers of personnel in every non-instructional category except central office senior administration. The group of separate districts had the lowest mean numbers of total instructional and total staff, and the lowest mean numbers of personnel in every non-instructional category except central office supervisory administration and in-school support (clerical).

The mean number of personnel in every personnel category reported in Table 6 tended to increase with increasing size of school system.

Mean Ratios of Personnel Per 1,000 Pupils

Table 7 presents the mean ratios of personnel per 1,000 pupils for the administrative, central office, support, instructional, non-instructional, and total personnel components in 132 Alberta school

TABLE 6

MEAN NUMBERS OF PERSONNEL IN GROUPS OF SCHOOL SYSTEMS OF (1) DIFFERENT TYPES OF JURISDICTION AND (2) DIFFERENT SIZES

Type of Jurisdiction	N	V3 No. CO Senior Admin.	V4 No. CO Int. Admin.	V5 No. CO Sup. Admin.	V6 No. CO Serv. Admin.	V100 Total CO. Admin.	V8 No. CO Support
1. Counties	29	2.5	0.3	0.6	1.0	4.4	3.0
2. Divisions	29	2.3	0.6	0.6	0.9	4.3	2.5
3. Public Districts	30	1.7	1.9	5.3	3.0	11.9	15.9
4. Separate Districts	44	0.9	0.2	1.4	0.7	3.2	2.8

Size (No. of Pupils)	N	Cty.	Div.	Pub. Dist.	Sep. Dist.	V3	V4	V5	V6	V100	V8
1. 75,629-80,366	2			2		7.0	24.8	68.8	42.5	143.0	216.0
2. 21,684-32,038	2				2	4.5	4.9	28.8	11.6	49.9	52.5
3. 3,000-8,673	18	8	6	4		3.0	0.8	2.0	1.3	7.1	5.1
4. 1,036-2,970	51	21	18	7	5	2.2	0.4	0.4	0.8	3.8	2.4
5. 22-939	59		5	17	37	0.7	<0.1	0.0	0.1	0.8	0.3
Total Province	132	29	29	30	44	-	-	-	-	-	-

TABLE 6 (Continued)

Type of Jurisdiction	N	V101 Total CO Staff	V87 In-school Support (Clerical)	V88 In-school Support (Aides)	V136 Total In-school Support	V138 Total Support Staff	V110 No. In-school Admin. (F.T.E.)
1. Counties	29	7.4	8.8	2.0	10.8	13.9	6.6
2. Divisions	29	6.8	6.0	4.6	10.6	13.1	5.6
3. Public Districts	30	27.9	20.8	12.6	33.4	49.3	19.5
4. Separate Districts	44	6.1	6.3	1.5	7.9	10.7	4.5

Size (No. of Pupils)	N	Cty.	Div.	Pub. Dist.	Sep. Dist.	V101	V87	V88	V136	V138	V110
1. 75,629-80,366	2			2		359.0	241.9	168.5	410.4	626.4	236.8
2. 21,684-32,038	2				2	102.4	114.9	20.4	135.3	187.8	74.4
3. 3,000-8,673	18	8	6	4		12.2	15.9	5.3	21.2	26.2	12.1
4. 1,036-2,970	51	21	18	7	5	6.1	5.6	2.7	8.3	10.7	4.8
5. 22-939	59		5	17	37	1.1	0.8	0.5	1.2	1.5	0.8
Total Province	132	29	29	30	44	-	-	-	-	-	-

TABLE 6 (Continued)

Type of Jurisdiction	N	V133 Total Admin. Staff	V140 Total Non-instructional Staff	V132 Total Instructional Staff	V142 Total Staff
1. Counties	29	10.9	24.8	136.3	161.2
2. Divisions	29	9.9	23.0	103.3	126.3
3. Public Districts	30	31.4	80.7	299.5	380.2
4. Separate Districts	44	7.8	18.4	74.9	93.3

Size (No. of Pupils)	N	Cty.	Div.	Pub. Dist.	Sep. Dist.	V133	V140	V132	V142
1. 75,629-80,366	2			2		379.8	1,006.2	3,516.7	4,522.9
2. 21,684-32,038	2				2	124.3	312.0	1,171.6	1,483.6
3. 3,000-8,673	18	8	6	4		19.3	45.5	227.5	273.0
4. 1,036-2,970	51	21	18	7	5	8.6	19.2	92.7	112.0
5. 22-939	59		5	17	37	1.6	3.1	17.4	20.6
Total Province	132	29	29	30	44	-	-	-	-

TABLE 7

MEAN RATIOS OF PERSONNEL PER 1,000 PUPILS IN GROUPS OF SCHOOL SYSTEMS OF (1) DIFFERENT TYPES OF JURISDICTION AND (2) DIFFERENT SIZES

Type of Jurisdiction	N	V171 CO Admin. Staff/ 1,000 Pupils	V177 In-school Admin. Staff/ 1,000 Pupils	V148 Total Admin. Staff/1,000 Pupils	V175 CO Support Staff/1,000 Pupils	V173 In-school Support Staff/ 1,000 Pupils	V152 Total Support Staff/ 1,000 Pupils
1. Counties	29	1.66	2.37	4.03	1.23	3.80	5.03
2. Divisions	29	2.43	2.48	4.91	1.26	4.99	6.25
3. Public Districts	30	1.98	2.39	4.37	0.80	3.94	4.74
4. Separate Districts	44	2.11	2.12	4.22	0.57	2.56	3.13
Significant Difference between Pairs		1 + 2 (0.06)	NIL	1 + 2 (0.06)	1 + 4 (0.01) 2 + 4 (0.01)	2 + 4 (0.01)	1 + 4 (0.06) 2 + 4 (0.01)

Size (No. of Pupils)	N	Cty.	Div.	Pub. Dist.	Sep. Dist.	V171	V177	V148	V175	V173	V152
1. 75,629-80,366	2			2		1.84	3.04	4.87	2.77	5.26	8.02
2. 21,684-32,038	2				2	1.84	2.72	4.55	1.96	4.96	6.92
3. 3,000-8,673	18	8	6	4		1.51	2.56	4.08	1.07	4.41	5.48
4. 1,036-2,970	51	21	18	7	5	1.95	2.53	4.49	1.26	4.26	5.51
5. 22-939	59		5	17	37	2.31	2.01	4.33	0.48	2.86	3.34
Total Province	132	29	29	30	44	-	-	-	-	-	-
Significant Difference between Pairs						NIL	4 + 5 (0.05)	NIL	1 + 3 (0.07) 1 + 5 (0.01) 3 + 5 (0.09) 4 + 5 (0.01)	NIL	4 + 5 (0.01)

TABLE 7 (Continued)

Type of Jurisdiction	N	V150 Total CO Staff/ 1,000 Pupils	V154 Total Non-Instr. Staff/ 1,000 Pupils	V156 Total Instr. Staff/1,000 Pupils	V157 Total Staff/1,000 Pupils	V169 Pupils/Total Instr. Staff
1. Counties	29	2.89	9.06	50.28	59.34	19.89
2. Divisions	29	3.68	11.16	49.30	60.46	20.28
3. Public Districts	30	2.78	9.10	49.64	58.74	20.14
4. Separate Districts	44	2.67	7.35	45.57	52.92	21.95
Significant Difference between Pairs		2 + 3 (0.09) 2 + 4 (0.02)	2 + 4 (0.01)	1 + 4 (0.03) 3 + 4 (0.09)	1 + 4 (0.01) 2 + 4 (0.01) 3 + 4 (0.01)	1 + 4 (0.01) 2 + 4 (0.02) 3 + 4 (0.02)

Size (No. of Pupils)	N	Cty.	Div.	Pub. Dist.	Sep. Dist.	V150	V154	V156	V157	V169
1. 75,629-80,366	2			2		4.60	12.90	45.07	57.96	22.19
2. 21,684-32,038	2				2	3.80	11.47	43.49	54.95	22.99
3. 3,000-8,673	18	8	6	4		2.58	9.55	49.55	59.10	20.18
4. 1,036-2,970	51	21	18	7	5	3.21	10.00	48.63	58.63	20.57
5. 22-939	59		5	17	37	2.79	7.67	48.01	55.68	20.83
Total Province	132	29	29	30	44	-	-	-	-	-
Significant Difference between Pairs						NIL	4 + 5 (0.02)	NIL	NIL	N/A

systems grouped by (1) type of jurisdiction and (2) size of school system. Table 7 also contains the results of the analyses of variance for selected personnel ratios grouped by type of jurisdiction and size of school system. Where the means of pairs showed a relevant and statistically significant difference (Scheffé procedure, $p \leq 0.10$) this is shown immediately below the relevant variable.

V171-Central office administrative staff per 1,000 pupils. The mean ratios for jurisdiction groups of school systems were: divisions 2.43, separate districts 2.11, public districts 1.98, and counties 1.66. The analysis of variance indicated that there were significant differences ($p=0.06$) in the mean ratios for this variable between groups of counties and divisions.

In the number of pupils grouping, the group of the smallest systems had the highest mean central office administrative ratio. The mean ratios for this variable for groups of smallest to largest school systems were: 2.31, 1.95, 1.51, 1.84, and 1.84. However, the analysis of variance did not reveal any significant differences in mean central office administrative ratio among groups of school systems of different sizes.

V177-In-school administrative staff per 1,000 pupils. The divisions again had the highest mean ratios of 2.48 followed by public districts 2.39, counties 2.37, and separate districts 2.12. No significant differences occurred in the mean ratios for this variable among school systems grouped by type of jurisdiction.

The sequence of mean ratios for groups of largest to groups of smallest systems was 3.04, 2.72, 2.56, 2.53, and 2.01. Thus, the group

of the largest school systems had the highest mean in-school administrative ratio. A significant difference (p=0.05) occurred in mean in-school administrative staff per 1,000 pupils between the two groups of the smallest school systems (size groups 4 and 5). This may reflect the heavy loading of size group 5 with separate districts (37 out of 59), which had the lowest mean ratio for this variable.

V148-Total administrative staff per 1,000 pupils. Divisions again had the highest mean ratio of 4.91 followed by public districts 4.37, separate districts 4.22, and counties 4.03. A significant difference (p=0.06) occurred in the mean ratios between groups of counties and divisions.

The mean ratios for this variable for groups of smallest to largest school systems were: 4.33, 4.49, 4.08, 4.55, and 4.87. No significant differences occurred in the mean values of this variable among groups of school systems of different sizes.

V175-Central office support staff per 1,000 pupils. The divisions had the highest mean ratio of 1.26 and separate districts had the lowest mean ratio of 0.57. The mean ratios for counties and public districts were, respectively, 1.23 and 0.80. Significant differences occurred in the mean ratios for this variable between separate districts and divisions (p=0.01), and between separate districts and counties (p=0.01).

A tendency toward increasing size of this ratio with increasing school system size was shown by the mean ratios of 0.48, 1.26, 1.07, 1.96, and 2.77. Significant differences occurred between size groups 1 and 3 (p=0.07), size groups 1 and 5 (p=0.01), size groups 3 and 5

(p=0.09), and size groups 4 and 5 (p=0.01).

V173-In-school support staff per 1,000 pupils. The mean ratios were: divisions 4.99, public districts 3.94, counties 3.80, and separate districts 2.56. There were significant differences (p=0.01) in the mean ratios for this variable between groups of divisions and separate school districts.

The mean ratios generally rose with increasing size of school system. For groups of smallest to largest school systems the mean ratios were: 2.86, 4.26, 4.41, 4.96, and 5.26. No significant differences occurred in mean in-school support staff per 1,000 pupils among groups of school systems of different sizes.

V152-Total support staff per 1,000 pupils. The mean ratios were: divisions 6.25, counties 5.03, public districts 4.74, and separate districts 3.13. Divisions again had the highest and separate districts the lowest mean ratios. Significant differences occurred in the mean ratios for this variable between groups of separate districts and divisions (p=0.01), and between groups of separate districts and counties (p=0.06).

The following mean ratios, for groups of smallest to groups of largest school systems--3.34, 5.51, 5.48, 6.92, and 8.02--suggested that increasing size of school system tended to be associated with increasing ratios. Significant differences (p=0.01) occurred in the mean ratios for this variable between the two groups of the smallest school systems. Again this may reflect the loading of the group of smallest school systems with separate districts and the associated lower ratios.

V150-Total central office staff per 1,000 pupils. As the following mean ratios illustrate, the divisions again had the highest and the separate districts the lowest mean ratios: divisions 3.68, counties 2.89, public districts 2.78, and separate districts 2.67. Significant differences occurred in the mean ratios for this variable between groups of divisions and separate districts ($p=0.02$), and between groups of divisions and public districts ($p=0.09$).

The mean ratios for groups of smallest to groups of largest school systems were: 2.79, 3.21, 2.58, 3.80, and 4.60. No significant differences occurred in the mean values for this ratio among groups of school systems of different sizes.

V154-Total non-instructional staff per 1,000 pupils. The mean ratios were: divisions 11.16, public districts 9.10, counties 9.06, and separate districts 7.35. A significant difference ($p=0.01$) occurred in the mean ratios for this variable between groups of divisions and separate districts.

With increasing school system size the mean ratios were: 7.67, 10.00, 9.55, 11.47, and 12.90. A significant difference ($p=0.02$) occurred in the mean ratios between the two groups of the smallest school systems.

V156-Total instructional staff per 1,000 pupils. The mean instructional ratios were similar for counties (50.28), public districts (49.64), and divisions (49.30), but the mean instructional ratio for separate districts was substantially lower (45.57). Significant differences occurred in the mean instructional ratio between groups of separate districts and counties ($p=0.03$), and between groups of separate

districts and public districts (p=0.09).

For groups of smallest to groups of largest school systems the mean ratios were: 48.01, 48.63, 49.55, 43.49, and 45.07. No significant differences occurred in the mean instructional ratio between groups of school systems of different sizes.

V157-Total staff per 1,000 pupils. The mean ratios were: divisions 60.46, counties 59.34, public districts 58.74, and separate districts 52.92. The mean total staff ratio for separate districts was again substantially lower than the mean ratios for divisions, counties, and public districts. There were significant differences in the mean total staff ratio between separate districts and counties (p=0.01), between separate districts and divisions (p=0.01), and between separate districts and public districts (p=0.01).

The following ratios, for groups of smallest to groups of largest school systems, did not reveal any definite trend between the mean total staff ratio and school system size: 55.68, 58.63, 59.10, 54.95, and 57.96. No significant differences occurred in the mean ratios between groups of school systems of different sizes.

V169-Pupils per total instructional staff. The mean ratios for this variable give an indication of mean class size. The mean ratios were: separate districts 21.95, divisions 20.28, public districts 20.14, and counties 19.89.

In order of increasing size of school system the mean ratios were: 20.83, 20.57, 20.18, 22.19, and 22.19.

Mean Ratios of Personnel Per 100 Staff Members

Mean ratios of personnel per 100 staff members for the administrative, central office, support, instructional, non-instructional and total personnel components in 132 school systems grouped by (1) type of jurisdiction and (2) size of school system are reported in Table 8. As the ordering of the means was generally similar for ratios of personnel per 1,000 pupils and per 100 staff members, the mean ratios of personnel per 100 staff members are not reported in detail in the text. Instead, the major trends in the mean ratios of personnel per 100 staff members are reported in the summary for this section.

MEANS OF SELECTED "OTHER" VARIABLES ARRANGED BY (1) TYPE OF JURISDICTION AND (2) SIZE OF SCHOOL SYSTEM

The means of seven organizational variables which could not be classified as personnel variables are presented in Table 9.

V98-Mean teacher qualifications. Mean teacher qualifications were highest in the public districts (3.31) and lowest in the separate districts (3.03). Mean teacher qualifications in counties and divisions were, respectively, 3.17 and 3.13. A significant difference ($p=0.08$) occurred in mean teacher qualifications between groups of public and separate school districts.

As the following means for groups of smallest to groups of largest school systems illustrate, there was an apparent trend toward increasing mean teacher qualifications with increasing size of school system: 2.99, 3.21, 3.33, 3.82, and 3.95. There were significant

TABLE 8

MEAN RATIOS OF PERSONNEL PER 100 STAFF MEMBERS IN GROUPS OF SCHOOL SYSTEMS OF (1) DIFFERENT TYPES OF JURISDICTION AND (2) DIFFERENT SIZES

Type of Jurisdiction	N	V147 Total Admin. Staff/ 100 Staff	V149 Total CO Staff/ 100 Staff	V151 Total Support Staff/ 100 Staff	V153 Total Non-instr. Staff/ 100 Staff	V155 Total Instr. Staff/ 100 Staff
1. Counties	29	6.80	4.87	8.39	15.19	84.81
2. Divisions	29	8.10	6.01	10.17	18.28	81.72
3. Public Districts	30	7.52	4.75	7.96	15.48	84.52
4. Separate Districts	44	7.95	4.96	5.82	13.78	86.22
Significant Difference between Pairs		1 + 2 (0.09)	NIL	2 + 4 (0.01)	2 + 4 (0.01)	2 + 4 (0.02)

Size (No. of Pupils)	N	Cty.	Div.	Pub. Dist.	Sep. Dist.	V147	V149	V151	V153	V155
1. 75,629-80,366	2			2		8.42	7.92	13.84	22.25	77.75
2. 21,684-32,038	2				2	8.26	6.91	12.58	20.85	79.16
3. 3,000-8,673	18	8	6	4		6.90	4.37	9.27	16.17	83.83
4. 1,036-2,970	51	21	18	7	5	7.67	5.47	9.30	16.96	83.04
5. 22-939	59		5	17	37	7.78	4.89	5.75	13.54	86.46
Total Province	132	29	29	30	44	-	-	-	-	-
Significant Difference between Pairs						NIL	NIL	4 + 5 (0.01)	4 + 5 (0.03)	4 + 5 (0.03)

TABLE 9

MEANS OF SELECTED "OTHER" VARIABLES IN GROUPS OF SCHOOL SYSTEMS OF (1) DIFFERENT TYPES OF JURISDICTION AND (2) DIFFERENT SIZES

Type of Jurisdiction	N	V96 Total No. Schools	V97 Area (Sq. Miles)	V98 Mean Teacher Qualifications	V99 No. CO Depts.	V144 Total No. Pupils	V145 Pupils/ Sq. Mi.	V146 Sq. Mi./ School
1. Counties	29	11	1,552	3.17	3.4	2,750	2.25	156.5
2. Divisions	29	9	4,805	3.13	3.3	2,137	2.72	386.1
3. Public Districts	30	14	53	3.31	2.5	6,531	190.56	24.7
4. Separate Districts	44	5	34	3.03	1.7	1,700	53.12	23.1
Significant Difference between Pairs		N/A	N/A	3+4 (0.08)	1+4 (0.01) 2+4 (0.01)	N/A	1+3 (0.01) 2+3 (0.01) 4+3 (0.01)	1+2 (0.01) 2+3 (0.01) 2+4 (0.01)

Size (No. of Pupils)	N	Cty.	Div.	Pub. Dist.	Sep. Dist.	V96	V97	V98	V99	V144	V145	V146
1. 75,629-80,366	2			2		160	132	3.95	8.0	77,998	602.52	0.85
2. 21,684-32,038	2				2	65	132	3.82	7.0	26,861	214.04	2.15
3. 3,000-8,673	18	8	6	4		14	1,449	3.33	4.5	4,645	102.42	109.71
4. 1,036-2,970	51	21	18	7	5	8	2,875	3.21	3.1	1,912	48.44	207.87
5. 22-939	59		5	17	37	2	225	2.99	1.3	367	38.15	83.28
Total Province	132	29	29	30	44	-	-	-	-	-	-	-
Significant Difference between Pairs						N/A	N/A	1+5 (0.05) 3+5 (0.07)	N/A	N/A	1+2 (0.04) 1+3 (0.01) 1+4 (0.01) 1+5 (0.01)	NIL

differences in mean teacher qualifications between size groups 1 and 5 ($p=0.05$), and between size groups 3 and 5 ($p=0.07$).

V99-Number of central office departments. There were significant differences in the mean values for this variable between groups of separate districts and counties ($p=0.01$), and between groups of separate districts and divisions ($p=0.01$).

As might be expected the mean number of central office departments tended to be larger in larger school systems.

V145-Pupils per square mile. The means for the counties (2.25) and divisions (2.72) reflected their predominantly "rural" characteristics, while the inclusion of the majority of the "urban" areas in Alberta was reflected in the means for the public districts (190.56) and the separate districts (53.12).

V146-Square miles per school. The means were: divisions 386.1, counties 156.5, public districts 24.7, and separate districts 23.1.

The apparent trend for the pupil size categorization appeared to be a decrease in mean square miles per school with increasing size of school system.

In geographic terms, variables 145 and 146 are measures of pupil population and school density. The inclusion of Northland School Division, the largest school system in Alberta in terms of geographic area, is reflected in the high mean value for the group of divisions for variable 146. Although the presentation of such variables can be misleading, they do highlight some important differences in variables which should be considered in an analysis of this type. The four large

urban school systems in Calgary and Edmonton each contained far more schools and pupils in relatively smaller geographic areas than did any of the other school systems, which could lead to problems of coordination and communication. On the other hand, the larger areas and relatively smaller numbers of pupils served by counties and divisions could produce coordination and communication problems of a different type. For example, the coordination and communication problems in school systems which have small numbers of pupils in relatively large geographic areas may be associated with the "diseconomies of scale" which occur in systems with very few pupils (Sabulao and Hickrod, 1971). If too few pupils are distributed over a relatively large geographic area, then schools may be too small to operate efficiently from an economic point of view and few services may be offered. Services such as special or vocational education may not be offered at all, or else students may have to be sent to the larger urban centres to obtain them. Large amounts of the resources of such systems may be spent on transporting pupils to small schools and providing time for school system personnel to travel the large distances between schools within the system. On the other hand, the coordination and communication problems in school systems which have larger numbers of pupils in relatively small geographic areas may be associated with complexity. In such systems there may be large numbers of schools, schools may be larger in size, and a greater variety of courses may be offered to students. In such systems, simply communicating the large volume of Board decisions to students and staff, and providing a feedback system from parents, students, and employees to the Board, become difficult problems.

SUMMARY OF THE MEANS OF PERSONNEL AND "OTHER" VARIABLES

Type of Administrative Jurisdiction

Significant differences existed between the means of one or more of the pairs of groups for fourteen of the sixteen personnel ratios grouped by type of jurisdiction.

As a group the school divisions had the highest mean ratios of personnel per 1,000 pupils in all of the non-instructional categories and the highest mean ratio of total personnel per 1,000 pupils. That is, the group of school divisions had the highest mean ratios of personnel per 1,000 pupils in each of the following categories: central office administration, in-school administration, total administration, central office support, in-school support, total support, total central office, total non-instructional, and total personnel. In addition, the group of school divisions had the highest mean ratios of personnel per 100 staff members for the total administrative, total central office, total support, and total non-instructional categories. The school divisions also had the highest mean percentage of personnel in non-instructional positions (18.28%), and the lowest mean percentage of personnel in instructional positions (81.72%).

As a group the counties had the lowest mean ratios of (a) central office administrative staff per 1,000 pupils, (b) total administrative staff per 1,000 pupils, and (c) total administrative staff per 100 staff members. This finding may reflect the advantages of the shared aspects of municipal and educational administration in the counties, or it may reflect differences in the quantity and/or quality of the services provided. The group of counties had the second lowest mean percentage of personnel in non-instructional positions (15.19%),

and the seond highest percentage of personnel in instructional positions (84.81%). However, the group of counties had the highest mean ratio of instructional staff per 1,000 pupils (50.28).

The group of separate districts had the smallest mean ratios of personnel in most of the non-instructional categories. That is, the separate districts had the lowest mean ratios of personnel per 1,000 pupils for each of the following personnel components: in-school administration, central office support, in-school support, total support, total central office, total non-instructional, and total staff. The non-instructional components expressed as ratios per 100 staff members tended to reflect the lower staff per 1,000 pupil ratios of the separate districts. The separate districts had the lowest mean ratios of total support staff per 100 staff, and total non-instructional staff per 100 staff. Overall, as a group, the separate districts not only had the lowest mean ratios of personnel per 1,000 pupils for the instructional, non-instructional, and total staff components; they also had the lowest mean teacher qualifications (3.03 years of training). However, the group of separate districts had the lowest mean percentage of staff in non-instructional positions (13.78%), and the highest mean percentage of staff in instructional positions (86.22%). This latter finding may be associated with the fact that the majority of separate districts, which were very small in terms of the number of pupils they contained, had no central office staffs other than a part-time secretary-treasurer.

Except for the mean ratios for the counties mentioned above, the groups of counties and public districts tended to have relatively similar mean values for the personnel ratios per 1,000 pupils. The mean values of the personnel ratios per 1,000 pupils for the counties

and public districts generally tended to be lower than those for the groups of divisions and higher than those for the groups of separate districts. The group of public districts had the highest mean teacher qualifications (3.31 years of training).

When considering the importance of the means reported above, the wide range of values for each variable, for each of the four types of jurisdiction (Tables 29 to 33, Appendix G) should be kept in mind. For example, mean teacher qualifications, a very important salary determinant, ranged from 1.00 to 4.14 years of training in the school systems in the study.

Size of School System

Considerable variation in personnel ratios occurred among school systems of similar size. Tendencies were observed for increases in school system size to be associated with increases in the following mean ratios of personnel per 1,000 pupils: (a) in-school administrative, (b) total administrative, (c) central office support, (d) in-school support, (e) total support, (f) total central office, and (g) total non-instructional. However, in most cases these tendencies were not very marked. For the following mean ratios of personnel per 1,000 pupils no regularity of pattern was apparent with increasing size of school system: (a) central office administrative, (b) total instructional, and (c) total staff.

Increasing size of school system appeared to be associated with increases in mean ratios for the (a) total support staff per 100 staff members, and (b) total non-instructional staff per 100 staff members. No regularity of pattern was apparent with increases in system size for

either the mean administrative ratio per 100 staff members, or the mean central office ratio per 100 staff members. Mean teacher qualifications tended to increase with increasing size of school system.

The two groups containing the four largest school systems tended to have higher mean non-instructional ratios, and lower mean instructional ratios, than did the three groups of smaller school systems.

A close inspection of both the type of administrative jurisdiction grouping and the size grouping of the school systems suggested that the type of jurisdiction may be more important than size of system in explaining the relative sizes of the various personnel components in the school systems in the study. The distribution of school systems of different types of jurisdiction among the size categorization may have "loaded" the size categorization so that it reflects the results of the jurisdictions categorization. For example, separate districts, which tended to have the lowest ratios of both instructional and non-instructional personnel, made up the greatest majority (37 of 59) of systems in size group 5. In most instances, where significant differences between groups occurred, these differences were between size group 5 and another group. On the other hand, type of jurisdiction may appear to be more important than size in the explanation of the relative sizes of the various personnel components in this study because of the particular distribution of the sizes of school systems in Alberta.

CORRELATION COEFFICIENTS: PERSONNEL RATIOS AND SELECTED ORGANIZATIONAL VARIABLES

Problem A2

In abbreviated form, this problem was, what relationships exist between (1) selected personnel ratios and (2) selected organizational variables in 132 Alberta school systems?

Table 10 lists the correlation coefficients between each of the personnel ratios and each of the organizational variables. In the discussion below, the probability level is indicated in brackets immediately after each correlation coefficient. All correlation coefficients were tested for significance at the 0.05 level. The 0.01 level is reported when $p \ll 0.01$.

Personnel Ratios Per 1,000 Pupils

V171-Central office administrative staff per 1,000 pupils.

Statistically significant, positive correlation coefficients were obtained between the central office administrative ratio and each of the following variables: supplementary requisition per pupil .40 (.01), operating budget per pupil .37 (.01), and square miles per school .20 (.02). Statistically significant, negative correlation coefficients were obtained between the central office administrative ratio and (a) mean teacher qualifications -.22 (.01), and (b) mean school size (mean number of pupils per school) -.20 (.02). The correlation coefficients obtained between the central office administrative ratio and each of the following variables were not statistically significant: (a) the total number of schools -.08 (.35), (b) the total number of pupils -.07 (.46),

TABLE 10

CORRELATION COEFFICIENTS: PERSONNEL RATIOS AND SELECTED VARIABLES
(N=132)

VARIABLES	V96 Total No. Schools		V144 Total No. Pupils		V142 Total No. Staff		V99 No. Central Office Departments	
	r	p	r	p	r	p	r	p
V171 CO Admin. Staff/1,000 Pupils	-.08	.35	-.07	.46	-.06	.48	-.05	.56
V177 In-School Admin. Staff/1,000 Pupils	.18	.04	.16	.08	.16	.07	.24	.01
V148 Total Admin. Staff/1,000 Pupils	.06	.52	.05	.54	.06	.52	.13	.15
V175 CO Support Staff/1,000 Pupils	.37	.01	.34	.01	.34	.01	.48	.01
V173 In-School Support Staff/1,000 Pupils	.18	.04	.12	.17	.13	.15	.29	.01
V152 Total Support Staff/1,000 Pupils	.26	.01	.20	.02	.21	.02	.40	.01
V150 Total CO Staff/1,000 Pupils	.17	.05	.16	.07	.16	.06	.26	.01
V154 Total Non-Instr. Staff/1,000 Pupils	.24	.01	.19	.03	.19	.03	.37	.01
V156 Total Instr. Staff/1,000 Pupils	-.06	.48	-.08	.37	-.07	.42	.00	.97
V157 Total Staff/1,000 Pupils	.06	.50	.02	.81	.03	.73	.18	.04
V147 Total Admin. Staff/100 Staff	.03	.75	.05	.59	.05	.61	.04	.69
V149 Total CO Staff/100 Staff	.19	.03	.19	.03	.19	.03	.25	.01
V151 Total Support Staff/100 Staff	.28	.01	.22	.01	.23	.01	.41	.01
V153 Total Non-Instr. Staff/100 Staff	.26	.01	.22	.01	.22	.01	.37	.01
V155 Total Instr. Staff/100 Staff	-.26	.01	-.22	.01	-.22	.01	-.37	.01

TABLE 10 (continued)

VARIABLES	V181 Supplementary Requisition Mill Rate		V182 Operating Budget/Pupil		V183 Supplementary Requisition/ Pupil	
	r	p	r	p	r	p
V171 CO Admin. Staff/1,000 Pupils	.04	.62	.37	.01	.40	.01
V177 In-School Admin. Staff/1,000 Pupils	.25	.01	.02	.86	-.09	.31
V148 Total Admin. Staff/1,000 Pupils	.22	.01	.33	.01	.28	.01
V175 CO Support Staff/1,000 Pupils	.09	.30	.20	.02	.17	.05
V173 In-School Support Staff/1,000 Pupils	.20	.02	.20	.02	.17	.06
V152 Total Support Staff/1,000 Pupils	.20	.02	.23	.01	.20	.02
V150 Total CO Staff/1,000 Pupils	.09	.30	.41	.01	.42	.01
V154 Total Non-Instr. Staff/1,000 Pupils	.24	.01	.31	.01	.26	.01
V156 Total Instr. Staff/1,000 Pupils	-.02	.80	.45	.01	.45	.01
V157 Total Staff/1,000 Pupils	.10	.28	.54	.01	.52	.01
V147 Total Admin. Staff/100 Staff	.16	.07	.06	.50	.04	.62
V149 Total CO Staff/100 Staff	.07	.47	.27	.01	.28	.01
V151 Total Support Staff/100 Staff	.19	.03	.14	.11	.12	.16
V153 Total Non-Instr. Staff/100 Staff	.22	.01	.14	.10	.12	.16
V155 Total Instr. Staff/100 Staff	-.22	.01	-.14	.10	-.12	.16

TABLE 10 (continued)

VARIABLES	V98 Mean Teacher Qualifications		V170 Mean School Size		V146 Square Miles/ School		V145 Pupils/Square Miles	
	r	p	r	p	r	p	r	p
V171 CO Admin. Staff/1,000 Pupils	-.22	.01	-.20	.02	.20	.02	-.09	.29
V177 In-School Admin. Staff/1,000 Pupils	.28	.01	.31	.02	.16	.07	.11	.23
V148 Total Admin. Staff/1,000 Pupils	.00	.98	.04	.61	.29	.01	-.01	.93
V175 CO Support Staff/1,000 Pupils	.27	.01	.21	.02	.26	.01	.21	.02
V173 In-School Support Staff/1,000 Pupils	.29	.01	.03	.70	.41	.01	.04	.67
V152 Total Support Staff/1,000 Pupils	.34	.01	.09	.31	.45	.01	.09	.29
V150 Total CO Staff/1,000 Pupils	.00	.98	-.03	.77	.32	.01	.06	.51
V154 Total Non-Instr. Staff/1,000 Pupils	.29	.01	.09	.31	.47	.01	.07	.39
V156 Total Instr. Staff/1,000 Pupils	-.26	.01	-.23	.01	.07	.42	-.08	.37
V157 Total Staff/1,000 Pupils	-.09	.33	-.16	.07	.29	.01	-.03	.71
V147 Total Admin. Staff/100 Staff	.02	.82	.12	.17	.14	.12	.00	.96
V149 Total CO Staff/100 Staff	.02	.87	.02	.79	.24	.01	.08	.37
V151 Total Support Staff/100 Staff	.38	.01	.15	.09	.38	.01	.11	.19
V153 Total Non-Instr. Staff/100 Staff	.35	.01	.17	.05	.38	.01	.10	.24
V155 Total Instr. Staff/100 Staff	-.34	.01	-.17	.05	-.38	.01	-.10	.24

(c) the total number of staff -.06 (.48), (d) the number of central office departments -.05 (.56), (e) pupils per square mile -.09 (.29), and (f) supplementary requisition mill rate .04 (.62). The finding that none of the three measures of school system size was significantly correlated with the ratio of central office administrative staff does not support the results of previous administrative ratio studies conducted in western Canadian school systems by Gill (1967), Blowers (1969), Vithayathil (1969), and Lepatski (1970). Four variables were more highly correlated with the central office administrative ratio than were any of the three measures of system size. The finding that some of the variables were positively correlated with the central office administrative ratio while others were negatively correlated with it reflects the complexity of the relationships involved.

V177-In-school administrative staff per 1,000 pupils. Although ten of the eleven variables were positively correlated with the in-school administrative ratio, most of the correlation coefficients were low and only five were statistically significant. The following variables were significantly correlated with the in-school administrative ratio: mean school size .31 (.02), mean teacher qualifications .28 (.01), supplementary requisition mill rate .25 (.01), number of central office departments .24 (.01), and the total number of schools .18 (.04). The correlation coefficients between the in-school administrative ratio and each of the following variables were not statistically significant: the total number of pupils .16 (.08), the total number of staff .16 (.07), square miles per school .16 (.07), pupils per square mile .11 (.23), operating budget per pupil .02 (.86), and supplementary

requisition per pupil -.09 (.31). The relative lack of importance of all three measures of school system size was again noted.

V148-Total administrative staff per 1,000 pupils. Although ten of the eleven variables were positively correlated with the total administrative ratio, most of the correlation coefficients were low and only four were statistically significant. The following variables were significantly correlated with the total administrative ratio: operating budget per pupil .33 (.01), square miles per school .29 (.01), supplementary requisition per pupil .28 (.01), and supplementary requisition mill rate .22 (.01). Correlation coefficients obtained between the total administrative ratio and each of the following variables were not statistically significant: mean teacher qualifications .00 (.98), pupils per square mile -.01 (.93), mean school size .04 (.61), and the number of central office departments .13 (.15). The following correlation coefficients were so low that they suggested that there was almost no relationship between school system size and the total administrative ratio in the school systems in the study: total number of schools .06 (.52), total number of staff .06 (.52), and total number of pupils .05 (.54). This conclusion appeared to support the findings of a study conducted by Reiss (1970), but it did not appear to support the results of studies conducted by Gill (1967), Blowers (1969), Vithayathil (1969), and Lepatski (1970). Four variables were more highly correlated with the total administrative ratio than were any of the three measures of school system size.

V175-Central office support staff per 1,000 pupils. The correlation coefficients between each of the eleven variables and the

central office support ratio were positive and ten of the eleven were statistically significant. In descending order of magnitude the correlation coefficients were: number of central office departments .48 (.01), total number of schools .37 (.01), total number of pupils .34 (.01), total number of staff .34 (.01), mean teacher qualifications .27 (.01), square miles per school .26 (.01), pupils per square mile .21 (.02), mean school size .21 (.02), operating budget per pupil .20 (.02), supplementary requisition per pupil .17 (.05), and supplementary requisition mill rate .09 (.30). The finding that the size of the central office support ratio increased as all three measures of system size increased appeared to provide supportive evidence for the results of support staff studies conducted by Rushing (1966), Carter (1968), Duboyce (1970), and Lepatski (1970).

V173-In-school support staff per 1,000 pupils. Although all of the correlation coefficients between each of the eleven variables and the in-school support ratio were low positive, only six were statistically significant. In descending order of magnitude the correlation coefficients were: square miles per school .41 (.01), mean teacher qualifications .29 (.01), number of central office departments .29 (.01), operating budget per pupil .20 (.02), supplementary requisition mill rate .20 (.02), total number of schools .18 (.04), supplementary requisition per pupil .17 (.06), total number of staff .13 (.15), total number of pupils .12 (.17), pupils per square mile .04 (.67), and mean school size .03 (.70). The relative lack of importance of all three measures of school system size was again noted.

V152-Total support staff per 1,000 pupils. All of the

correlation coefficients obtained between the total support ratio and each of the eleven variables were low positive and nine of the eleven were statistically significant. In descending order of magnitude the correlation coefficients were: square miles per school .45 (.01), number of central office departments .40 (.01), mean teacher qualifications .34 (.01), total number of schools .26 (.01), operating budget per pupil .23 (.01), total number of staff .21 (.02), total number of pupils .20 (.02), supplementary requisition per pupil .20 (.02), supplementary requisition mill rate .20 (.02), pupils per square mile .09 (.29), and mean school size .09 (.31). The positive correlation coefficients obtained between all three measures of system size and the total support ratio appeared to provide supportive evidence for similar findings by Rushing (1966), Carter (1968), Duboyce (1970), and Lepatski (1970). The finding that square miles per school, number of central office departments, and mean teacher qualifications, were all more highly correlated with the total support ratio than were any of the three measures of school system size, suggested that factors in addition to size must be considered in the explanation of the variation of the support ratio.

V150-Total central office staff per 1,000 pupils. Although ten of the eleven variables were positively related to the central office ratio, most of the correlation coefficients were quite low and only five were statistically significant. The one negative correlation coefficient, between the central office ratio and mean school size, was so low (-.03) that it was considered unimportant. In descending order of magnitude the correlation coefficients were: supplementary

requisition per pupil .42 (.01), operating budget per pupil .41 (.01), square miles per school .32 (.01), number of central office departments .26 (.01), total number of schools .17 (.05), total number of staff .16 (.06), total number of pupils .16 (.07), supplementary requisition mill rate .09 (.30), pupils per square mile .06 (.51), mean school size -.03 (.77), and mean teacher qualifications .00 (.98). The positive correlation coefficients obtained between the three measures of system size and the central office ratio appeared to provide supportive evidence for similar findings by Lepatski (1970) and Holdaway (1971). However, four variables were more highly correlated with the central office ratio than were any of the three measures of system size.

V154-Total non-instructional staff per 1,000 pupils. While all of the eleven variables were positively correlated with the non-instructional ratio, most of the correlation coefficients were quite low and nine of the eleven were statistically significant. In descending order of magnitude the correlation coefficients were: square miles per school .47 (.01), number of central office departments .37 (.01), operating budget per pupil .31 (.01), mean teacher qualifications .29 (.01), supplementary requisition per pupil .26 (.01), supplementary requisition mill rate .24 (.01), total number of schools .24 (.01), total number of pupils .19 (.03), total number of staff .19 (.03), mean school size .09 (.31), and pupils per square mile .07 (.39). The positive correlation coefficients obtained between the non-instructional ratio and each measure of system size appeared to provide supportive evidence for similar findings by Lepatski (1970) and Holdaway (1971). However, six variables appeared to be relatively more important than

system size in the explanation of the variation in the non-instructional ratio, as they were more highly correlated with this ratio than were any of the three measures of system size.

V156-Total instructional staff per 1,000 pupils. The instructional ratio was significantly and positively correlated with operating budget per pupil .45 (.01), and supplementary requisition per pupil .45 (.01). Statistically significant, negative correlation coefficients were obtained between the instructional ratio and (a) mean teacher qualifications -.26 (.01), and (b) mean school size -.23 (.01). The correlation coefficients between the instructional ratio and each of the following variables were not statistically significant: total number of pupils -.08 (.37), pupils per square mile -.08 (.37), total number of staff -.07 (.42), square miles per school .07 (.42), total number of schools -.06 (.48), supplementary requisition mill rate -.02 (.80), and the number of central office departments .00 (.97). Only the first four variables mentioned above were significantly related to the instructional ratio. None of the three measures of system size were significantly related to the instructional ratio.

V157-Total staff per 1,000 pupils. A positive, statistically significant relationship existed between the total staff ratio and each of the following variables: operating budget per pupil .54 (.01), supplementary requisition per pupil .52 (.01), square miles per school .29 (.01), and number of central office departments .18 (.04). The correlation coefficients between the total staff ratio and each of the following variables were not statistically significant: mean school size -.16 (.07), supplementary requisition mill rate .10 (.28), mean

teacher qualifications -.09 (.33), total number of schools .06 (.50), pupils per square mile -.03 (.71), total number of staff .03 (.73), and total number of pupils .03 (.73). Seven variables were more highly correlated with the total staff ratio than were any of the three measures of system size.

Personnel Ratios Per 100 Staff Members

The correlation coefficients between each of the personnel ratios per 100 staff members and each of the eleven organizational variables were also summarized in Table 10, page 86. As the personnel ratios per 100 staff members were given less emphasis in this study than the personnel ratios per 1,000 pupils, they were dealt with more briefly. Overall, the direction of the correlation coefficients between each of the personnel ratios per 100 staff members and each of the eleven variables was similar to those for the ratios per 1,000 pupils. However, the correlation coefficients for the ratios per 100 staff members were generally lower than those for the ratios per 1,000 pupils.

V147-Total administrative staff per 100 staff members. All of the correlation coefficients between the administrative ratio and each of the following variables were low positive and none were statistically significant: supplementary requisition mill rate .16 (.07), square miles per school .14 (.12), mean school size .12 (.17), operating budget per pupil .06 (.50), total number of pupils .05 (.59), total number of staff .05 (.61), supplementary requisition per pupil .04 (.62), number of central office departments .04 (.69), total number of schools .03 (.75), mean teacher qualifications .02 (.82), and pupils per square

mile .01 (.96).

V149-Total central office staff per 100 staff members. Low positive correlation coefficients were obtained between the central office ratio and each of the following variables: supplementary requisition per pupil .28 (.01), operating budget per pupil .27 (.01), number of central office departments .25 (.01), square miles per school .24 (.01), total number of schools .19 (.03), total number of pupils .19 (.03), total number of staff .19 (.03), pupils per square mile .08 (.37), supplementary requisition mill rate .07 (.47), mean school size .02 (.79), and mean teacher qualifications .02 (.87).

V151-Total support staff per 100 staff members. Low positive correlation coefficients were obtained between the total support ratio and each of the following variables: number of central office departments .41 (.01), mean teacher qualifications .38 (.01), square miles per school .38 (.01), total number of schools .28 (.01), total number of staff .23 (.01), total number of pupils .22 (.01), supplementary requisition mill rate .19 (.03), mean school size .15 (.09), operating budget per pupil .12 (.16), and pupils per square mile .11 (.19).

V153-Total non-instructional staff per 100 staff members. Low positive correlation coefficients were obtained between the total non-instructional ratio and each of the following variables: square miles per school .38 (.01), number of central office departments .37 (.01), mean teacher qualifications .35 (.01), total number of schools .26 (.01), total number of pupils .22 (.01), total number of staff .22 (.01), supplementary requisition mill rate .22 (.01), mean school size

.17 (.05), operating budget per pupil .14 (.10), supplementary requisition per pupil .12 (.16), and pupils per square mile .10 (.24).

V155-Total instructional staff per 100 staff members. Each of the eleven variables was negatively correlated with the total instructional ratio. Most of the correlation coefficients were low, but statistically significant. In descending order of magnitude the correlation coefficients were: square miles per school -.38 (.01), number of central office departments -.37 (.01), mean teacher qualifications -.34 (.01), total number of schools -.26 (.01), total number of pupils -.22 (.01), total number of staff -.22 (.01), supplementary requisition mill rate -.22 (.01), mean school size -.17 (.05), operating budget per pupil -.14 (.10), supplementary requisition per pupil -.12 (.16), and pupils per square mile -.10 (.24).

COLLECTIVE RELATIONSHIPS: STEPWISE MULTIPLE REGRESSION ANALYSIS

Problem A3

In abbreviated form, this problem stated: What percentage of the variance of each of selected personnel ratios is accounted for by selected organizational variables?

On the basis of the evidence contained in the research summarized in the review of the literature in Chapter 2, the selected organizational variables analyzed below were considered likely to be associated with the personnel ratios in Alberta school systems. Further, Ferguson (1966:390-402) has suggested that, by using several meaningful predictors in the multiple regression model, the correlation between the criterion and the weighted sum of predictors can be maximized.

Therefore, a multiple regression model with a personnel ratio as the criterion and nine organizational variables as predictors was applied to the data. The three variables related to operating budget and supplementary requisition were added after preliminary stepwise multiple regression analyses had shown that only very low cumulative percentages of variance could be predicted using the variables which had been selected initially.

With nine predictor variables the multiple regression equation was of the form:

$$Y = A_0 + B_1X_1 + B_2X_2 + B_3X_3 + B_4X_4 \cdots B_9X_9$$

where Y was the criterion variable (a personnel ratio), and A_0 was a constant, X_1 to X_9 were the predictor variables (the variables numbered (1) to (9) in Problem A3, page 7), and B_1 to B_9 were the regression weights of predictor variables 1 to 9 respectively. Each of the administrative, central office, support, instructional, non-instructional and total personnel ratios, successively served as the criterion variable in the stepwise multiple regression analysis.

The following explanation is provided to elucidate this section of the data analysis. Stepwise multiple regression analysis is an extension of multiple regression analysis. Efroymson (1960) explains that multiple regression analysis is used in data analysis to obtain the best fit of a set of observations of independent and dependent variables by an equation of the form outlined above. Stepwise multiple regression analysis yields essentially the same results as the regular multiple regression analysis except that the former adds a number of intermediate regression equations. Efroymson (1960) states:

These equations are obtained by adding one variable at a time and

thus giving the following intermediate equations:

$$Y = A_0 + B_1X_1$$

$$Y = A_0 + B_1X_1 + B_2X_2$$

$$Y = A_0 + B_1X_1 + B_2X_2 + B_3X_3$$

The variable added is that one which makes the greatest improvement in 'goodness to fit'. The coefficients represent the best values when the equation is fitted by the specific variables in the equation.

An important property of the stepwise procedure is based on the facts that (a) a variable may be indicated to be significant in an early stage and thus enter the equation, and (b) after several other variables are added to the regression equation, the initial variable may be indicated to be insignificant. The insignificant variable will be removed from the regression equation before adding an additional variable. Therefore, only significant variables are included in the final regression.

Draper and Smith (1966:172) state that stepwise multiple regression analysis is the best of the variable selection procedures and recommend its use.

The results of the attempts to use stepwise multiple regression analysis to determine the best predictors for six personnel ratios are summarized in Table 11. This table shows the criterion variable used, the significant predictor variables ($p \leq 0.05$), the first non-significant predictor variable to enter the regression analysis, and the cumulative percentage of variance accounted for by the predictor variables.

V148-Total administrative staff per 1,000 pupils. Only a small percentage of the variance in the administrative ratio was accounted for by the predictor variables. The first predictor variable to emerge, operating budget per pupil, accounted for 11.13% of the variance in this ratio.

V150-Total central office staff per 1,000 pupils. Three

TABLE 11

STEPWISE MULTIPLE REGRESSION ANALYSIS USING NINE PREDICTOR VARIABLES WITH SIX STAFFING RATIOS
(N=132)

CRITERION VARIABLE	PREDICTOR VARIABLES (In order of entry into regression analysis)	INCREASE IN PREDICTION		CUMULATIVE % OF VARIANCE
		F	p	
V148 Total Admin. Staff/ 1,000 Pupils	V182 Operating Budget/Pupil	16.28	0.01	11.13
	V146 Square Miles/School	4.16	0.04	13.91
	V181 Supplementary Req. Mill Rate	1.99	0.16	15.23
V150 Total CO Staff/1,000 Pupils	V183 Supplementary Req./Pupil	27.79	0.01	17.61
	V146 Square Miles/School	8.71	0.01	22.83
	V 99 No. of Central Office Depts.	7.01	0.01	26.83
	V181 Supplementary Req. Mill Rate	3.28	0.07	26.68
V152 Total Support Staff/ 1,000 Pupils	V146 Square Miles/School	33.58	0.01	20.53
	V 98 Mean Teacher Qualifications	28.40	0.01	34.87
	V 99 No. of Central Office Depts.	10.02	0.01	39.60
	V183 Supplementary Req./Pupil	1.87	0.17	40.47
V154 Total Non-instructional Staff/1,000 Pupils	V146 Square Miles/School	37.84	0.01	22.55
	V 99 No. of Central Office Depts.	20.33	0.01	33.09
	V 98 Mean Teacher Qualifications	9.11	0.01	37.54
	V183 Supplementary Req./Pupil	4.70	0.03	39.76
	V181 Supplementary Req. Mill Rate	0.29	0.59	39.90
V156 Total Instructional Staff/ 1,000 Pupils	V183 Supplementary Req./Pupil	34.20	0.01	20.83
	V 98 Mean Teacher Qualifications	8.88	0.01	25.93
	V182 Operating Budget/Pupil	7.78	0.01	30.17
	V181 Supplementary Req. Mill Rate	7.05	0.01	33.85
	V146 Square Miles/School	1.89	0.17	34.83
V157 Total Staff/1,000 Pupils	V182 Operating Budget/Pupil	53.96	0.01	29.33
	V183 Supplementary Req./Pupil	10.29	0.01	34.55
	V181 Supplementary Req. Mill Rate	2.48	0.11	35.80

predictor variables, supplementary requisition per pupil, square miles per school, and the number of central office departments, collectively accounted for 26.83% of the variance in the central office ratio. The first predictor variable to emerge, supplementary requisition per pupil, accounted for 17.61% of the variance in the central office ratio.

V152-Total support staff per 1,000 pupils. Three variables, square miles per school, mean teacher qualifications, and the number of central office departments, collectively accounted for 39.60% of the variance in the support ratio. The first predictor variable to emerge, square miles per school, accounted for 20.53% of the variance in the support ratio.

V154-Total non-instructional staff per 1,000 pupils. Almost forty (39.76) per cent of the variance in the non-instructional ratio was collectively accounted for by the following four variables: square miles per school, number of central office departments, mean teacher qualifications, and supplementary requisition per pupil. The first predictor variable to emerge, square miles per school, accounted for 22.55% of the variance in the non-instructional ratio.

V156-Total instructional staff per 1,000 pupils. Four variables, supplementary requisition per pupil, mean teacher qualifications, operating budget per pupil, and supplementary requisition mill rate, collectively accounted for 33.85% of the variance in the instructional ratio. The first predictor variable to emerge, supplementary requisition per pupil, accounted for 20.83% of the variance in the instructional ratio.

V157-Total staff per 1,000 pupils. Two variables, operating budget per pupil, and supplementary requisition per pupil collectively accounted for 34.55% of the variance in the total staff ratio. The first predictor variable to emerge, operating budget per pupil, accounted for 29.33% of the variance in the total staff ratio.

The small cumulative percentages of variance in the administrative, central office, support, non-instructional, instructional, and total staff ratios which could be accounted for by the predictor variables appeared to suggest that reliable prediction of the values of the personnel ratios by using the values of the nine predictor variables was not possible for school systems in Alberta.

None of the measures of school system size appeared as statistically significant predictors of any of the six personnel ratios analyzed above. This finding appeared to provide supportive evidence for a similar conclusion by Reiss (1970) and non-supportive evidence for the results of a study of Alberta school systems conducted by Vithayathil (1969:67).

STEPWISE MULTIPLE REGRESSION ANALYSIS USING LOGARITHMS

There was some justification from earlier research to suggest that a logarithmic function might account for higher cumulative percentages of variance in personnel ratios than the function utilized above which used the raw values for both the predictor and criterion variables in the regression analyses. Logarithmic approaches were used previously in administrative ratio studies by Indik (1964), Gill (1967), Blowers (1969), and Vithayathil (1969). Morss (1969:103) states:

The question of which formulation is most appropriate should not

be answered on an a priori basis. Presumably, the best formulation is the one that best approximates the real world, and this cannot be determined without empirical testing.

When the low cumulative percentages of variance that could be accounted for by using the raw values for the criterion and predictor variables were found, Morss' (1969:103) suggestion that the logarithmic function should be tried out was adopted to determine whether or not it resulted in better predictors. Accordingly, all of the raw values for the six criterion and nine predictor variables were converted to logarithms and the stepwise multiple regression analyses were repeated.

Using logarithms, and with nine predictor variables the multiple regression equation was of the form:

$$\log Y = \log A_0 + C_1 \log X_1 + C_2 \log X_2 + C_3 \log X_3 \cdots \cdots C_9 \log X_9$$

where logY was the criterion variable (a personnel ratio), log X_1 to X_9, were the predictor variables, C_1 to C_9 were the regression weights of the predictor variables $\log X_1$ to $\log X_9$ respectively, and A_0 was a constant. In the stepwise multiple regression analyses which used the logarithmic function, each of the administrative, central office, support, instructional, non-instructional, and total staff ratios successively served as the criterion variable, as shown in Table 12.

V148-Total administrative staff per 1,000 pupils. The only significant predictor variable, operating budget per pupil, accounted for 11.73% of the variance in the administrative ratio.

V150-Total central office staff per 1,000 pupils. Three variables, the number of central office departments, total number of pupils, and total number of staff, collectively accounted for 36.43% of the variance in the central office ratio. The first predictor

TABLE 12

STEPWISE MULTIPLE REGRESSION ANALYSIS USING LOGARITHMS OF NINE PREDICTOR VARIABLES WITH LOGARITHMS OF SIX STAFFING RATIOS (N=132)

CRITERION VARIABLES	PREDICTOR VARIABLES (In order of entry into regression analysis)	INCREASE IN PREDICTION		CUMULATIVE % OF VARIANCE
		F	p	
V148 Total Admin. Staff/ 1,000 Pupils	V182 Operating Budget/Pupil	47.27	0.01	11.73
	V 99 No. of Central Office Depts.	3.14	0.08	13.82
V150 Total CO Staff/1,000 Pupils	V 99 No. of Central Office Depts.	31.06	0.01	19.28
	V144 Total No. of Pupils	14.73	0.01	27.56
	V142 Total No. of Staff	17.86	0.01	36.43
	V182 Operating Budget/Pupil	0.97	0.33	36.91
V152 Total Support Staff/ 1,000 Pupils	V142 Total No. of Staff	71.72	0.01	35.55
	V144 Total No. of Pupils	21.10	0.01	44.61
	V 98 Mean Teacher Qualifications	11.02	0.01	49.01
	V146 Square Miles/School	7.80	0.01	51.96
	V182 Operating Budget/Pupil	1.27	0.26	52.44
V154 Total Non-instructional Staff/1,000 Pupils	V142 Total No. of Staff	48.84	0.01	27.31
	V144 Total No. of Pupils	29.47	0.01	40.83
	V 98 Mean Teacher Qualifications	3.10	0.08	42.23
V156 Total Instructional Staff/1,000 Pupils	V182 Operating Budget/Pupil	41.04	0.01	24.00
	V 98 Mean Teacher Qualifications	7.58	0.01	28.22
	V183 Supplementary Req./Pupil	4.16	0.04	30.48
	V181 Supplementary Req. Mill Rate	18.27	0.01	39.22
	V145 Pupils/Square Mile	0.64	0.42	39.53
V157 Total Staff/1,000 Pupils	V182 Operating Budget/Pupil	73.61	0.01	36.15
	V183 Supplementary Req./Pupil	5.27	0.02	38.66
	V181 Supplementary Req. Mill Rate	9.24	0.01	42.79
	V142 Total No. of Staff	2.84	0.09	44.04

variable to emerge, the number of central office departments, accounted for 27.56% of the variance in the central office ratio.

V152-Total support staff per 1,000 pupils. Four variables, total number of staff, total number of pupils, mean teacher qualifications, and square miles per school, collectively accounted for 51.96% of the variance in the support ratio. The first predictor variable to emerge, total number of staff, accounted for 35.55% of the variance.

V154-Total non-instructional staff per 1,000 pupils. Two variables, the total number of staff, and the total number of pupils, collectively accounted for 40.83% of the variance in the non-instructional ratio. The first predictor variable to emerge, the total number of staff, accounted for 27.31% of the variance in this ratio.

V156-Total instructional staff per 1,000 pupils. Four variables, operating budget per pupil, mean teacher qualifications, supplementary requisition per pupil, and the supplementary requisition mill rate, collectively accounted for 39.22% of the variance in the instructional ratio. The first predictor variable to emerge, operating budget per pupil, accounted for 24.00% of the variance in this ratio.

V157-Total staff per 1,000 pupils. Three variables, operating budget per pupil, supplementary requisition per pupil, and the supplementary requisition mill rate, collectively accounted for 42.79% of the variance in the total staff ratio. The first predictor variable to emerge, operating budget per pupil, accounted for 36.15% of the

variance in the total staff ratio.

Overall, the stepwise multiple regression analyses which used the logarithmic function accounted for slightly higher cumulative percentages of variance in the criterion variables than did the raw values function reported earlier. However, the cumulative percentages of variance accounted for in the criterion variables when the logarithmic function was used were again too low to permit reliable prediction of the criterion variables from the predictor variables.

The order of entry of statistically significant predictor variables into the regression analyses was somewhat different for the logarithmic and raw values functions. In particular, two variables, the total number of staff, and the total number of pupils, appeared as statistically significant predictor variables for the total central office, support, and non-instructional personnel ratios per 1,000 pupils in the approach which used the logarithmic function; but these two variables did not appear as significant predictors for those three ratios in the approach which used the raw values function.

Again, system size did not appear to be a significant predictor of the total administrative ratio. This appeared to provide supportive evidence for a similar conclusion by Reiss (1970:24), and non-supportive evidence for the results of a study conducted by Vithayathil (1969:67). Overall, system size did not account for high enough cumulative percentages of the variance in the criterion variables to be considered as a good predictor of the sizes of the personnel ratios in Alberta school systems.

The low cumulative percentages of the variance which were accounted for in the six personnel ratios examined in the two approaches

used in the stepwise multiple regression analyses suggested two possible alternatives for consideration. First, variables other than those analyzed in this study may be important factors affecting the sizes of personnel ratios in Alberta school systems. A number of such variables were suggested in the review of the literature in Chapter 2. For example, Reiss (1970:28) has speculated that "irrationality in organizations", "administrative style of leaders" and "Blau's (1970) Formal Theory of Differentiation in Organizations" may help to explain the variation in personnel ratios in school systems. Or perhaps, as Pondy (1967:47) has suggested, the administrative and other personnel ratios are variables subject to administrative discretion:

> . . . that is, the number of administrative personnel employed in an organization is chosen so as to maximize the achievement of the goals of the dominant managerial coalition.

Second, a non-linear and/or non-logarithmic function might provide a better fit to the data and could result in higher explained cumulative percentages of variance for the criterion variables. Some examples of alternative functions were presented by Sabulao and Hickrod (1971:178-192). The determination of the shape of such a function was beyond the scope of the present study.

SUMMARY OF CHAPTER 4

Significant differences occurred between the means of one or more of the pairs of groups for fourteen of the sixteen personnel ratios grouped by type of jurisdiction. As a group the school divisions had the highest mean ratios of personnel per 1,000 pupils in all of the non-instructional categories and the highest mean ratio of total personnel per 1,000 pupils. As a group the counties had the lowest mean ratios

of central office administrative staff per 1,000 pupils, and total administrative staff per 1,000 pupils, and the highest mean ratio of instructional staff per 1,000 pupils. The group of separate districts had the lowest mean ratios of personnel per 1,000 pupils in the non-instructional, instructional, and total personnel components.

Tendencies were observed for increases in school system size to be associated with increases in the following mean ratios of personnel per 1,000 pupils: (a) in-school administrative, (b) total administrative, (c) central office support, (d) in-school support, (e) total support, (f) total central office, and (g) total non-instructional.

However, system size appeared to be relatively less important than certain other variables in the explanation of the variation in the sizes of personnel ratios per 1,000 pupils in school systems in the study as three or more of the other variables considered were more highly correlated with each of the administrative, central office, support, non-instructional, instructional, and total personnel ratios than were any of the three measures of system size.

The small cumulative percentages of variance in the criterion variables which could be accounted for by the predictor variables appeared to indicate that reliable prediction of the values of the administrative, central office, support, non-instructional, instructional, and total personnel ratios was not possible for the school systems in the study on the basis of the nine predictor variables used. This conclusion remained the same whether the raw values or logarithmic functions were used in the stepwise multiple regression analyses.

Chapter 5

SALARY RATIOS AND SELECTED ORGANIZATIONAL VARIABLES

This chapter contains a comparison of the means of salary and other financial variables in groups of school systems arranged according to (a) size and (b) type of administrative jurisdiction. In addition, Chapter 5 contains an examination of the individual relationships between (a) selected salary ratios and (b) selected organizational variables, in 132 Alberta school systems.

MEANS OF SALARY AND OTHER FINANCIAL VARIABLES ARRANGED BY (1) TYPE OF ADMINISTRATIVE JURISDICTION AND (2) SIZE OF SCHOOL SYSTEM

Problem B1 -

What are the distributions of the means salary costs (a) per pupil and (b) per staff member of the administrative, central office, support, instructional, and non-instructional personnel components in groups of school systems arranged by (1) size and (2) type of administrative jurisdiction?

The (unweighted) means of selected salary and other financial variables for 132 Alberta school systems grouped by (1) type of jurisdiction and (2) size of school system, are presented in this section. The mean salaries of personnel are presented first, followed by salary ratios per pupil, and salary ratios per staff member. The salaries reported in this section are the mean monthly (September, 1971) salaries for each of the categories of personnel which were reported in

Chapter 4, Tables 6 to 8, pages 66 to 77.

Because of the large amounts of data presented, comments are restricted to the more important variables. In discussing the differences among groups of school systems, reference is sometimes made to Tables 34 to 38 in Appendix G which contain the ranges, standard deviations, and weighted provincial means for the major variables which are reported in this section. Wide variations in the values of the variables within both the jurisdiction and size categorizations can be readily discerned from these tables.

Mean Salaries of Personnel

Table 13 lists the mean salaries of personnel in the various categories in 132 Alberta school systems grouped by (1) type of jurisdiction and (2) size of school system. As the mean salaries of personnel received less emphasis in this study than the mean ratios, the mean salaries of the personnel in the various categories are not reported in detail in the text. Instead, only major trends are reported.

The group of public school districts had the highest mean salaries of personnel in the total administrative, total central office, total support, total non-instructional, total instructional, and total staff components, and the group of separate districts had the lowest.

The mean salaries of personnel in every personnel category reported in Table 13 tended to increase with increasing size of school system.

Salary Ratios Per Pupil

Table 14 presents the mean salary ratios per pupil for the administrative, central office, support, instructional, non-

TABLE 13

MEAN SALARIES OF PERSONNEL IN GROUPS OF SCHOOL SYSTEMS OF (1) DIFFERENT TYPES OF JURISDICTION AND (2) DIFFERENT SIZES

Type of Jurisdiction	N	V9 CO Senior Admin. $	V10 CO Int. Admin. $	V11 CO Sup. Admin. $	V12 CO Serv. Admin. $	V102 Total CO Admin. $	V14 CO Support (Clerical) $
1. Counties	29	3,195	243	562	581	4,582	1,268
2. Divisions	29	2,791	358	631	571	4,351	926
3. Public Districts	30	2,368	2,366	7,042	2,924	14,700	7,525
4. Separate Districts	44	1,018	331	1,811	558	3,719	1,168

Size (No. of Pupils)	N	Cty.	Div.	Pub. Dist.	Sep. Dist.	V9	V10	V11	V12	V102	V14
1. 75,629-80,366	2			2		14,447	31,619	92,816	41,680	180,562	103,772
2. 21,684-32,038	2				2	8,853	6,756	37,386	10,547	63,543	21,832
3. 3,000-8,673	18	8	6	4		4,206	676	2,272	935	8,089	1,961
4. 1,036-2,970	51	21	18	7	5	2,637	245	475	449	3,806	967
5. 22-939	59		5	17	37	554	27	0	25	606	84
Total Province	132	29	29	30	44	-	-	-	-	-	-

TABLE 13 (Continued)

Type of Jurisdiction	N	V103 Total CO Staff $	V89 In-school Support (Cler.) $	V90 In-school Support (Aides) $	V137 Total In-school Support $	V139 Total Support $	V117 In-school Admin. $
1. Counties	29	5,850	2,480	549	3,029	4,297	8,465
2. Divisions	29	5,278	2,878	1,735	4,613	5,540	7,151
3. Public Districts	30	22,225	8,732	4,637	13,368	20,893	27,284
4. Separate Districts	44	4,887	2,318	544	2,862	4,031	6,218

Size (No. of Pupils)	N	Cty.	Div.	Pub. Dist.	Sep. Dist.	V103	V89	V90	V137	V139	V117
1. 75,629-80,366	2			2		284,334	106,979	64,257	171,236	275,008	337,396
2. 21,684-32,038	2				2	85,375	43,104	8,045	51,148	72,980	103,465
3. 3,000-8,673	18	8	6	4		10,050	6,937	2,212	9,149	11,109	15,891
4. 1,036-2,970	51	21	18	7	5	4,774	1,587	732	2,320	3,287	6,148
5. 22-939	59		5	17	37	689	226	128	354	438	1,079
Total Province	132	29	29	30	44	-	-	-	-	-	-

TABLE 13 (Continued)

Type of Jurisdiction	N	V135 Total Admin. $	V141 Total Non-instr. $	V134 Total Instr. $	V143 Total Staff $
1. Counties	29	13,047	17,344	99,974	117,317
2. Divisions	29	11,502	17,042	76,759	93,801
3. Public Districts	30	41,983	62,876	245,690	308,566
4. Separate Districts	44	9,937	13,967	59,218	73,185

Size (No. of Pupils)	N	Cty.	Div.	Pub. Dist.	Sep. Dist.	V135	V141	V134	V143
1. 75,629-80,366	2			2		517,957	792,965	2,908,119	3,701,084
2. 21,684-32,038	2				2	167,008	239,988	960,034	1,200,020
3. 3,000-8,673	18	8	6	4		23,981	35,090	175,355	210,445
4. 1,036-2,970	51	21	18	7	5	9,954	13,241	67,886	81,127
5. 22-939	59		5	17	37	1,685	2,123	12,656	14,778
Total Province	132	29	29	30	44	-	-	-	-

TABLE 14

MEAN SALARY RATIOS PER PUPIL IN GROUPS OF SCHOOL SYSTEMS OF (1) DIFFERENT TYPES OF JURISDICTION AND (2) DIFFERENT SIZES

Type of Jurisdiction	N	V172 CO Admin. $/Pupil	V178 In-school Admin. $/ Pupil	V159 Total Admin. $/Pupil	V176 CO Support $/Pupil	V174 In-school Support $/Pupil	V163 Total Support $/Pupil
1. Counties	29	1.74	3.02	4.76	0.53	1.02	1.55
2. Divisions	29	2.32	3.23	5.55	0.45	1.66	2.11
3. Public Districts	30	1.74	3.09	4.82	0.31	1.26	1.57
4. Separate Districts	44	1.51	2.83	4.34	0.19	0.78	0.97
Significant Difference between Pairs		2 + 1 (0.07) 2 + 3 (0.06) 2 + 4 (0.01)	NIL	2 + 4 (0.01)	1 + 4 (0.01) 1 + 3 (0.06) 2 + 4 (0.01)	2 + 4 (0.03)	2 + 4 (0.01)

Size (No. of Pupils)	N	Cty.	Div.	Pub. Dist.	Sep. Dist.	V172	V178	V159	V176	V174	V163
1. 75,629-80,366	2			2		2.32	4.33	6.65	1.33	2.20	3.52
2. 21,684-32,038	2				2	2.34	3.78	6.11	0.82	1.86	2.68
3. 3,000-8,673	18	8	6	4		1.69	3.35	5.04	0.41	1.83	2.24
4. 1,036-2,970	51	21	18	7	5	1.99	3.22	5.21	0.51	1.18	1.69
5. 22-939	59		5	17	37	1.61	2.67	4.28	0.14	0.82	0.97
Total Province	132	29	29	30	44	-	-	-	-	-	-
Significant Difference between Pairs						NIL	4 + 5 (0.09)	4 + 5 (0.01)	1 + 3 (0.01) 1 + 4 (0.01) 1 + 5 (0.01) 2 + 5 (0.01) 3 + 5 (0.01) 4 + 5 (0.01)	3 + 5 (0.05)	1 + 5 (0.09) 4 + 5 (0.05) 3 + 5 (0.01)

TABLE 14 (Continued)

Type of Jurisdiction	N	V161 Total CO $/Pupil	V165 Total Non-instr. $/Pupil	V167 Total Instr. $/Pupil	V168 Total Staff $/Pupil
1. Counties	29	2.27	6.32	36.54	42.85
2. Divisions	29	2.77	7.65	36.38	44.04
3. Public Districts	30	2.04	6.39	36.80	43.19
4. Separate Districts	44	1.70	5.31	32.76	38.07
Significant Difference between Pairs		2 + 4 (0.01) 2 + 3 (0.04)	2 + 4 (0.01)	1 + 4 (0.01) 2 + 4 (0.02) 3 + 4 (0.01)	1 + 4 (0.01) 2 + 4 (0.01) 3 + 4 (0.01)

Size (No. of Pupils)	N	Cty.	Div.	Pub. Dist.	Sep. Dist.	V161	V165	V167	V168
1. 75,629-80,366	2			2		3.64	10.17	37.30	47.47
2. 21,684-32,038	2				2	3.15	8.78	35.69	44.47
3. 3,000-8,673	18	8	6	4		2.10	7.27	37.87	45.14
4. 1,036-2,970	51	21	18	7	5	2.50	6.90	35.63	42.53
5. 22-939	59		5	17	37	1.75	5.25	34.16	39.41
Total Province	132	29	29	30	44	-	-	-	-
Significant Difference between Pairs						4 + 5 (0.01)	1 + 5 (0.03) 3 + 5 (0.01) 4 + 5 (0.01)	NIL	3 + 5 (0.01) 4 + 5 (0.08)

instructional, and total personnel components in 132 Alberta school systems grouped by (1) type of jurisdiction and (2) size of school system. Table 14 also contains the results of the analyses of variance for selected salary ratios grouped by type of jurisdiction and size of school system. Where the means of pairs showed a relevant and statistically significant difference (Scheffé procedure, $p \leq 0.10$) this is shown immediately below the relevant variable.

V172-Central office administrative salaries per pupil. The mean administrative salary ratio per pupil was highest for divisions ($2.32), and lowest for separate districts ($1.51). Groups of counties and public districts had the same mean of $1.74. There were significant differences in the means for this ratio between groups of divisions and counties ($p=0.07$), divisions and public districts ($p=0.06$), and divisions and separate districts ($p=0.01$).

For groups of smallest to largest school systems the mean ratios were: $1.61, $1.99. $1.69, $2.34, and $2.32. No significant differences occurred in mean central office administrative salaries per pupil among groups of school systems of different sizes.

V178-In-school administrative salaries per pupil. The means were: divisions $3.23, public districts $3.09, counties $3.02, and separate districts $2.83. No significant differences occurred in the mean values for this ratio between groups of school systems of different types of jurisdiction.

A tendency toward increasing size of this ratio with increasing size of system was shown by the mean ratios of $2.67, $3.22, $3.35, $3.78, and $4.33. There were significant differences ($p=0.09$) in the

means for this ratio between the two groups of the smallest school systems.

V159-Total administrative salaries per pupil. Divisions had the highest mean ratio of $5.55, followed by public districts $4.82, counties $4.76, and separate districts $4.34. There were significant differences (p=0.01) in the means for this ratio between groups of divisions and separate districts.

The mean ratios generally rose with increasing size of school system. For groups of smallest to largest school systems the mean ratios were: $4.28, $5.21, $5.04, $6.11, and $6.65. A significant difference (p=0.01) occurred in the mean values for this ratio between the two groups of the smallest school systems.

V176-Central office support salaries per pupil. In descending order of magnitude the mean ratios were: counties $0.53, divisions $0.45, public districts $0.31, and separate districts $0.19. Significant differences occurred in the mean values for this ratio between groups of counties and separate districts (p=0.01), counties and public districts (p=0.06), and divisions and separate districts (p=0.01).

A tendency toward increasing size of this ratio with increasing system size was shown by the mean values of $0.14, $0.51, $0.41, $0.82, and $1.33. Significant differences occurred in the mean values for this ratio between size groups 1 and 3 (p=0.01), groups 1 and 4 (p=0.01), groups 1 and 5 (p=0.01), groups 2 and 5 (p=0.01), groups 3 and 5 (p=0.01), and groups 4 and 5 (p=0.01).

V174-In-school support salaries per pupil. As the following ratios illustrate, divisions again had the highest and separate districts the lowest mean ratios: divisions $1.66, public districts $1.26, counties $1.02, and separate districts $0.78. A significant difference (p=0.03) occurred in mean in-school support salaries per pupil between groups of divisions and separate districts.

A tendency toward increasing size of this ratio with increasing system size was shown by the mean values of $0.82, $1.18, $1.83, $1.86, and $2.20. A significant difference (p=0.05) occurred in the mean values for this ratio between size groups 3 and 5.

V163-Total support salaries per pupil. The mean ratios were: divisions $2.11, public districts $1.57, counties $1.55, and separate districts $0.97. There were significant differences (p=0.01) in mean support salaries per pupil between the groups of divisions and separate districts.

Mean support salaries per pupil tended to increase as system size increased. For groups of smallest to largest school systems the mean ratios were: $0.97, $1.69, $2.24, $2.68, and $3.52. Significant differences occurred in the mean values for this ratio between size groups 1 and 5 (p=0.09), groups 3 and 5(p=0.01), and groups 4 and 5 (p=0.05).

V161-Total central office salaries per pupil. The mean ratios were: divisions $2.77, counties $2.27, public districts $2.04, and separate districts $1.70. There were significant differences in mean central office salaries per pupil between groups of divisions and separate districts (p=0.01), and between divisions and public districts

(p=0.04).

The mean ratios for groups of smallest to groups of largest school systems were: $1.75, $2.50, $2.10, $3.15, and $3.64. A significant difference (p=0.01) occurred in the mean values for this ratio between the two groups of the smallest school systems.

V165-Total non-instructional salaries per pupil. The divisions had the highest mean of $7.65, the separate districts had the lowest mean of $5.31, while the means of $6.39 for the public districts and $6.32 for the counties were similar. A significant difference (p=0.01) occurred in the mean non-instructional salary ratio per pupil between groups of divisions and separate districts.

A trend toward increasing size of this ratio with increasing size of school system was shown by the mean ratios of: $5.25, $6.90, $7.27, $8.78, and $10.17. There were significant differences in the mean values for this ratio between size groups 1 and 5 (p=0.03), groups 3 and 5 (p=0.01), and groups 4 and 5 (p=0.01).

V167-Total instructional salaries per pupil. Although the mean instructional salary ratios per pupil of $36.80 for public districts, $36.54 for counties, and $36.38 for divisions were similar, the mean of $32.76 for separate districts was substantially lower. There were significant differences in the mean values for this ratio between groups of counties and separate districts (p=0.01), divisions and separate districts (p=0.02), and public districts and separate districts (p=0.01).

In the size categorization, irregular changes occurred with increasing system size. For groups of smallest to groups of largest

school systems the means were: $34.16, $35.63, $37.87, $35.69, and $37.80. There were no statistically significant differences in mean instructional salaries per pupil between groups of school systems of different sizes. The differences in mean instructional salaries per pupil may be associated with differences in mean teacher qualifications and years of experience, mean class size, and/or differences in gross salary rates among the school systems in the study.

V168-Total salaries per pupil. The mean total salary ratios per pupil were similar for divisions ($44.04), public districts ($43.19), and counties ($42.85), but the mean ratio for separate districts ($38.07) was substantially lower. There were significant differences in the mean values for this ratio between groups of separate districts and counties (p=0.01), separate districts and divisions (p=0.01), and separate districts and public districts (p=0.01).

As the following ratios illustrate, mean total salaries per pupil generally tended to increase with increasing size of school system: $39.41, $42.53, $45.14, $44.47, and $47.47. There were significant differences in the mean values for this ratio between size groups 3 and 5 (p=0.01), and between size groups 4 and 5 (p=0.08).

Salary Ratios Per Staff Member

Table 15 lists the mean salary ratios per staff member for the various personnel components in 132 Alberta school systems grouped by (1) type of jurisdiction and (2) size of school system. As the ordering of the means was similar for both the ratios per pupil and per staff member, the mean salary ratios per staff member are not reported in detail in the text. Instead, the major trends in salary ratios per

TABLE 15

MEAN SALARY RATIOS PER STAFF MEMBER IN GROUPS OF SCHOOL SYSTEMS OF (1) DIFFERENT TYPES OF JURISDICTION AND (2) DIFFERENT SIZES

Type of Jurisdiction	N	V158 Admin. $/ Staff Member	V160 CO Staff $/Staff Member	V162 Support $/ Staff Member	V164 Non-instr. $/ Staff Member	V166 Instr. $/ Staff Member	V184 Total $/ Staff Member
1. Counties	29	80.46	38.26	25.89	106.36	616.03	722.39
2. Divisions	29	91.74	45.28	34.83	126.58	602.82	729.40
3. Public Districts	30	83.52	35.07	26.65	110.17	630.23	740.40
4. Separate Districts	44	81.65	31.65	17.93	99.57	621.79	721.36
Significant Difference between Pairs		NIL	2 + 3 (0.09) 2 + 4 (0.01)	2 + 4 (0.02)	2 + 4 (0.02)	NIL	N/A

Size (No. of Pupils)	N	Cty.	Div.	Pub. Dist.	Sep. Dist.	V158	V160	V162	V164	V166	V184
1. 75,629-80,366	2			2		114.85	62.80	60.65	175.50	643.90	819.40
2. 21,684-32,038	2				2	110.95	57.30	48.60	159.55	649.75	809.30
3. 3,000-8,673	18	8	6	4		85.38	35.62	38.19	123.58	640.37	763.95
4. 1,036-2,970	51	21	18	7	5	89.05	42.62	28.59	117.65	609.02	726.67
5. 22-939	59		5	17	37	77.32	30.72	16.70	94.01	617.60	711.61
Total Province	132	29	29	30	44	-	-	-	-	-	-
Significant Difference between Pairs						4 + 5 (0.07)	1 + 5 (0.06) 4 + 5 (0.01)	1 + 5 (0.08) 4 + 5 (0.07) 3 + 5 (0.01)	1 + 5 (0.02) 4 + 5 (0.01) 3 + 5 (0.03)	NIL	N/A

staff member are reported below in the summary for this section.

Financial Variables

Table 16 lists the means of selected financial variables in 132 Alberta school systems grouped by (1) type of jurisdiction and (2) size of school system.

V182-Operating budget per pupil. The mean annual (1971) operating expenditures per pupil were: divisions $1025., counties $941., public districts $922., and separate districts $734. There were significant differences in mean operating expenditures per pupil between groups of separate districts and counties ($p=0.01$), separate districts and divisions ($p=0.01$), and separate districts and public districts ($p=0.01$).

For groups of smaller to groups of larger school systems the mean ratios were: $851., $930., $883., $818., and $905.

V183-Supplementary requisition per pupil. The mean supplementary requisition per pupil was substantially lower in the group of separate districts ($43.) than it was in the groups of public districts ($91.), counties ($97.), or divisions ($111.). There were significant differences in the mean values for this ratio between groups of separate districts and counties ($p=0.02$), separate districts and divisions ($p=0.01$), and separate districts and public districts ($p=0.04$).

The mean supplementary requisition per pupil was substantially higher for the group of the largest school systems than it was for any of the four groups of smaller school systems. In order of increasing system size the mean ratios were: $77., $82., $83., $84., and $133.

TABLE 16

MEANS OF FINANCIAL VARIABLES IN GROUPS OF SCHOOL SYSTEMS OF (1) DIFFERENT TYPES OF JURISDICTION AND (2) DIFFERENT SIZES

Type of Jurisdiction	N	V181 Supp. Req. Mill Rate	V182 Operating Budget/Pupil	V183 Supp. Req./ Pupil
1. Counties	29	12.59	941.43	97.23
2. Divisions	29	12.78	1,025.03	111.12
3. Public Districts	30	10.13	921.74	90.50
4. Separate Districts	44	12.61	733.61	42.87
Significant Difference between Pairs		NIL	1 + 4 (0.01) 2 + 4 (0.01) 3 + 4 (0.01)	1 + 4 (0.02) 2 + 4 (0.01) 3 + 4 (0.04)

Size (No. of Pupils)	N	Cty.	Div.	Pub. Dist.	Sep. Dist.	V181	V182	V183
1. 75,629-80,366	2			2		14.87	905.28	132.91
2. 21,684-32,038	2				2	15.76	818.17	83.93
3. 3,000-8,673	18	8	6	4		12.38	882.82	82.83
4. 1,036-2,970	51	21	18	7	5	12.16	930.08	82.03
5. 22-939	59		5	17	37	11.70	850.62	76.87
Total Province	132	29	29	30	44	-	-	-
Significant Difference between Pairs						NIL	NIL	NIL

SUMMARY OF THE MEANS OF SALARY AND OTHER FINANCIAL VARIABLES

Type of Administrative Jurisdiction

Statistically significant differences existed between the means of one or more pairs of groups for twelve of the sixteen salary ratios grouped by type of jurisdiction.

The group of school divisions had the highest mean salary costs per pupil for the central office administrative, in-school administrative, total administrative, in-school support, total support, total central office, total non-instructional, and total staff components. The school divisions also had the highest mean salary costs per staff member for the total administrative, total central office, total support, and total non-instructional personnel components, and the highest mean operating budget per pupil and the highest mean supplementary requisition per pupil. However, the divisions had the lowest mean instructional salary costs per staff member.

The group of separate school districts had the lowest mean salary costs per pupil for every non-instructional component. That is, the separate districts had the lowest mean salary costs per pupil for the central office administrative, in-school administrative, total administrative, central office support, in-school support, total support, total central office, and total non-instructional components. In addition, the separate districts had the lowest mean salary costs per pupil in the instructional and total staff components. As a group the separate districts had the lowest mean salary costs per staff member in the total central office, total support, total non-instructional, and total staff components. The separate districts also

had the lowest mean operating budget per pupil and the lowest mean supplementary requisition per pupil.

As a group the counties had the highest mean central office support salary costs per pupil and the lowest mean total administrative salary costs per staff member. The group of public school districts had the lowest mean instructional salary costs per pupil, the highest mean instructional salary costs per staff member, and the highest mean total salary costs per staff member. Except for the mean ratios mentioned earlier in this paragraph, the groups of counties and public districts tended to have similar mean salary costs per pupil and per staff member. Generally these means for the groups of counties and public school districts tended to be lower than those for the group of divisions and higher than those for the group of separate districts.

There were no studies in the review of the literature in Chapter 2 which could be directly compared with the present study as none of the previous studies reported salary ratios for school systems grouped by type of jurisdiction.

When considering the importance of the means reported above, the wide range of values for each variable, for each of the four types of jurisdiction (Tables 34 to 38, Appendix G) should be kept in mind.

Size of School System

When the data were separated into groups of school systems of different sizes, tendencies were observed for increasing size of school system to be associated with increasing mean salary ratios per pupil and per staff member for every calculated non-instructional component. The tendencies toward increasing size of non-instructional salary ratios

with increasing size of school system, which were more marked than the similar trends observed in Chapter 4 for the non-instructional personnel ratios, may be accounted for by the relatively higher non-instructional salary schedules in the larger school systems. Irregular increases were observed in the mean instructional salary costs per pupil and per staff member.

The results of the present study appeared to provide supportive evidence for the similar findings of Lepatski (1970) and Holdaway (1971) relative to the increases in the mean administrative, central office, support, instructional, non-instructional, and total salary ratios per pupil with increases in system size.

In the present study, with increasing size of school system, irregular changes were observed in both mean operating budget per pupil and mean supplementary requisition per pupil. However, the mean supplementary requisition per pupil was substantially higher in the group of the largest school systems than it was in any of the four groups of smaller systems.

Again, considerable variation in salary ratios occurred among systems of similar size.

CORRELATION COEFFICIENTS: SALARY RATIOS AND SELECTED ORGANIZATIONAL VARIABLES

Problem B2

In abbreviated form this problem was: What relationships exist between (1) selected salary ratios and (2) selected organizational variables, in 132 Alberta school systems?

Table 17 lists the correlation coefficients between each of the

TABLE 17

CORRELATION COEFFICIENTS: SALARY RATIOS AND SELECTED VARIABLES
(N=132)

VARIABLES	V96 Total No. Schools		V144 Total No. Pupils		V142 Total No. Staff		V99 No. Central Office Departments	
	r	p	r	p	r	p	r	p
V172 CO Admin.$/Pupil	.13	.15	.11	.21	.11	.20	.33	.01
V178 In-School Admin. $/Pupil	.24	.01	.22	.01	.22	.01	.28	.01
V159 Total Admin. $/Pupil	.27	.01	.24	.01	.24	.01	.42	.01
V176 CO Support $/Pupil	.49	.01	.44	.01	.45	.01	.59	.01
V174 In-School Support $/Pupil	.22	.01	.17	.05	.18	.04	.33	.01
V163 Total Support $/Pupil	.32	.01	.27	.01	.27	.01	.46	.01
V161 Total CO $/Pupil	.27	.01	.24	.01	.24	.01	.47	.01
V165 Total Non-Instr. $/Pupil	.35	.01	.30	.01	.30	.01	.51	.01
V167 Total Instr. $/Pupil	.10	.25	.08	.35	.09	.31	.22	.01
V168 Total Staff $/Pupil	.22	.01	.18	.04	.19	.03	.38	.01
V158 Total Admin. $/Staff Member	.26	.01	.25	.01	.25	.01	.36	.01
V160 Total CO $/Staff Member	.29	.01	.27	.01	.27	.01	.48	.01
V162 Total Support $/Staff Member	.33	.01	.28	.01	.28	.01	.45	.01
V164 Total Non-Instr. $/Staff Member	.35	.01	.32	.01	.32	.01	.49	.01
V166 Total Instr. $/Staff Member	.05	.54	.08	.37	.08	.38	.04	.67

TABLE 17 (continued)

VARIABLES	V98 Mean Teacher Qualifications		V170 Mean School Size		V146 Square Miles/ School		V145 Pupils/Square Mile	
	r	p	r	p	r	p	r	p
V172 CO Admin. $/Pupil	.01	.95	-.06	.48	.29	.01	.06	.48
V178 In-School Admin. $/Pupil	.33	.01	.32	.01	.17	.05	.18	.04
V159 Total Admin. $/Pupil	.26	.01	.21	.02	.31	.01	.18	.04
V176 CO Support $/Pupil	.30	.01	.20	.02	.24	.01	.27	.01
V174 In-School Support $/Pupil	.29	.01	.10	.25	.27	.01	.09	.33
V163 Total Support $/Pupil	.34	.01	.15	.10	.31	.01	.15	.09
V161 Total CO $/Pupil	.10	.25	.02	.86	.32	.01	.14	.11
V165 Total Non-Instr. $/Pupil	.35	.01	.20	.02	.36	.01	.19	.03
V167 Total Instr. $/Pupil	.07	.43	.04	.62	.12	.17	.15	.09
V168 Total Staff $/Pupil	.19	.03	.12	.19	.24	.01	.20	.02
V158 Total Admin. $/Staff Member	.30	.01	.29	.01	.16	.07	.20	.02
V160 Total CO $/Staff Member	.14	.12	.07	.43	.24	.01	.17	.05
V162 Total Support $/Staff Member	.36	.01	.19	.03	.25	.01	.16	.07
V164 Total Non-Instr. $/Staff Member	.40	.01	.29	.01	.25	.01	.22	.01
V166 Total Instr. $/Staff Member	.23	.01	.27	.01	-.20	.02	.25	.01

TABLE 17 (continued)

VARIABLES	V181 Supplementary Requisition Mill Rate		V182 Operating Budget/Pupil		V183 Supplementary Requisition/ Pupil	
	r	p	r	p	r	p
V172 CO Admin. $/Pupil	.11	.21	.44	.01	.47	.01
V178 In-School Admin. $/Pupil	.28	.01	.05	.55	-.07	.44
V159 Total Admin. $/Pupil	.29	.01	.32	.01	.24	.01
V176 CO Support $/Pupil	.18	.04	.24	.01	.24	.01
V174 In-School Support $/Pupil	.24	.01	.10	.24	.10	.24
V163 Total Support $/Pupil	.26	.01	.16	.08	.15	.08
V161 Total CO $/Pupil	.15	.09	.45	.01	.46	.01
V165 Total Non-Instr. $/Pupil	.32	.01	.28	.01	.23	.01
V167 Total Instr. $/Pupil	.10	.23	.46	.01	.48	.01
V168 Total Staff $/Pupil	.21	.02	.49	.01	.49	.01
V158 Total Admin. $/Staff Member	.23	.01	.08	.37	.03	.72
V160 Total CO $/Staff Member	.12	.19	.31	.01	.33	.01
V162 Total Support $/Staff Member	.24	.01	.08	.34	.10	.26
V164 Total Non-Instr. $/Staff Member	.28	.01	.10	.26	.08	.37
V166 Total Instr. $/Pupil	.03	.77	-.06	.43	-.03	.76

salary ratios and each of the organizational variables. In the discussion below, the probability level is indicated in brackets immediately following each correlation coefficient.

Salary Ratios Per Pupil

V172-Central office administrative salaries per pupil. Although ten of the eleven variables were positively correlated with the central office administrative ratio per pupil, most of the correlation coefficients were low and only four were statistically significant. The correlation coefficients between the central office administrative salary ratio and each of the following variables were positive and statistically significant: supplementary requisition per pupil .47 (.01), operating budget per pupil .44 (.01), number of central office departments .33 (.01), and square miles per school .29 (.01). The correlation coefficients between the central office administrative salary ratio and each of the following variables were not statistically significant: total number of schools .13 (.15), total number of staff .11 (.20), total number of pupils .11 (.21), supplementary requisition mill rate .11 (.21), pupils per square mile .06 (.48), mean school size (mean number of pupils per school) -.06 (.48), and mean teacher qualifications .01 (.95). Four variables were more highly correlated with the central office administrative salary ratio per pupil than were any of the three measures of system size.

V178-In-school administrative salaries per pupil. The correlation coefficients between the in-school administrative salary ratio per pupil and each of the following variables were low positive

and statistically significant: mean teacher qualifications .33 (.01), mean school size .32 (.01), number of central office departments .28 (.01), supplementary requisition mill rate .28 (.01), total number of schools .24 (.01), total number of pupils .22 (.01), total number of staff .22 (.01), pupils per square mile .18 (.04), and square miles per school .17 (.05). Operating budget per pupil .05 (.55), and supplementary requisition per pupil -.07 (.44) were not significantly related to the in-school administrative salary ratio per pupil. Four variables were more highly correlated with the in-school administrative salary ratio per pupil than were any of the three measures of system size.

V159-Total administrative salaries per pupil. All of the correlation coefficients between the administrative salary ratio per pupil and each of the eleven variables were positive and statistically significant. In descending order of magnitude the correlation coefficients were: number of central office departments .42 (.01), operating budget per pupil .32 (.01), square miles per school .31 (.00), supplementary requisition mill rate .29 (.01), total number of schools .27 (.01), mean teacher qualifications .26 (.01), supplementary requisition per pupil .24 (.01), total number of pupils .24 (.01), total number of schools .24 (.01), mean school size .21 (.02), and pupils per square mile .18 (.04). Four variables were more highly correlated with the total administrative salary ratio per pupil than were any of the three measures of school system size.

V176-Central office support salaries per pupil. All of the correlation coefficients between the central office support salary ratio

per pupil and each of the eleven variables were positive and statistically significant. In descending order of magnitude the correlation coefficients were: number of central office departments .59 (.01), total number of schools .49 (.01), total number of staff .45 (.01), total number of pupils .44 (.01), mean teacher qualifications .30 (.01), pupils per square mile .27 (.01), square miles per school .24 (.01), operating budget per pupil .24 (.01), supplementary requisition per pupil .24 (.01), mean school size .20 (.02), and supplementary requisition mill rate .18 (.04). Only one variable was more highly correlated with the central office support salary ratio than were any of the three measures of school system size.

V174-In-school support salaries per pupil. Although all of the correlation coefficients between the in-school support salary ratio and each of the eleven variables were low positive, only seven were statistically significant. In descending order of magnitude the correlation coefficients were: number of central office departments .33 (.01), mean teacher qualifications .29 (.01), square miles per school .27 (.01), supplementary requisition mill rate .24 (.01), total number of schools .22 (.01), total number of staff .18 (.04), total number of pupils .17 (.05), operating budget per pupil .10 (.24), supplementary requisition per pupil .10 (.24), mean school size .10 (.25), and pupils per square mile .09 (.33). Four variables were more highly correlated with the in-school support salary ratio than were any of the three measures of school system size.

V163-Total support salaries per pupil. Although all of the correlation coefficients between the total support salary ratio and each

of the eleven variables were positive, most were quite low and only seven were statistically significant. In descending order of magnitude the correlation coefficients were: number of central office departments .46 (.01), mean teacher qualifications .34 (.01), total number of schools .32 (.01), square miles per school .31 (.01), total number of pupils .27 (.01), total number of staff .27 (.01), supplementary requisition mill rate .26 (.01), operating budget per pupil .16 (.08), supplementary requisition per pupil .15 (.08), pupils per square mile .15 (.09), and mean school size .15 (.10). Two variables were more highly correlated with the total support salary ratio than were any of the three measures of school system size.

V161-Total central office salaries per pupil. While all of the correlation coefficients between the central office salary ratio and each of the eleven variables were positive, most were quite low and only seven were statistically significant. In descending order of magnitude the correlation coefficients were: number of central office departments .47 (.01), supplementary requisition per pupil .46 (.01), operating budget per pupil .45 (.01), square miles per school .32 (.01), total number of schools .27 (.01), total number of pupils .24 (.01), total number of staff .24 (.01), supplementary requisition mill rate .15 (.09), pupils per square mile .14 (.11), mean teacher qualifications .10 (.25), and mean school size .02 (.86). Four variables were more highly correlated with the central office salary ratio than were any of the three measures of school system size.

V165-Total non-instructional salaries per pupil. All of the correlation coefficients between the non-instructional salary ratio and

each of the eleven variables were positive and statistically significant. In descending order of magnitude the correlation coefficients were: number of central office departments .51 (.01), square miles per school .36 (.01), mean teacher qualifications .35 (.01), total number of schools .35 (.01), supplementary requisition mill rate .32 (.01), total number of pupils .30 (.01), total number of staff .30 (.01), operating budget per pupil .28 (.01), supplementary requisition per pupil .23 (.01), mean school size .20 (.02), and pupils per square mile .19 (.03). Two variables were more highly correlated with the non-instructional salary ratio than were any of the three measures of school system size.

V167-Total instructional salaries per pupil. Although all of the correlation coefficients between the instructional salary ratio and each of the eleven variables were positive, most were quite low and only three were statistically significant. In descending order of magnitude the correlation coefficients were: supplementary requisition per pupil .48 (.01), operating budget per pupil .46 (.01), number of central office departments .22 (.01), pupils per square mile .15 (.09), square miles per school .12 (.17), total number of schools .10 (.25), supplementary requisition mill rate .10 (.23), total number of staff .09 (.31), total number of pupils .08 (.35), mean teacher qualifications .07 (.43), and mean school size .04 (.62). The correlation coefficient between the instructional salary ratio and mean teacher qualifications was suprisingly low. Perhaps the mean number of years of teaching experience, differences in basic salary schedules, and/or differences in mean class size should be considered as independent variables in future studies of this type. Five variables were more highly correlated

with the instructional salary ratio than were any of the three measures of school system size.

V168-Total personnel salaries per pupil. All of the correlation coefficients between the ratio of total personnel salaries per pupil and each of the eleven variables were positive, and ten of the eleven were statistically significant. In descending order of magnitude the correlation coefficients were: operating budget per pupil .49 (.01), supplementary requisition per pupil .49 (.01), number of central office departments .38 (.01), square miles per school .24 (.01), total number of schools .22 (.01), supplementary requisition mill rate .21 (.02), pupils per square mile .20 (.02), mean teacher qualifications .19 (.03), total number of staff .19 (.03), total number of pupils .18 (.04), and mean school size .12 (.19). Four variables were more highly correlated with the total salary ratio than were any of the three measures of school system size.

Salary Ratios Per Staff Member

V158-Total administrative salaries per staff member. Although all of the correlation coefficients between the total administrative salary ratio and each of the eleven variables were positive, most were quite low and only eight were statistically significant. In descending order of magnitude the correlation coefficients were: number of central office departments .36 (.01), mean teacher qualifications .30 (.01), mean school size .29 (.01), total number of schools .26 (.01), total number of pupils .25 (.01), total number of staff .25 (.01), supplementary requisition mill rate .23 (.01), pupils per square mile

.20 (.02), square miles per school .16 (.07), operating budget per pupil .08 (.37), and supplementary requisition per pupil .03 (.72). Three variables were more highly correlated with the total administrative salary ratio than were any of the three measures of system size.

V160-Total central office salaries per staff member. Again, all of the correlation coefficients between the central office salary ratio and each of the eleven variables were positive, and eight were statistically significant. In descending order of magnitude the correlation coefficients were: number of central office departments .48 (.01), supplementary requisition per pupil .33 (.01), operating budget per pupil .31 (.01), total number of schools .29 (.01), total number of pupils .27 (.01), total number of staff .27 (.01), square miles per school .24 (.01), pupils per square mile .17 (.05), mean teacher qualifications .14 (.12), supplementary requisition mill rate .12 (.19), and mean school size .07 (.43). Three variables were more highly correlated with the central office salary ratio than were any of the three measures of system size.

V162-Total support salaries per staff member. Although all of the correlation coefficients between the support salary ratio and each of the eleven variables were positive, only eight were statistically significant. In descending order of magnitude the correlation coefficients were: number of central office departments .45 (.01), mean teacher qualifications .36 (.01), total number of schools .33 (.01), total number of pupils .28 (.01), total number of staff .28 (.01), square miles per school .25 (.01), supplementary requisition mill rate .24 (.01), mean school size .19 (.03), pupils per square

mile .16 (.07), supplementary requisition per pupil .10 (.26), and operating budget per pupil .08 (.34). Two variables were more highly correlated with the total support salary ratio than were any of the three measures of system size.

V164-Total non-instructional salaries per staff member. While all of the correlation coefficients between the non-instructional salary ratio and each of the eleven variables were positive, only nine were statistically significant. In descending order of magnitude the correlation coefficients were: number of central office departments .49 (.01), mean teacher qualifications .40 (.01), total number of schools .35 (.01), total number of pupils .32 (.01), total number of staff .32 (.01), mean school size .29 (.01), supplementary requisition per pupil .28 (.01), square miles per school .25 (.01), pupils per square mile .22 (.01), operating budget per pupil .10 (.26), and supplementary requisition per pupil .08 (.37). Two variables were more highly correlated with the total non-instructional salary ratio than were any of the three measures of system size.

V166-Total instructional salaries per staff member. The majority of the correlation coefficients between the instructional salary ratio and each of the eleven variables were low and only four were statistically significant. The correlation coefficients between the instructional salary ratio and the following variables were negative: square miles per school -.20 (.02), operating budget per pupil -.06 (.43), and supplementary requisition per pupil -.03 (.76). The correlation coefficients between the instructional salary ratio and each of the following variables were positive: mean school size .27 (.01),

pupils per square mile .25 (.01), mean teacher qualifications .23 (.01), total number of pupils .08 (.37), total number of staff .08 (.38), total number of schools .05 (.54), number of central office departments .04 (.67), and supplementary requisition mill rate .03 (.77). Four variables were more highly correlated with the total instructional salary ratio than were any of the three measures of system size.

There were no studies listed in the review of the literature in Chapter 2 whose results could be directly compared with the correlation coefficients obtained for the relationships between the salary ratios and the eleven organizational variables examined in this study.

SUMMARY OF CHAPTER 5

Significant differences existed between the means of one or more pairs of groups for twelve of the sixteen salary ratios when the school systems were grouped by type of jurisdiction. The group of school divisions had the highest mean operating budget per pupil, the highest mean supplementary requisition per pupil, and the highest salary costs per pupil for every non-instructional category except the central office support component. The group of separate districts had the lowest mean operating budget per pupil, the lowest mean supplementary requisition per pupil, and the lowest mean salary costs per pupil for the instructional and total staff components. In addition the group of separate districts had the lowest mean salary costs per pupil for every non-instructional component.

Tendencies were observed for increasing size of school system to be associated with increasing mean salary ratios per pupil and per staff member for every calculated non-instructional component.

Overall, the correlation coefficients for the individual relationships between the sixteen salary ratios and the eleven organizational variables were somewhat higher than those reported in Chapter 4 for the individual relationships between the sixteen personnel ratios and the same eleven organizational variables.

When judged by the magnitude of the correlation coefficients, for every one of the sixteen salary ratios considered, at least one of the other organizational variables--number of central office departments, mean teacher qualifications, square miles per school, operating budget per pupil, supplementary requisition per pupil, mean school size, pupils per square mile and supplementary requisition mill rate--was relatively more important in the explanation of the variation in the sizes of the salary ratios in Alberta school system than were any of the three measures of system size. That is, in addition to system size, other variables such as the ones examined in this study, should be considered in the explanation of the variation of the salary ratios in Alberta school systems.

Chapter 6

TOTAL NUMBERS AND SALARIES OF PERSONNEL IN ELEMENTARY AND SECONDARY EDUCATION IN ALBERTA

First, the organizational structure of the Alberta Department of Education is briefly outlined in this chapter. Then, the numbers and salary costs of the personnel employed in operating elementary and secondary education in the central and regional offices of the Alberta Department of Education are presented. Local school system and Department of Education personnel are added to provide estimates of the administrative, central office, support, instructional, non-instructional, and total personnel components for the elementary and secondary education system of Alberta. The numbers and salary costs of Department of Education personnel are expressed as percentages of the personnel employed in operating elementary and secondary education in Alberta.

The Organization of the Department of Education

The organization chart contained in Figure 3 illustrates the major functions performed by each of the ten branches of the Alberta Department of (Elementary and Secondary) Education. Byrne (1957:191), former Deputy Minister of Education of Alberta, has described the functions of the Department of Education as follows:

> The provincial Department of Education should perform the following functions in order to meet the criteria for effective instructional leadership:

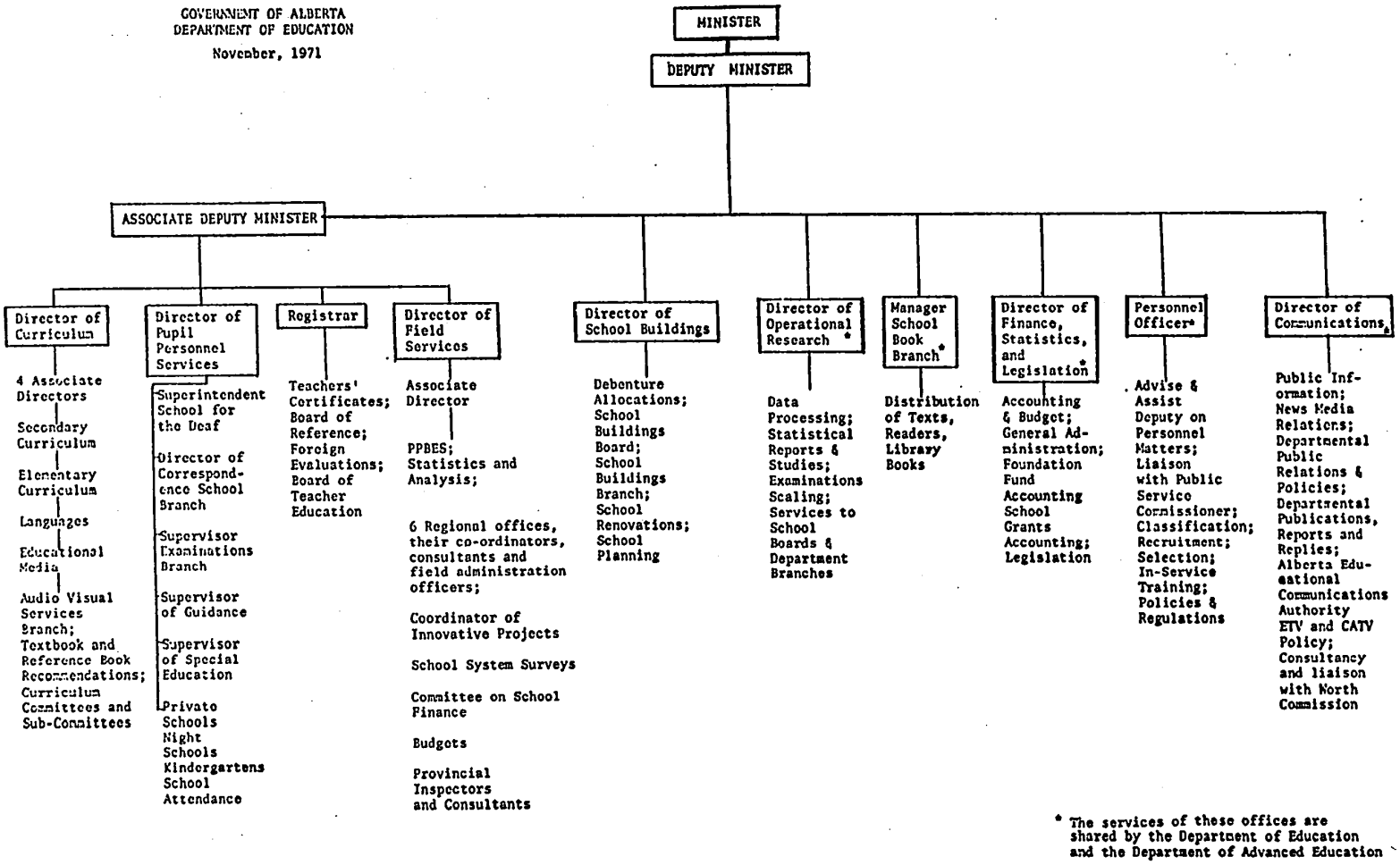

FIGURE 2: THE ORGANIZATION OF THE DEPARTMENT OF EDUCATION

(i) Plan, and maintain the foundation or minimum program.
(ii) Provide for over-all, long-range educational planning.
(iii) Stimulate and encourage local creativity in planning.
(iv) Coordinate the administration of the instructional program for schools within the province.
(v) Provide necessary services to local school units.
(vi) Establish and maintain a program of educational research.

Regional Offices of the Department of Education. A recent change in the organizational structure of education in Alberta was the division of the province into six zones or "inspectorates" and the creation of a Department of Education Regional Office for each zone. The six Regional Offices, which are located in Grande Prairie, Red Deer, Athabasca, Edmonton, Calgary, and Lethbridge, are part of the Field Services Branch of the Department of Education. Stringham (1971:2) has described the purposes of the Regional Offices as follows:

> With the change from provincially to locally employed superintendents, the government's capacity to monitor school systems in the Province as markedly reduced but both functions of the Department of Education, viz., service and regulatory, remained. The decision to fulfill these two functions through a regional office structure as is done in Ontario, Quebec, and Manitoba was a decision to emphasize the service aspects of the Department and make the regulatory function less dominant. This is consistent with those features of the School Act and School Foundation Plan which emphasize local autonomy.

Numbers and Salaries of Department of Education Personnel

Table 18 presents the full-time equivalent numbers and the September, 1971 total gross salaries of the personnel employed in operating elementary and secondary education in the central and regional offices of the Department of Education. Department of Education personnel were categorized according to the definitions outlined in Chapter 1 in exactly the same manner as was used for classifying school system personnel. Thus, throughout this chapter, all of the personnel

TABLE 18

NUMBERS AND SALARIES OF PERSONNEL EMPLOYED IN ELEMENTARY AND SECONDARY EDUCATION IN THE CENTRAL AND REGIONAL OFFICES OF THE ALBERTA DEPARTMENT OF EDUCATION

PERSONNEL CATEGORY	NUMBER OF PERSONNEL IN EACH CATEGORY IN FULL-TIME EQUIVALENTS	GROSS SEPTEMBER SALARIES FOR ALL PERSONNEL IN EACH CATEGORY
Central office administration	170.6	$217,802.
In-school administration	5.0	$ 6,024.
Total administration	175.6	$223,826.
Central office support	237.9	$ 91,717.
In-school support	122.0	$ 45,590.
Total support	359.9	$137,307.
Total instructional	160.3	$122,779.
Total central office	408.5	$309,519.
Total non-instructional	535.5	$361,133.
Total staff	695.8	$483,912.

categories (components) for both local school systems and the Department of Education correspond to the definitions outlined in Chapter 1. In order to maintain the uniformity of the definitions used in this study, plant operation and maintenance, transportation, warehouse, and cafeteria personnel were excluded from the support component in the Department of Education in exactly the same manner as personnel performing these functions were excluded from the support component in school systems. Department of Education personnel employed in the School for the Deaf and the Correspondence School Branch were considered to be "in-school" personnel, and were classified as "in-school administrative," "in-school support" or "instructional" personnel. All other personnel in the central and regional offices of the Department of Education were considered to be "central office" personnel and were classified as "central office administrative" or "central office support" personnel. Department of Education personnel employed in post-secondary education were excluded from this study.

Percentages of Personnel in Elementary and Secondary Education in Alberta

Problem A4. What percentage of the total staff involved in operating the elementary and secondary education system in Alberta is represented by Department of Education personnel?

Percentages of personnel in the provincial elementary and secondary education system. Table 19 lists the numbers and percentages of personnel in (a) the central and regional offices of the Department of Education and (b) the 139 school systems in the study. The data for 139 school systems included the actual data for 135 systems, plus

TABLE 19

NUMBERS AND PERCENTAGES OF PERSONNEL IN (1) THE CENTRAL AND REGIONAL OFFICES OF THE DEPARTMENT OF EDUCATION AND (2) 139 SCHOOL SYSTEMS IN ALBERTA

PERSONNEL CATEGORY	NUMBERS OF PERSONNEL		TOTAL NUMBER OF PERSONNEL	PERCENTAGES OF PERSONNEL	
	DEPARTMENT OF EDUCATION	139 LOCAL SCHOOL SYSTEMS		DEPARTMENT OF EDUCATION	139 LOCAL SCHOOL SYSTEMS
Central office administration	170.6	765.8	936.4	18.22	81.78
In-school administration	5.0	1,550.0	1,160.0	0.43	99.57
Total administration	175.6	1,920.8	2,096.4	8.38	91.62
Central office support	237.9	770.5	1,008.4	23.59	76.41
In-school support	122.0	1,990.8	2,112.8	5.77	94.23
Total support	359.9	2,761.3	3,121.2	11.53	88.47
Total central office	408.5	1,536.3	1,944.8	21.00	79.00
Total non-instructional	535.5	4,682.1	5,217.6	10.26	89.74
Total instructional	160.3	19,639.2	19,799.5	0.81	99.19
Total staff	695.8	24,321.3	25,017.1	2.78	97.22

estimated data for four systems. The estimates for the four systems which did not provide data for the study were obtained by averaging the data for systems of the same type of jurisdiction and of similar size in terms of the number of pupils. For example, the data for a missing public school district with 98 pupils was estimated from the average for public districts of similar size.

Department of Education personnel represented the following percentages of the total numbers of personnel in the major staffing components in the provincial elementary and secondary education system: central office administration 18.22%, in-school administration 0.43%, total administration 8.38%, central office support 23.59%, in-school support 5.77%, total support 11.53%, total central office 21.00%, total non-instructional 10.26%, total instructional 0.81%, and total staff 2.78%. Thus, Department of Education and local school system personnel respectively represented 2.78% and 97.22% of the total number of personnel involved in operating the elementary and secondary education system in Alberta.

When the staffs of the Department of Education and the 139 school systems were combined the following percentages of personnel were in the major staffing components in the provincial elementary and secondary education system: central office administration 3.74%, in-school administration 4.64%, total administration 8.38%, central office support 4.03%, in-school support 8.45%, total support 12.48%, total central office 7.77%, total non-instructional 20.86%, and total instructional 79.14%. Thus, of all the Department of Education and school system personnel included in the study and employed in operating the elementary and secondary education system of Alberta, 20.86% were

non-instructional personnel and 79.14% were instructional personnel. Over ninety-two per cent (92.23%) of these personnel were "in-school" personnel, while 7.77% were "central office" personnel.

Percentages of personnel in the Department of Education. The following information, which was calculated from the Department of Education data presented in Table 19, page 144, is provided as a matter of interest. Personnel in the major staffing components in the Department of Education represented the following percentages of the total Department of Education staff: central office administration 24.52%, in-school administration 0.72%, total administration 25.24%, central office support 34.19%, in-school support 17.53%, total support 51.72%, total central office 58.70%, total non-instructional 76.96%, and total instructional 23.04%.

Percentages of personnel in local school systems. Personnel in the major staffing components in all 139 school systems represented the following percentages of the total local school system staff in the study: central office administration 3.15%, in-school administration 4.75%, total administration 7.90%, central office support 3.17%, in-school support 8.19%, total support 11.35%, total central office 6.32%, total non-instructional 19.25%, and total instructional 80.75%. The preceding percentages were calculated from the data shown in Table 19, page 144, for all 139 local school systems. Thus, of all the local school system personnel included in this study, 80.75% were instructional staff and 19.25% were non-instructional staff. In addition, 6.32% of the school system personnel studied were "central office" personnel and 93.68% were "in-school" personnel. Stated in

another manner, more than two-thirds of local school system non-instructional personnel were in-school support or in-school administrative personnel.

The exclusion of plant operation and maintenance, transportation, warehouse, and cafeteria personnel from the support component in this study should be remembered when the data summarized above are reviewed.

Salaries of Personnel in Elementary and Secondary Education in Alberta

Problem B3. What percentage of the total salaries paid to staff involved in operating the elementary and secondary education system in Alberta is represented by the salaries of Department of Education personnel?

Percentage salary costs in the provincial elementary and secondary education system. Table 20 summarizes the total gross September, 1971 salaries and percentage salary costs for the personnel in (a) the central and regional offices of the Department of Education and (b) the 139 school systems in the study. Salaries of Department of Education personnel represented the following percentages of the total salaries paid to personnel in the various staffing components in the provincial elementary and secondary education system: central office administration 19.87%, in-school administration 0.38%, total administration 8.37%, central office support 21.11%, in-school support 5.69%, total support 11.11%, total central office 20.22%, total non-instructional 9.23%, total instructional 0.79% and total staff 2.49%. Thus, Department of Education and local school system personnel respectively received 2.49% and 97.51% of the salaries paid to the

TABLE 20

GROSS SALARIES AND PERCENTAGE SALARY COSTS OF PERSONNEL IN (1) THE CENTRAL AND REGIONAL OFFICES OF THE DEPARTMENT OF EDUCATION AND (2) 139 SCHOOL SYSTEMS IN ALBERTA

PERSONNEL CATEGORY	SALARIES OF PERSONNEL*		TOTAL SALARIES OF PERSONNEL	PERCENTAGES OF SALARIES	
	DEPARTMENT OF EDUCATION	139 LOCAL SCHOOL SYSTEMS		DEPARTMENT OF EDUCATION	139 LOCAL SCHOOL SYSTEMS
Central office administration	217,802.	878,410.	1,096,212.	19.87	80.13
In-school administration	6,024.	1,573,116.	1,579,140.	0.38	99.62
Total administration	223,826.	2,451,526.	2,675,352.	8.37	91.63
Central office support	91,717.	342,802.	434,519.	21.11	78.89
In-school support	45,590.	755,278.	800,868.	5.69	94.31
Total support	137,307.	1,098,080.	1,235,387.	11.11	88.89
Total central office	309,519.	1,221,212.	1,530,731.	20.22	79.78
Total non-instructional	361,133.	3,549,606.	3,910,739.	9.23	90.77
Total instructional	122,779.	15,403,995.	15,526,774.	0.79	99.21
Total staff	483,912.	18,953,601.	19,437,513.	2.49	97.51

*All salaries were for the month of September, 1971 only.

personnel who operate the elementary and secondary education system in Alberta.

When the salaries paid to Department of Education and local school system personnel were added, the following percentages of total salaries were paid to the personnel in the major staffing components in the elementary and secondary education system in Alberta: central office administration 5.64%, in-school administration 8.12%, total administration 13.76%, central office support 2.24%, in-school support 4.12%, total support 6.36%, total central office 7.88%, total non-instructional 20.12%, and total instructional 79.88%. Thus, of all the salaries paid to the Department of Education and school system personnel included in the study and employed in operating the elementary and secondary education system in Alberta, 20.12% were non-instructional salaries and 79.88% were instructional salaries. Over ninety-two per cent (92.12%) of these salaries were paid to "in-school" personnel, while 7.88% were paid to "central office" personnel.

Percentage salary costs in the Department of Education. The following information, which was calculated from the Department of Education data shown in Table 20, page 148, is provided as a matter of interest. Salaries paid to personnel in the major staffing components in the Department of Education represented the following percentages of the total salaries paid to Department of Education staff: central office administration 45.01%, in-school administration 1.24%, total administration 46.25%, central office support 18.95%, in-school support 9.42%, total support 28.37%, total central office 63.96%, total non-instructional 74.63%, and total instructional 25.37%.

Percentage salary costs in 139 school systems. Salaries paid to personnel in the major staffing components in the 139 school systems represented the following percentages of the total salaries paid to the school system personnel in the study: central office administration 4.63%, in-school administration 8.30%, total administration 12.93%, central office support 1.81%, in-school support 3.98%, total support 5.79%, total central office 6.44%, total non-instructional 18.73%, and total instructional 81.27%. Thus, of all the salaries paid to the school system personnel in this study, 81.27% were instructional salaries and 18.73% were non-instructional salaries. In addition, of the total salaries paid to the school system personnel, 6.44% were "central office" salaries, while 93.56% were "in-school" salaries. Two-thirds of the non-instructional salaries were paid to "in-school" personnel and one-third were paid to "central office" personnel. The exclusion of certain categories of personnel from the non-instructional component in this study should be remembered.

SUMMARY OF CHAPTER 6

Department of Education and school system personnel respectively represented 2.78% and 97.22% of the total number of personnel involved in operating the elementary and secondary education system in Alberta. The distribution of salary costs was very similar to the distribution of the number of personnel: Department of Education and school system personnel respectively received 2.49% and 97.51% of the salaries paid to the personnel who operate the provincial elementary and secondary education system.

Of all of the Department of Education and local school system

personnel included in the study and employed in operating the elementary and secondary education system in Alberta, 20.86% were non-instructional personnel and 79.14% were instructional personnel. The distribution of salary costs was agin very similar to the distribution of the number of personnel: non-instructional and instructional personnel respectively received 20.12% and 79.88% of the total salaries paid to all personnel included in the study.

Of the total number of personnel in the Department of Education and the 139 school systems in the study, 92.23% were "in-school" personnel and 7.77% were "central office" personnel. The distribution of salary costs closely approximated the distribution of personnel: "in-school" and "central office" personnel respectively received 92.12% and 7.88% of the total salaries paid to all personnel included in the study.

Chapter 7

INTERVIEWS WITH SUPERINTENDENTS AND "ALTERNATES"

The frequency counts of the answers given by school system officials to the staffing adequacy opinionnaire concerning central office and in-school staff shortages, priorities for instructional and non-instructional staff, and suggested changes in personnel utilization, are presented in this chapter.

The superintendents and/or secretary-treasurers and/or principals of 43 Alberta school systems--8 counties, 13 divisions, 12 public school districts, and 10 separate school districts--were interviewed to obtain their opinions on the adequacy of the numbers of staff in their school systems. The 43 school systems were deliberately selected to be representative of Alberta school systems of different size, geographic location and type of jurisdiction. The instrument used for the data collection, the Staffing Adequacy Interview Schedule, and a list of the school systems in which interviews were conducted are in Appendix E.

Of the 43 interviews completed, in the 36 school systems which employed a superintendent, the superintendent was interviewed; in the 7 school systems which did not employ a superintendent, the secretary-treasurer and a school principal were interviewed. The 7 school systems selected for interview which did not employ a superintendent were all very small public and separate school districts. For convenience, the superintendents and other school system officials interviewed will be

referred to as "respondents."

PRESENTATION AND INTERPRETATION OF THE DATA

Problem C1

What are the views of superintendents and other central office officials in school systems concerning: (a) the adequacy of the numbers of personnel, (b) priorities for instructional and non-instructional staff, and (c) suggested changes in personnel utilization?

Central office staffing adequacy. Respondents were asked to: (a) identify from a list, functional areas in which there were current staff shortages in their central office services; (b) estimate the number of personnel in full-time equivalents (FTE) needed to operate each service at an adequate level; and (c) state their opinions of the reasons for the staff shortages in each functional area. The results are summarized in Table 21.

In the 43 school systems studied the respondents mentioned a total of 94 staff shortages requiring a minimum number of 112 additional personnel to operate central office services at an adequate level. The staff shortages should be considered as low estimates only for the following reasons: (a) some respondents were unable to estimate the actual numbers of personnel needed to eliminate shortages in particular functional areas in their school systems; and (b) respondents deliberately kept their estimates of staff needs low because of local school board policy to operate within the financial constraints set by provincial government financial policy.

In terms of frequency of mention, followed by the actual numbers

TABLE 21

OPINIONS OF SUPERINTENDENTS CONCERNING STAFF SHORTAGES FOR CENTRAL OFFICE FUNCTIONS

FUNCTION	Nos. of Systems Reporting Shortage					Additional Nos. of Staff (FTE) Considered Essential					Reasons for Shortage[a]				
	COUNTIES	DIVISIONS	PUBLIC DISTRICTS	SEPARATE DIST'S	CUMULATIVE f	COUNTIES	DIVISIONS	PUBLIC DISTRICTS	SEPARATE DIST'S	TOTAL N SHORT	GOV'T FINANCIAL POLICY	SCHOOL BOARD POLICY	LACK OF QUALIFIED PERSONNEL	EVOLVING NEED	UNKNOWN-OTHER
N	8	13	12	10	43	8	13	12	10						
GENERAL ADMINISTRATION[b]	1	5	3	2	11	2	4	3	2	11	2	3	0	4	2
BUSINESS-FINANCIAL ADMIN.	1	0	4	2	7	1	0	8	2	11	1	1	0	3	2
CURRICULUM & INSTRUCTION															
-Library/A-V Media	2	5	1	0	8	2	5	2	0	9	4	3	0	2	0
-Psychological/Counselling	3	4	1	2	10	3	4	3	5	15	5	2	0	1	2
-Remedial Reading	1	2	0	0	3	1	2	0	0	3	3	1	0	1	0
-Special Education	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-Adult Education/Extension	0	1	0	1	2	0	1	0	1	2	1	0	1	0	0
-Community School	0	0	2	0	2	0	0	1	0	1	0	0	0	1	1
-Curriculum Development, Evaluation, Supervision & Consultation	1	8	5	4	18	1	11	7	5	24	12	4	1	0	3
PERSONNEL SERVICES															
-Recruitment, Placement, & Evaluation	0	2	3	0	5	0	2	5	0	7	2	1	0	0	3
-Staff Development	0	0	1	1	2	0	0	1	1	2	0	0	0	0	2
BUILDING, MAINTENANCE & OPERATIONS	0	2	1	0	3	0	2	1	0	3	2	2	0	0	0
PURCHASING & STORES	0	1	0	0	1	0	1	0	0	1	1	1	0	0	0
TRANSPORTATION	1	1	0	1	3	1	1	0	1	3	1	0	0	1	1
RESEARCH & DEVELOPMENT	0	0	2	1	3	0	0	1	1	2	1	1	0	1	0
PUBLIC RELATIONS	0	0	3	0	3	0	0	2	0	2	0	0	0	3	0
COMPUTER/INFORMATION SYSTEMS	0	2	3	0	5	0	2	3	0	5	0	0	0	3	2
SECRETARIAL & CLERICAL	1	2	3	2	8	1	3	2	5	11	2	0	0	3	3
TOTALS					94					112	37	19	2	23	21

[a] Two or more reasons were sometimes given for a particular staff shortage.

[b] Staff performing "general administration" commonly are also involved in other functions.

of the personnel shortages in brackets, the respondents most often reported staff shortages in the following functional areas: curriculum development, evaluation, supervision, and consultation-18 (24), general administration-11 (11), psychological and counselling services-10 (15), secretarial and clerical services-8 (11), library/audio-visual media services-8 (9), business and financial administration-8 (11), personnel services-5 (7), and computer operations/information systems/program budgeting-5 (5).

In descending order of frequency of mention, the reasons given by the respondents for the staff shortages were: government financial policy-37, evolving local school system needs-23, unknown or other-21, local school board policy-19, and lack of qualified personnel-2. Respondents often gave more than one reason for a particular staff shortage. The most frequently occurring combination of reasons was government financial policy and local school board policy, where boards were attempting to operate within the constraints of government financial policy. The second most frequently occurring combination of reasons for staff shortages was government financial policy and evolving need for additional or new services in local school systems. The majority of the 21 responses in the "unknown-other" category were the replies of respondents who were unable or unwilling to state reasons for staff shortages. Other reasons included in this category were: size of system too small to offer adequate service, awkward geographic shape of system; lack of public acceptance for the provision of particular services; and in one case a superintendent wanted to add services but was opposed by his school principals.

In-school staffing adequacy. Respondents were asked to: (a) identify from a list, functional areas in which there were current staff shortages in in-school services in their school systems; (b) estimate the number of personnel in full-time equivalents needed to operate each service at an adequate level; and (c) state their opinions of the reasons for the staff shortages in each functional area. The results are summarized in Table 22.

In the 43 school systems sampled, the respondents mentioned a total of 100 staff shortages requiring a minimum number of 348 additional personnel to operate in-school services at an adequate level. The staff shortages in terms of numbers of personnel should be considered as low estimates for the same reasons mentioned under central office staffing adequacy.

The greatest in-school personnel needs appeared to be for: (a) psychological, guidance and remedial specialists, (b) teacher aides, (c) library/audio-visual media specialists, (d) secretaries and clerks, and (e) general administrators.

In terms of frequency of mention, followed by the actual numbers of the personnel shortages in brackets, the respondents most often reported staff shortages in the following functional areas: diagnostic, remedial, psychological and counselling services-23 (68), teacher aides-15 (117), library/audio-visual media services-13 (48), secretarial and clerical services-10 (33), curriculum development, evaluation and supervision-9 (24), special education-8 (17), general administration-6 (8), and vocational education/industrial arts-6 (12). The respondents replies appeared to indicate that in-school staff shortages currently occurred largely in the areas of specialist and support personnel, with

TABLE 22

OPINIONS OF SUPERINTENDENTS CONCERNING STAFF SHORTAGES FOR IN-SCHOOL FUNCTIONS

FUNCTION	Nos. of Systems Reporting a Shortage					Additional Nos. of Staff (FTE) Considered Essential					Reasons for Shortage [a]				
	COUNTIES	DIVISIONS	PUBLIC DIST'S	SEPARATE DIST'S	CUMULATIVE f	COUNTIES	DIVISIONS	PUBLIC DIST'S	SEPARATE DIST'S	TOTAL N SHORT	GOV'T FINANCIAL POLICY	SCHOOL BOARD POLICY	LACK OF QUALIFIED PERSONNEL	EVOLVING NEED	UNKNOWN-OTHER
N	8	13	12	10	43	8	13	12	10						
GENERAL ADMINISTRATION [b]	1	0	1	4	6	1	0	3	4	8	1	0	0	3	2
CURRICULUM & INSTRUCTION															
-Physical Sciences	0	0	1	0	1	0	0	1	0	1	1	0	0	0	0
-Social Sciences	0	1	0	1	2	0	1	0	1	2	1	2	0	0	0
-English	1	0	0	0	1	1	0	0	0	1	0	0	0	0	1
-Other Languages	1	0	0	0	1	3	0	0	0	3	0	0	0	1	0
-Fine Arts	2	1	0	0	3	6	3	0	0	9	1	1	0	2	0
-Business Education	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-Vocational Ed./Ind. Arts	0	3	2	1	6	0	7	4	1	12	1	0	1	0	4
-Catechistics	0	0	0	1	1	0	0	0	3	3	0	0	0	1	0
-JHS Electives	0	0	1	0	1	0	0	2	0	2	0	0	1	0	0
-Library/A-V Media	2	4	4	3	13	8	18	19	3	48	8	4	1	0	1
-Psychological/Remedial/ Counselling	7	6	8	2	23	21	22	22	3	68	16	5	0	2	2
-Special Education	1	2	4	1	8	1	4	4	8	17	3	0	1	0	4
-Teacher Aides	2	7	5	1	15	18	22	76	1	117	7	3	1	3	3
-Curriculum Development, Evaluation & Supervision	1	3	3	2	9	4	10	8	2	24	8	3	0	2	1
COMMUNITY SCHOOL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SECRETARIAL & CLERICAL	3	3	3	1	10	5	7	20	1	33	5	4	0	2	0
TOTALS					100					348	52	22	5	16	18

[a] Two or more reasons were sometimes given for a particular staff shortage.

[b] Staff performing "general administration" commonly are also involved in other functions.

relatively few staff shortages in the area of general classroom instruction (teachers) in either particular subject areas or grade levels. This conclusion appeared to be supported by an examination of the reasons for the staff shortages in the most frequently mentioned area of general classroom instruction, vocational and industrial arts education, which required an additional 12 persons. The major reason given by the respondents for the shortages of vocational and industrial arts personnel was too few pupils to offer an adequate program in smaller rural school systems.

In descending order of frequency of mention, the reasons given by the respondents for the staff shortages were: government financial policy-52, school board policy-22, unknown or other-18, evolving local school system needs-16, and lack of qualified personnel-5. Thus, government financial policy was stated as a reason for in-school staff shortages more than twice as frequently as any other reason. Respondents often gave more than one reason for a particular staff shortage. The most frequently mentioned combinations of reasons for staff shortages in in-school services were the same as those mentioned for central office services. The majority of the responses in the "unknown-other" category were the replies of respondents who were unable or unwilling to state reasons for their staff shortages. Other reasons in this category were: too few pupils in a school system to offer service in an area such as special or vocational education; and lack of public acceptance for the provision of such services as special education or department heads in elementary schools.

Respondents from 39 of the 43 school systems studied reported that their systems utilized the diagnostic, psychological, and

counselling services provided by the Alberta Guidance Clinic and its regional offices. While the majority of the respondents praised the quality of the services offered, a number of respondents considered the quantity of service insufficient.

Instructional staff priorities. Respondents were asked to state three instructional staff priorities for spending a hypothetical ten per cent increase in the staffing budgets of their school systems. The priorities mentioned by the respondents in 43 school systems are summarized in Table 23.

Instructional staff priorities mentioned more than five times were: in-school psychological, remedial and guidance services-33; in-school curriculum development and supervision-17; in-school library/audio-visual media services-10; increased teacher preparation time-8; and special education-7. Instructional staff priorities mentioned fewer than few times included: fine arts-4; elementary teachers-4; vocational education-2; foreign languages-2; and one each for continuing education, junior high school (JHS) electives, teacher interns, physical education, and speech therapy.

The replies of the respondents suggested that the three highest current instructional staff priorities were for personnel to provide (a) psychological, remedial and counselling services, (b) in-school curriculum development and supervision services, and (c) in-school library/audio-visual media services.

Non-instructional staff priorities. Respondents were asked to state three non-instructional staff priorities for spending a hypothetical ten per cent increase in the staffing budgets of their

TABLE 23

PRIORITIES OF SUPERINTENDENTS FOR ADDING INSTRUCTIONAL STAFF

PRIORITY	Numbers of Systems Reporting a Priority				
	COUNTIES	DIVISIONS	PUBLIC DISTRICTS	SEPARATE DISTRICTS	CUMULATIVE f
N	8	13	12	10	
In-School Psychological/Remedial/Guidance	7	10	11	5	33
In-School Curriculum Development & Supervision	5	5	3	4	17
In-School Library/A-V Media	3	3	2	2	10
Increased Teacher Preparation Time	1	4	0	3	8
Special Education	2	2	2	1	7
Fine Arts	3	1	0	0	4
Elementary Teachers	0	0	4	0	4
Vocational Education	0	2	0	0	2
Foreign Languages	0	1	1	0	2
Catechetical	0	0	0	1	1
Continuing Education	0	0	1	0	1
Junior High School Electives	0	0	1	0	1
Teacher Interns	0	0	1	0	1
Physical Education	0	0	1	0	1
Speech Therapy	1	0	0	0	1

school systems. The priorities mentioned by the respondents in the 43 school systems are summarized in Table 24.

Non-instructional staff priorities mentioned more than five times included: teacher aides-19; in-school clerical-17; buildings and maintenance-17; central office general administration-10; and central office clerical-6. Non-instructional staff priorities mentioned one to five times included: central office library/audio-visual media director-5; central office curriculum development and supervision services-4; in-school business managers-4; central office purchasing and stores-3; increased school principal administrative time-3; central office business and financial administration-3; innovative project supervisor-2; transportation supervisor-2; public relations-2; and one each for information systems, personnel evaluation, staff development, and school problems.

In the opinions of the respondents in the 43 school systems, the three highest non-instructional staff priorities were (a) teacher aides, (b) in-school clerical personnel, and (c) buildings and maintenance personnel.

The posing of the questions relative to instructional and non-instructional staff priorities in a hypothetical situation in which staffing budgets were increased by ten per cent tended to move the respondents' replies slightly away from a "staffing adequacy" definition of staff needs toward a more "ideal" definition of staff needs. In effect, the respondents were asked, "If more money were available for staffing, how would you spend the increase in funds?" While the staffing priorities stated by the respondents closely paralleled the central office and in-school staff shortages perceived by them, a number

TABLE 24

PRIORITIES OF SUPERINTENDENTS FOR ADDING NON-INSTRUCTIONAL STAFF

PRIORITY	Number of Systems Reporting a Priority				
	COUNTIES	DIVISIONS	PUBLIC DISTRICTS	SEPARATE DISTRICTS	CUMULATIVE f
N	8	13	12	10	
Teacher Aides	5	6	5	3	19
In-School Clerical	6	3	6	2	17
Buildings & Maintenance	2	8	5	2	17
Central Office General Administration	2	3	1	4	10
Central Office Clerical	1	2	1	2	6
Central Office Library/A-V Media Director	0	3	0	2	5
Central Office Curriculum Development & Supervision	0	1	2	1	4
In-School Business Managers	0	1	2	1	4
Purchasing & Stores	0	1	2	0	3
Increase School Principal Administrative Time	1	1	0	1	3
Central Office Financial & Business Administration	0	0	3	0	3
Innovative Project Supervisor	1	1	0	0	2
Transportation Supervisor	0	2	0	0	2
Public Relations	0	0	2	0	2
Information Systems	0	0	1	0	1
Personnel Evaluation	0	0	1	0	1
Staff Development	0	0	1	0	1
School Problems	0	0	1	0	1

of priorities emerged which had not previously been mentioned as staff shortages. Examples of these included: increased preparation time for teachers; increased numbers of elementary teachers; and provision of teacher interns. In addition, personnel for buildings and maintenance received a much higher priority than could be expected from the frequency of mention of staff shortages in this area. Perhaps the respondents' perceptions of staff shortages were influenced by local school board attempts to operate within current financial restraints, while the hypothetical provision of additional funds may have tended to modify such constraints relative to staffing priorities.

Suggested changes in personnel utilization. Respondents were asked to state (a) the changes in personnel utilization they considered most desirable, and (b) the changes in personnel utilization which would contribute most to an improvement in student learning. The results are summarized in Table 25.

By far the most frequently suggested change in personnel utilization, the provision of more paid paraprofessional assistance for teachers, was mentioned by 22 respondents.

Changes suggested more than five times included: increase the numbers of in-school curriculum specialists-7; "trade-off" assistant principals for department heads and/or team leaders-7; and introduce differentiated staffing-6.

Changes suggested more than once but fewer than five times included: provide specialist services on a regional basis-4; share a superintendent among smaller systems-3; "trade-off" assistant principals for business managers-3; emphasize continual functional

TABLE 25

CHANGES IN PERSONNEL UTILIZATION SUGGESTED BY SUPERINTENDENTS
(N=43)

SUGGESTED CHANGE*	NUMBER OF TIMES MENTIONED
Provide more paid paraprofessional assistance for teachers	22
Trade-off assistant principals for department heads/team leaders	7
Increase numbers of in-school curriculum associates, coordinators, and consultants	7
Introduce differentiated staffing	6
Provide special education, remedial reading, psychological specialists on a regional basis	4
Share a superintendent among smaller systems	3
Trade-off assistant principals for school business managers	3
Emphasize continual functional reexamination of system staff staff needs and redeploy staff as needs change	3
Trade-off teacher-librarians for library technicians	2
Trade-off assistant principals for paraprofessionals	2
Trade-off assistant principals for specialists in fine arts and/or remedial reading	2
Introduce or increase the use of team teaching	2
Provide vocational education on a regional basis	1
Permit the use of non-teacher certificated personnel for instruction in music, vocational education	1
Utilize psychological/guidance/remedial specialists in teams	1
Increase principals administrative time to full-time	1
Increase the use of outside consultants as problems are identified rather than add more personnel to staff	1
Make principals responsible for program development and assistant principals responsible for business management	1
Increase the number of trained special education teachers	1
Increase the use of parents as volunteer teacher aides	1

*The listed changes are not mutually exclusive.

reexamination of system staff needs and redeploy staff as needs change-3; "trade-off" teacher-librarians for library technicians-2; "trade-off" assistant principals for paraprofessionals-2; "trade-off" assistant principals for fine arts and/or reading specialists-2; and introduce or increase the use of team teaching-2.

Changes suggested by one respondent only included: provide vocational education on a regional basis; permit the use of non-certificated personnel for instruction in music and vocational education; utilize specialist personnel in teams; increase school principal administration time; increase the number of trained special education teachers; increase the use of outside consultants; increase the use of volunteer teacher aides; and make principals responsible for program development and assistant principals responsible for business management.

While a number of the respondents' suggestions appeared to reflect a commitment to the linear expansion approach of simply adding more personnel to improve personnel utilization, a large number of the suggested changes reflect a concern for functional reexamination of system staff needs with subsequent redeployment or replacement of staff as system needs change.

In fourteen instances the respondents suggested that assistant principals be replaced by curriculum specialists, department heads, team leaders, business managers, paraprofessionals and/or subject specialists. This appeared to suggest that the respondents interviewed considered the current role of the assistant principal to be of doubtful utility and/or requiring redefinition.

Relocation of central office and in-school services. Respondents were asked the following two questions: (1) What personnel/services now based in central office could be more effectively/efficiently performed if they were based in schools?; and (2) What personnel/services now based in schools could be more effectively/efficiently performed if they were based in central office?

The respondents appeared to be largely satisfied with the current distribution of services between central offices and schools. Only two changes were mentioned by more than one respondent. Three respondents mentioned that the services of psychologists, and speech and remedial specialists could be more effectively and efficiently performed if such personnel were based in schools instead of in central office, and eight respondents indicated that audio-visual media services could be improved if they were coordinated in school system central offices.

Size of school unit. Respondents were asked whether the size of their school system was (1) too small, (2) about the right size, or (3) too large, (a) geographically, and (b) in terms of the number of pupils, to offer adequate educational services. The results are summarized in Table 26.

Twelve respondents reported that their systems were too small geographically, while 18 respondents indicated that their systems were too small in terms of the number of pupils. Thirty-one respondents considered their systems to be about the right size geographically, while 25 respondents reported their systems to be about the right size in terms of the number of pupils. No respondent reported that his system was too large either geographically or in terms of the number of pupils.

TABLE 26

OPINIONS OF SUPERINTENDENTS CONCERNING THE SIZE OF THEIR SCHOOL SYSTEMS (N=43)

SIZE ASPECT	TOO SMALL					ABOUT RIGHT SIZE					TOO LARGE				
	COUNTIES	DIVISIONS	PUBLIC DISTRICTS	SEPARATE DISTRICTS	TOTAL	COUNTIES	DIVISIONS	PUBLIC DISTRICTS	SEPARATE DISTRICTS	TOTAL	COUNTIES	DIVISIONS	PUBLIC DISTRICTS	SEPARATE DISTRICTS	TOTAL
N	8	13	12	10	43										
Geographical Area	3	2	2	5	12	5	11	10	5	31	0	0	0	0	0
Number of Pupils	5	5	3	5	18	3	8	9	5	25	0	0	0	0	0

SUMMARY OF CHAPTER 7

Respondents from 43 Alberta school systems were interviewed to obtain their opinions on the adequacy of the numbers of staff in their school systems. In total, the respondents reported that minimum numbers of 122 additional central office personnel and 348 additional in-school personnel were required to operate local school system educational services at an adequate level. The three most frequently mentioned central office staff shortages were for additional personnel to provide (a) curriculum services, (b) general administrative services, and (c) psychological and counselling services. The three most frequently mentioned in-school staff shortages were for additional personnel to provide (a) diagnostic, remedial, counselling and psychological services, (b) teacher aide services, and (c) library/audio-visual media services. Government financial policy was most frequently mentioned as the reason for both central office and in-school staff shortages.

The three highest instructional staff priorities reported by the respondents were for additional personnel to provide (a) in-school psychological, remedial and counselling services, (b) in-school curriculum development and supervision services, and (c) in-school library/audio-visual media services. The three highest non-instructional staff priorities were (a) teacher aides, (b) in-school clerical personnel, and (c) buildings and maintenance personnel.

The two changes in personnel utilization most frequently mentioned by the respondents were the provision of increased para-professional assistance for teachers, and replacement or redefinition

Chapter 8

CENTRAL OFFICE ORGANIZATIONAL STRUCTURES

Representative examples of the organizational structures of the central offices of Alberta school systems of different sizes are presented in this chapter. Following the approach used by Hickcox and Ducharme (1971:18) the organizational structures are categorized as "pure area," "tiered," "combination," and "functional" types.

Representative examples of the administrative or organizational structures of the central offices of 132 school systems in Alberta were examined and described as evidenced in formal organizational charts, interviews with chief superintendents, and as revealed in the study data. This approach was similar to Phase I of a study of organizational structures of American urban school districts conducted by Andes (1971:64). Andes' survey (1971:65) revealed that two basic approaches to school system organization are used--the administrative centralized and the administrative decentralized models. The principal difference between the two basic models was that the former maintained a large central office while the latter attempted to reduce the size of central office through reallocation of functions to regional centres. A very similar approach was used by the American Association of School Administrators (1971:16) in their study of the organizational structures of the central offices of 186 American school systems. The American Association of School Administrators' survey (1971:18), which examined central office organizational structure in terms of four categories--

of the role of the assistant principal.

The respondents appeared to be largely satisfied with the current distribution of services between central offices and schools.

A majority of the respondents appeared to be satisfied with the present size of their school systems. However, 12 respondents reported that their systems were too small geographically, while 18 respondents indicated that their systems were too small,in terms of the number of pupils, to offer adequate educational services. No respondent considered his school system too large either geographically or in terms of the number of pupils.

"centralized structure," "central-intermediate-local structure," "modified (decentralized) structure," and "other" types of structure--reported that more than 86 per cent of the respondents categorized their pattern of organization as "centralized structure."

An investigation of the organizational structure of 47 Ontario school systems conducted by Hickcox and Ducharme (1971:17-24), was very similar to the two studies reported above. The four patterns of organizational structure identified by Hickcox and Ducharme (1971:18)--"pure area type," "tiered structure type," "combination type" and "functional type"--are reproduced in Figure 4 and Table 27. In essence, the "pure area type" consisted of a superintendent, secretary-treasurer, and area superintendents. The "tiered structure type" consisted of a superintendent at the top, a second echelon of functional superintendents and a secretary-treasurer, and a third echelon of area superintendents. The "combination type" was characterized by the combination of functional responsibilities and area responsibilities in single positions. The "functional type" of organization differed from the other three types in that it did not have any area superintendents.

Further, after noting that small organizations have relatively the same functional requirements as larger organizations, Greenfield et al. (1969:52) suggested that, "the specific grouping of functions under executive officers will of necessity vary with the size and complexity of the organization."

The purposes of the data analysis in this chapter were: (1) to describe representative examples of the organizational structures of the central offices of Alberta school systems of different sizes; (2) to identify patterns of alternative organizational arrangements; (3) to

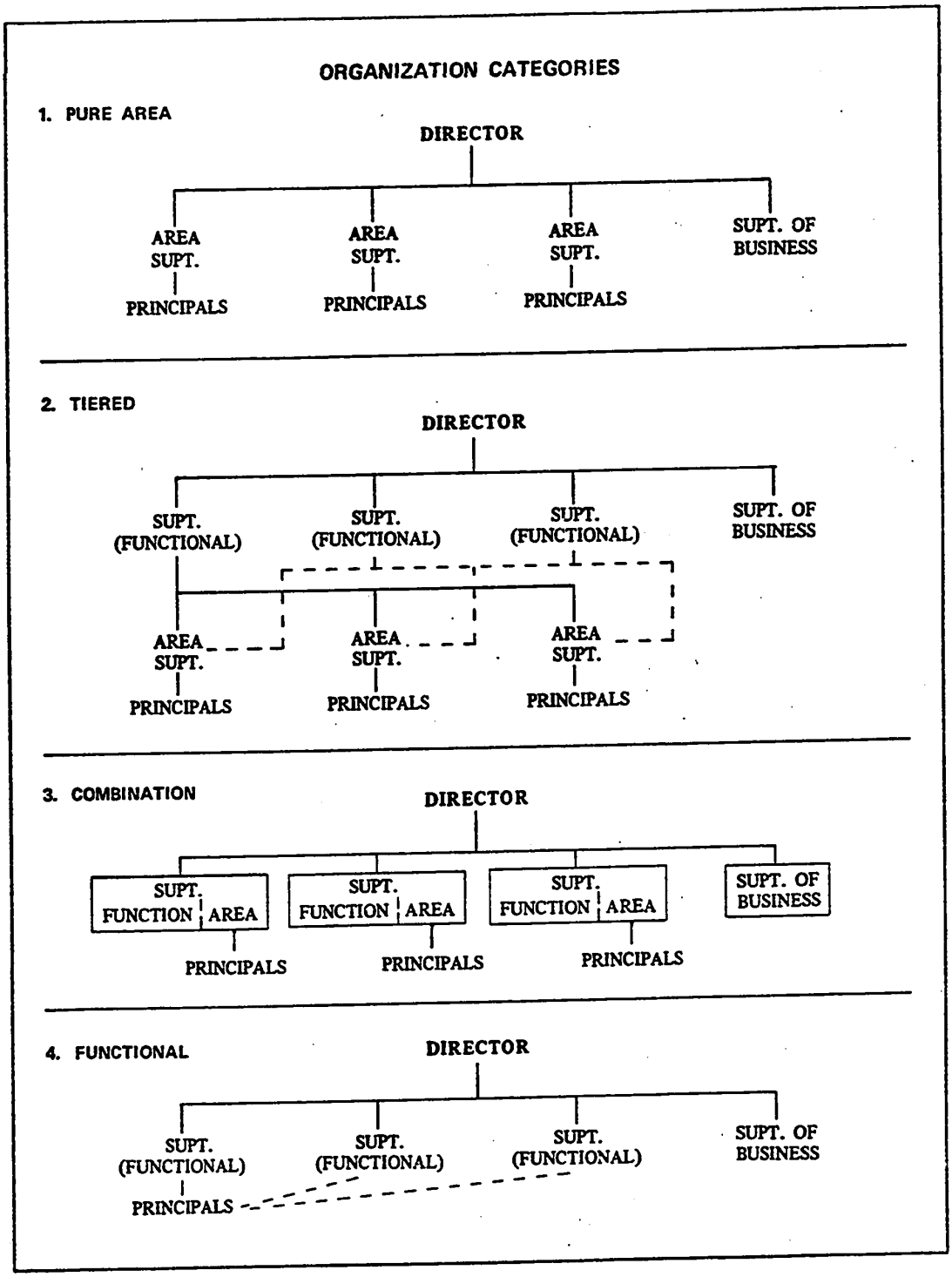

FIGURE 4: ORGANIZATIONAL CATEGORIES

Reproduced from Hickcox and Ducharme (1971:19).

TABLE 27

ORGANIZATIONAL CATEGORIES OF ONTARIO SCHOOL SYSTEMS

Organizational Categories of School Boards According to Pupil Population of Districts (n = 47)

Pupil Population	CATEGORY					
	Pure Area	Tiered	Combination	Functional	Not Known	Total
40,000 and over n = 9	1	8	0	0	0	9
20,000 to 39,999 n = 10	1	6	1	2	0	10
13,000 to 19,999 n = 10	0	7	1	2	0	10
6,000 to 12,999 n = 9	2	1	2	4	0	9
Less than 6,000 n = 9	0	0	0	4	5	9
Total	4	22	4	12	5	47

Reproduced from Hickcox and Ducharme (1971:21).

identify the distribution of the organizational structures of the central offices of Alberta school systems among Hickcox and Ducharme's (1971) four categories of organizational structure.

Size group 1 (75,629-80,366 pupils). Figure 5 is a representative example of the two large urban public school districts in Size Group 1. The system illustrated contained three functional divisions--curricular services, business administration services, and educational administration services. Essentially, this system contained the following eight functionally organized departments: the superintendent's cabinet, curriculum development, staff development, information services, controller's department, school facilities, administrative services, and research, development and information. Examples of the functions performed by each department are shown in Figure 5. The superintendent's cabinet consisted of the superintendent, deputy superintendent, three associate superintendents, five assistant superintendents, controller, and deputy secretary-treasurer. At first glance this system appeared to contain three hierarchical levels, the superintendent, division heads, and department heads. In terms of actual operation the system had two hierarchical levels, the superintendent's cabinet and the department heads. The superintendency team consisted of the superintendent, deputy superintendent, and three division heads.

As this system has no area superintendents, in terms of the Hickcox and Ducharme (1971) classification, it would be categorized as the "functional type" of organization. The other large urban system in Size Group 1 was categorized as the "tiered structure type" as it

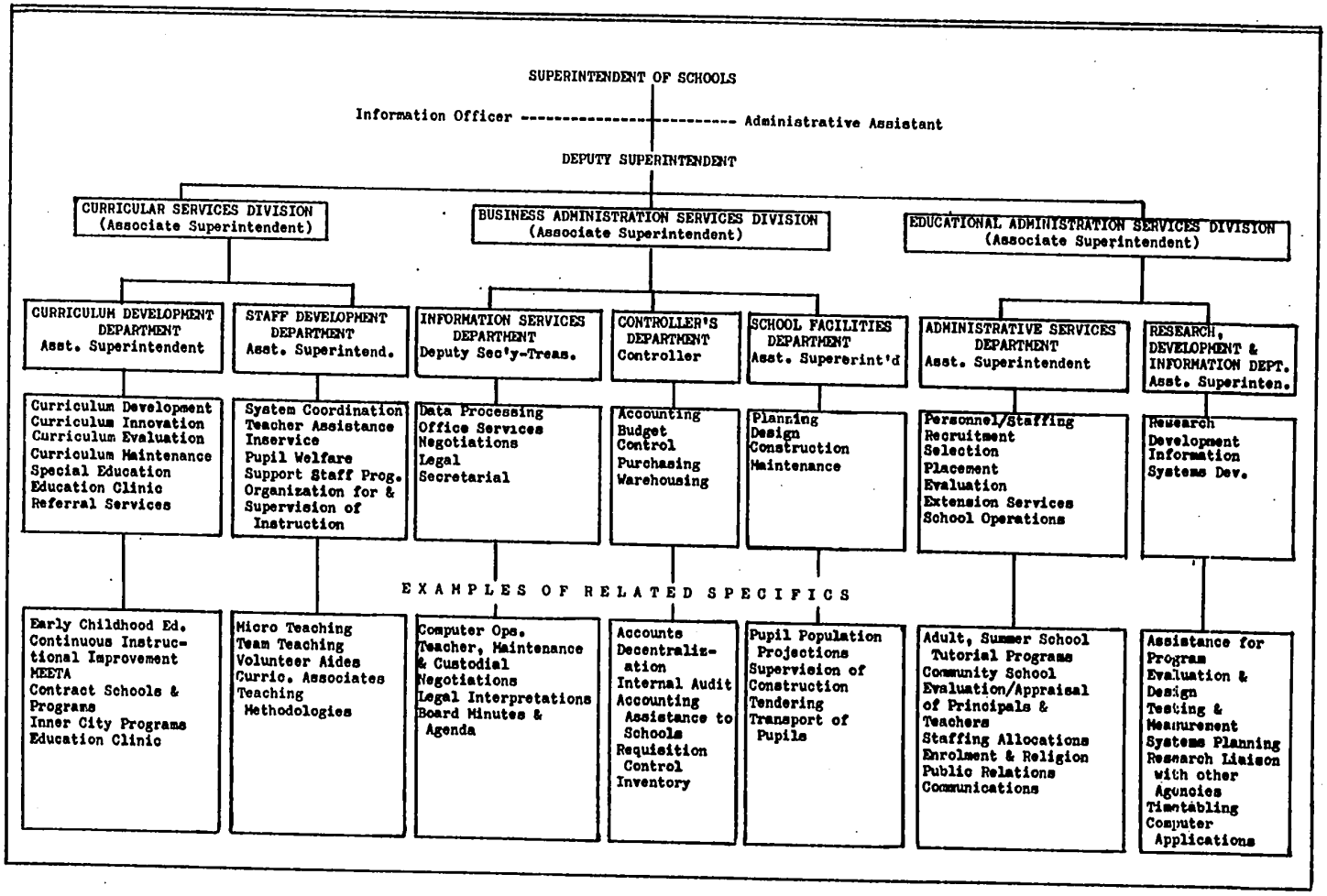

FIGURE 5: A REPRESENTATIVE EXAMPLE OF CENTRAL OFFICE ORGANIZATIONAL STRUCTURE IN SCHOOL SYSTEMS WITH 75,629-80,366 PUPILS

contained a superintendent, a second echelon of functional superintendents and secretary-treasurer, and a third echelon of area superintendents.

Size group 2 (21,684-32,038 pupils). Figure 6 is a representative example of the two large urban separate school districts in Size Group 2. The central office of this system consisted of five functional departments organized in two hierarchical levels. Below the superintendent were the departments of instruction, business administration, properties and maintenance, and personnel. Examples of some of the functions performed by the departments are shown in Figure 6. This system was classified as the "functional type" of organization as it did not have any area superintendents.

Size group 3 (3,000-8,673 pupils). Figure 7 illustrates two representative examples of the organizational patterns of the 18 school systems (8 counties, 6 divisions, and 4 public districts) in Size Group 3. The systems in Size Group 3 had substantially smaller numbers of central office personnel than did the systems in Size Groups 1 and 2. All 18 of the systems in Size Group 3 had a superintendent and a secretary-treasurer, and 17 of the 18 systems had an assistant superintendent of schools. Fourteen of the 18 systems had a director of maintenance, and six of the 18 had a director of pupil personnel services. Two systems had an instructional materials centre director, and only one had a director of personnel. The major variation in the organizational structure in the 18 systems was that while the secretary-treasurer was responsible to the superintendent in the majority of the systems (the single system), in two systems the secretary-treasurer

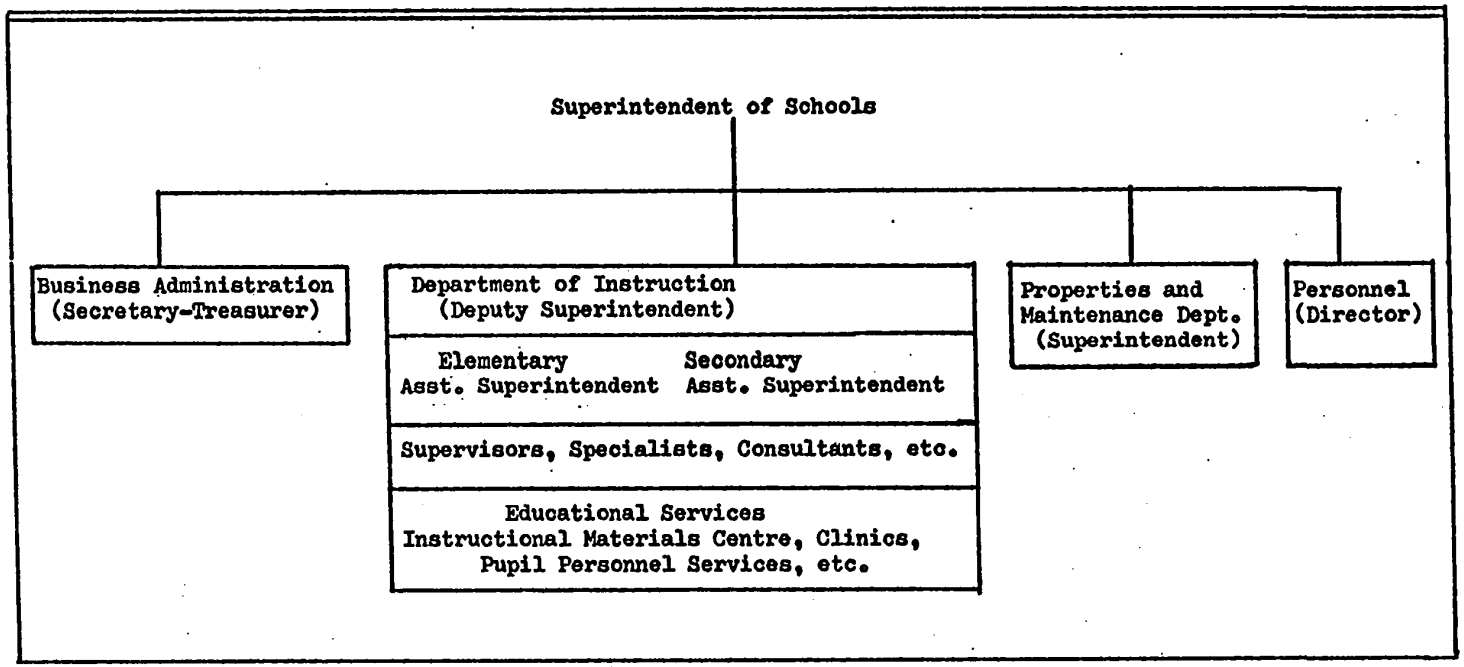

FIGURE 6: A REPRESENTATIVE EXAMPLE OF CENTRAL OFFICE ORGANIZATIONAL STRUCTURE IN SCHOOL SYSTEMS WITH 21,684-32,038 PUPILS

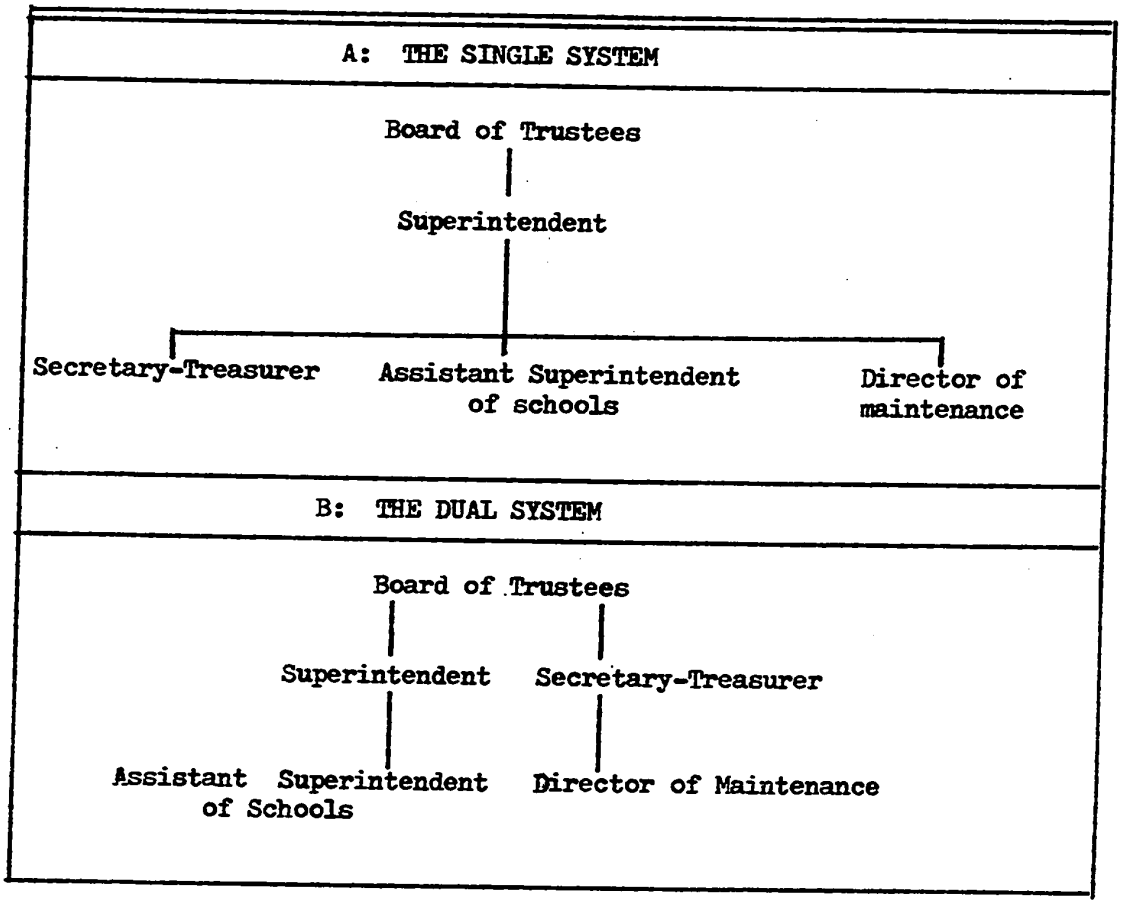

FIGURE 7: REPRESENTATIVE EXAMPLES OF ORGANIZATIONAL STRUCTURE IN SCHOOL SYSTEMS WITH 3,000-8,673 PUPILS

reported directly to the school board (the dual system). In effect, the functions in all 18 systems were grouped into four departments: instruction, educational administration, business administration, and buildings and maintenance. Following the approach used by Hickcox and Ducharme (1971:20) all 18 systems were categorized as the "functional type." Hickcox and Ducharme (1971:20) observed that,

> . . . small systems tend to look like functional types because they are not large enough to support a substantial central office staff. . . . We cannot say what would happen if these small systems were suddenly increased in size.

Size group 4 (1,036-2,970 pupils). The central office organizational structures of the 51 systems (21 counties, 18 divisions, 7 public districts, and 5 separate districts) in Size Group 4 were essentially the same as those for Size Group 3, except that there were relatively fewer central office personnel in Size Group 4. Figure 7, which was used to illustrate representative examples of Size Group 3, also represented the typical central office organizational structures in Size Group 4. As in Size Group 3, all 51 systems in Size Group 4 were categorized as the "functional type" of organizational structure. Seventeen systems had the "dual system" of organizational structure illustrated in Figure 7, while the remaining 34 systems were characterized by the "single system" shown in Figure 7.

In Size Group 4, 50 of the 51 systems had a superintendent, although three of these systems shared a superintendent with other systems. All 51 systems employed a secretary-treasurer. Thirty-five of the systems had directors of maintenance and twenty systems had an assistant superintendent or director of instruction. Six systems had a director of pupil personnel services, and three systems had an

instructional materials centre director.

Size group 5 (22-939 pupils). The 59 systems (5 divisions, 17 public districts, and 37 separate districts) in Size Group 5 had fewer central office personnel than any of the four groups of larger school systems. Thirty-eight of the 59 systems in this group did not have a superintendent, and an additional 18 systems shared their superintendents with one or more other school systems. In this group, only three systems employed their own full-time superintendent. Although all 59 systems reported a secretary-treasurer, 38 systems had no central office personnel other than a secretary-treasurer, and he was often only a part-time employee. In addition to the central office personnel already mentioned, only one of the 59 systems had a director of maintenance. No other central office personnel were reported by these systems. Again following the approach used by Hickcox and Ducharme (1971), all 59 systems were categorized as the "functional type" of organizational structure.

The shared superintendency. A modification in the organizational structure of Alberta school systems was the sharing of a superintendent among two or more small school systems. Table 28 lists the 21 systems which shared seven superintendents. Figure 8 represents a typical example of the organizational structure of systems which shared a superintendent. Systems of all four types of administrative jurisdiction had shared superintendents. In one case a division shared a superintendent with a county, and in another instance two divisions shared a superintendent with a public district. In three cases public districts shared a superintendent with one or more separate districts.

TABLE 28

SYSTEMS WITH SHARED SUPERINTENDENTS

Name of System	Number of Pupils in Each System	Total Number of Pupils in Systems Sharing a Superintendent
Neutral Hills School Division	824	2,044
County of Paintearth	1,220	
Sullivan Lake School Division	255	
Berry Creek School Division	249	1,402
Hanna Public School District	898	
Bonnyville Public School District	790	
Cold Lake Separate School District	280	1,260
Grande Centre Separate School District	190	
St. Paul Public School District	1,113	
Glen Avon Separate School District	401	1,515
St. Paul Regional High School District	included above	
Ft. McMurray Public School District	1,378	2,139
Ft. McMurray Separate School District	761	
Sexsmith Separate School District	113	
Grande Prairie Separate District	939	1,186
Beaverlodge Separate School District	134	
Vermillion Separate School District	349	
Provost Separate School District	289	
Wainwright Separate School District	251	1,277
Killam Separate School District	127	
St. Martins Separate School District	261	

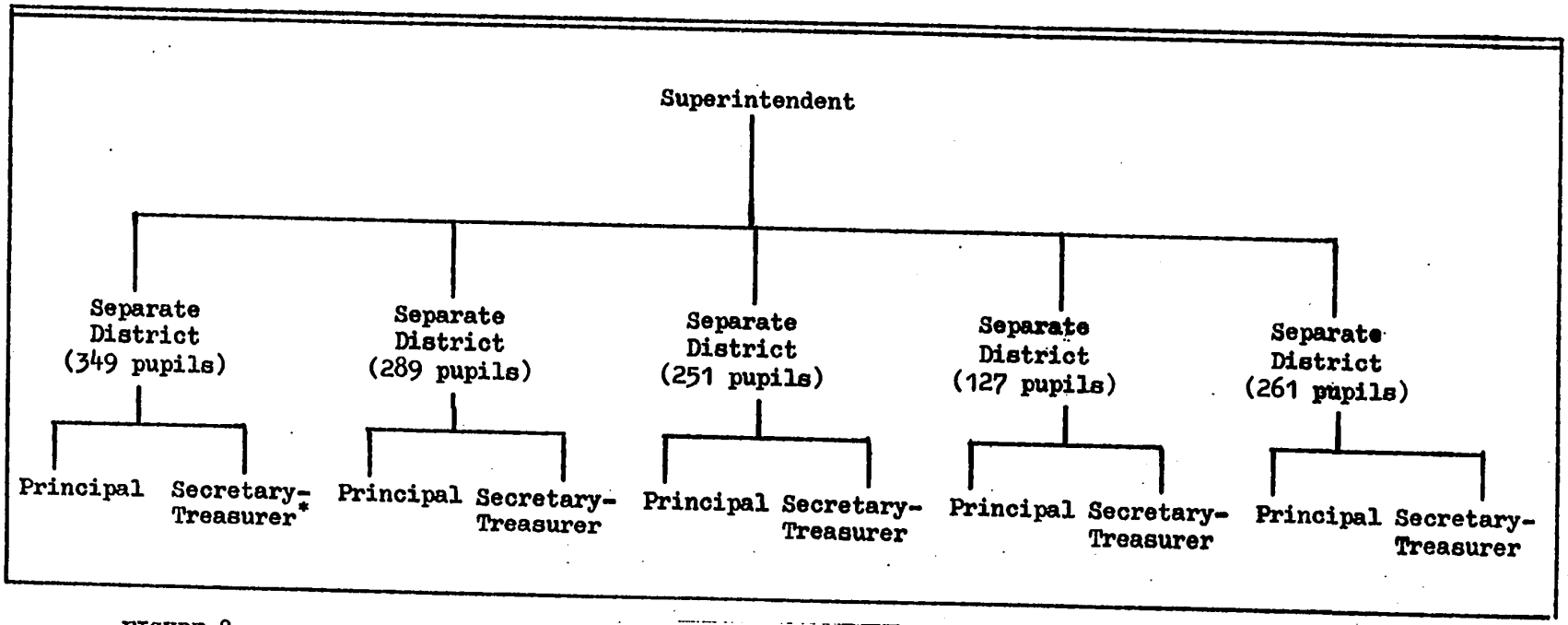

FIGURE 8: THE ORGANIZATIONAL STRUCTURE OF FIVE SEPARATE DISTRICTS WITH A SHARED SUPERINTENDENT

*The secretary-treasurers in all five districts were part-time employees only.

Each of the five separate districts had its own school board.

In two instances, groups of three and five separate districts each shared a superintendent.

SUMMARY OF CHAPTER 8

There appeared to be relatively little variation in the pattern of organizational structure of the central offices of the school systems in the study. When the data were classified according to the organizational structure categories developed by Hickcox and Ducharme (1971), 131 systems were categorized as the "functional" type, one system was the "tiered structure" type, and there were no systems of either the "pure area" or "combination" types. When the differences in the sizes of the school systems in the two studies were taken into account the results of the present study, outlined above, appeared to support those obtained by Hickcox and Ducharme (Table 27, page 173). In the Hickcox and Ducharme (1971) study, 38 of 47 systems had more than 6,000 pupils, while 125 of 132 systems in the present study had less than 6,000. In both studies, systems with less than 6,000 pupils were of the "functional" type.

Thirty-nine Alberta school systems did not employ a superintendent, and an additional 21 systems shared a superintendent with one or more other systems. All 29 counties and 29 divisions had either full-time or shared superintendents. Thirteen public and 26 separate districts did not employ a superintendent. The 39 systems without superintendents and the 21 systems which shared superintendents all had pupil populations of less than 3,000 students.

Chapter 9

SUMMARY AND CONCLUSIONS

Summary of the Study

The major purpose of the study was to examine a number of the relationships among selected personnel and salary ratios, and selected organizational variables, in all 139 operating school systems in Alberta. The minor purposes of the study were: (1) to compare the means of personnel and salary ratios in groups of school systems of different sizes and different types of jurisdiction; (2) to describe the numbers, salary costs, and functions of the personnel employed in operating elementary and secondary education in school systems and in the central and regional offices of the Department of Education of Alberta; (3) to survey the opinions of superintendents and other central office officials in school systems concerning the adequacy of the numbers of personnel, priorities for instructional and non-instructional staff, and suggested changes in personnel utilization; and (4) to describe the organizational structures of the Department of Education and a representative sample of the central offices of school systems in Alberta.

The data were collected by questionnaire, interviews, and visits to the Department of Education and school systems in Alberta.

SUMMARY AND DISCUSSION OF THE FINDINGS

Variations in Personnel and "Other" Variables in Groups of School Systems

Type of administrative jurisdiction. Significant differences existed between the means of one or more of the pairs of groups for fourteen of the sixteen personnel ratios grouped by type of jurisdiction. As a group the divisions had the highest mean ratios of personnel per 1,000 pupils in all of the non-instructional categories and the highest ratio of total personnel per 1,000 pupils. The group of divisions also had the highest mean percentage of personnel in non-instructional positions (18.28%), and the lowest mean percentage of personnel in instructional positions (81.72%).

As a group the counties had the lowest mean ratios of central office administrative staff per 1,000 pupils, and total administrative staff per 1,000 pupils, and the highest mean ratio of instructional staff per 1,000 pupils. The counties also had the second lowest mean percentage of personnel in non-instructional positions (15.19%) and the second highest mean percentage of personnel in instructional positions (84.81%). These findings may reflect the relative advantages of the shared aspects of municipal and educational administration in the counties. The differences in the findings for the groups of counties and school divisions may also be associated with differences in staffing priorities and/or differences in the quantity or the quality of the services offered in the two groups.

The group of separate districts had the lowest mean ratios of total non-instructional staff per 1,000 pupils, total instructional staff

per 1,000 pupils, total staff per 1,000 pupils, and the lowest mean teacher qualifications (3.03 years of training). The finding that the group of separate districts had the lowest mean percentage of staff in non-instructional positions (13.78%) and the highest mean percentage of staff in instructional positions (86.22%) may be associated with the fact that the majority of the separate districts, which were very small in terms of the numbers of pupils they contained, had no central office staff other than a part-time secretary-treasurer.

Except for the mean ratios for the counties mentioned above, the groups of counties and public districts tended to have relatively similar values for the mean ratios of personnel per 1,000 pupils. The values of the mean ratios of personnel per 1,000 pupils for the counties and public districts tended to be lower than those for the group of divisions and higher than those for the group of separate districts. The group of public districts had the highest mean teacher qualifications (3.31 years of training).

When considering the importance of the means reported above, the wide range of values for each variable for each of the four types of jurisdiction (Tables 29 to 33, Appendix G), should be kept in mind.

Size of school system. Considerable variation of personnel ratios occurred among school systems of similar size. Tendencies were observed for increases in school system size to be associated with increases in the following mean ratios of personnel per 1,000 pupils: (a) in-school administration, (b) total administration, (c) central office support, (d) in-school support, (e) total support, (f) total central office, and (g) total non-instructional. However, in most cases

these tendencies were not very marked. For the following mean ratios of personnel per 1,000 pupils no regular pattern was apparent with increasing size of school system: (a) central office administration, (b) total instructional, and (c) total staff. Mean teacher qualifications tended to increase with increasing size of school system.

The observed increases in mean total support, total central office and total non-instructional personnel ratios with increases in system size appeared to provide supportive evidence for similar findings by Lepatski (1970), and Holdaway (1971). The finding that the highest ratios of central office staff per 1,000 pupils occurred in the group of largest school systems (75,629-80,366 pupils) appeared to provide supportive evidence for a similar finding by Carter (1968). Carter (1968:55) suggested that districts with enrolments in excess of 75,000 pupils make more use of central office support resources such as data processing and clerical personnel, thus reducing the needs for and the greater costs of additional central office administrative personnel.

Variations in Salary and Other Financial Variables in Groups of School Systems

Type of administrative jurisdiction. Statistically significant differences existed between the means of one or more pairs of groups for twelve of the sixteen ratios when the school systems were grouped by type of jurisdiction. The group of school divisions had the highest mean operating budget per pupil, the highest mean supplementary requisition per pupil, and the highest salary costs per pupil for every non-instructional category except the central office support component. The group of separate districts had the lowest mean operating budget

per pupil, the lowest mean supplementary requisition per pupil, and the lowest mean salary costs per pupil for the instructional and total staff components. In addition, the group of separate districts had the lowest mean salary costs per pupil for every non-instructional component. The group of counties had the highest mean central office support salary costs per pupil, while the group of public districts had the highest mean instructional salary costs per pupil. Except for the means of the salary ratios mentioned in the previous sentence, the groups of counties and public districts tended to have similar mean salary costs per pupil. Generally these means for groups of counties and public districts tended to be lower than those for the group of divisions and higher than those for group of separate districts.

Size of school system. Tendencies were observed for increasing size of school system to be associated with increasing mean salary ratios per pupil and per staff member for every calculated non-instructional component. The tendencies toward increasing size of the non-instructional salary ratios with increasing size of school system, which were more marked than similar trends observed in Chapter 4 for the non-instructional personnel ratios, may be accounted for by the relatively higher non-instructional salary schedules in the larger school systems. Irregular increases were observed in the mean instructional costs per pupil and per staff member.

The observed increases in the mean administrative, central office, support, instructional, non-instructional, and total salary ratios per pupil with increases in system size appeared to provide supportive evidence for similar findings by Lepatski (1970), and Holdaway (1971).

In the present study, with increasing size of school system irregular changes were observed in both the mean operating budget per pupil and the mean supplementary requisition per pupil. The highest mean operating budget per pupil occurred in one of the groups of smaller school systems (1,036-2,970 pupils). The mean supplementary requisition per pupil was substantially higher in the group of the largest school systems than it was in any of the four groups of smaller systems.

As no attempt was made in this study to obtain the allocation of the non-personnel costs in operating budgets and supplementary requisitions among such different expenditure categories as maintenance and transportation, no inferences were or should be made about differences in operating budget per pupil or supplementary requisition per pupil among groups of school systems of different sizes or of different types of jurisdiction. Operating budgets and supplementary requisitions were included as variables simply to determine whether or not they appeared to be factors in the explanation of the variance in the personnel and salary ratios examined. In view of this reservation only those inferences related to the explanation of the variance in personnel and salary ratios were considered appropriate.

Correlation Coefficients: Personnel Ratios and Selected Organizational Variables

System size appeared to be relatively less important than certain other variables in the explanation of the variation in the sizes of the personnel ratios per 1,000 pupils in school systems in the study as three or more of the other variables considered were more highly

correlated with each of the administrative, central office, support, instructional, non-instructional, and total personnel ratios than were any of the three measures of system size.

Total administrative staff per 1,000 pupils. None of the three measures of system size were statistically significantly correlated with the total administrative ratio per 1,000 pupils. This conclusion appeared to provide supportive evidence for similar findings by Baker and Davis (1954), Blau et al. (1966), and Reiss (1970), and non-supportive evidence for the results of studies conducted by Anderson and Warkov (1961), Haas et al. (1963), Indik (1964), Hawley et al. (1965), Gill (1967), Blowers (1969), Vithayathil (1969), Lepatski (1970), Klatsky (1970), and Blau (1970). Statistically significant positive correlation coefficients were obtained between the administrative ratio and each of the following variables: operating budget per pupil, square miles per school, supplementary requisition per pupil, and the supplementary requisition mill rate. The positive relationship between operating budget per pupil and the administrative ratio appeared to provide supportive evidence for a similar finding by Hawley et al. (1965). The low positive correlation coefficient which was obtained between the administrative ratio and the number of central office departments in the present research, did not support Klatsky's (1970) finding that a significant negative relationship existed between these two variables.

Total support staff per 1,000 pupils. Statistically significant, positive correlation coefficients were obtained between the total support ratio and each of the following variables: square miles per school,

number of central office departments, mean teacher qualifications, total number of schools, operating budget per pupil, total number of staff, total number of pupils, supplementary requisition per pupil, and the supplementary requisition mill rate. The positive correlation coefficients obtained between each of the three measures of system size and the support ratio appeared to provide supportive evidence for similar findings by Haire (1959), Rushing (1966), Carter (1968), Duboyce (1970), and Lepatski (1970), and non-supportive evidence for the results of studies conducted by the Canadian Education Association (1964), and Blau et al. (1966).

Total central office staff per 1,000 pupils. Statistically significant, positive correlation coefficients were obtained between the central office ratio and each of the following variables: supplementary requisition per pupil, operating budget per pupil, square miles per school, number of central office departments, and the total number of schools. The low positive correlation coefficients obtained between the central office ratio and (a) the total number of staff and (b) the total number of pupils, were not statistically significant. The positive correlation coefficients obtained between each of the three measures of system size and the central office ratio appeared to provide supportive evidence for similar findings by Lepatski (1970), and Holdaway (1971).

Total non-instructional staff per 1,000 pupils. All of the correlation coefficients obtained between the total non-instructional ratio and each of the eleven variables were low positive and all were statistically significant except those between the non-instructional

ratio and (a) mean school size and (b) pupils per square mile. The positive correlation coefficients obtained between the non-instructional ratio and each of the three measures of system size appeared to provide supportive evidence for similar findings by Lepatski (1970) and Holdaway (1971). The statistically significant, positive correlation coefficient obtained between the non-instructional ratio and square miles per school suggested that school systems which had relatively few schools distributed throughout relatively large geographic areas tended to be associated with higher ratios of non-instructional personnel than did systems in which schools were not so widely dispersed. On the other hand, as the number of central office departments tended to be larger in larger school systems (page 79), the statistically significant, positive correlation coefficient obtained between the non-instructional ratio and the number of central office departments suggested that larger ratios of non-instructional staff tended to be associated with the relatively greater structural complexity in the larger systems. This conclusion appeared to provide supportive evidence for Blau and Schoenherr's (1971:90) conclusion that the structural complexities generated by large size raise the non-instructional ratio.

Total instructional staff per 1,000 pupils. The instructional ratio was significantly and positively correlated with operating budget per pupil, and supplementary requisition per pupil. Statistically significant, negative correlation coefficients were obtained between the instructional ratio and (a) mean teacher qualifications and (b) mean school size. None of the three measures of system size was significantly or importantly related to the instructional ratio in Alberta school

systems.

The significant, positive correlation coefficients obtained between supplementary requisition per pupil and (1) the instructional ratio and (2) the non-instructional ratio, suggested that school systems with larger supplementary requisitions per pupil employed greater numbers of both instructional and non-instructional personnel than did systems with smaller supplementary requisitions per pupil. The significant, positive correlation coefficients obtained between operating budget per pupil and (1) the instructional ratio and (2) the non-instructional ratio, suggested that school systems with larger operating budgets per pupil employed greater numbers of both instructional and non-instructional personnel than did systems with lower operating budgets per pupil. If the magnitude of the correlation coefficients between each of the five major personnel ratios per 1,000 pupils and (1) supplementary requisition per pupil and (2) operating budget per pupil, can be considered to give an indication of staffing priorities, then the priorities of the school systems in the study for employing additional personnel were for: (a) total instructional, (b) total central office, (c) total administrative, (d) total non-instructional, and (e) total support personnel.

Prediction of Personnel Ratios

The small cumulative percentages of variance in the criterion variables which could be accounted for by the predictor variables appeared to indicate that reliable prediction of the values of the administrative, central office, support, non-instructional, instructional, and total personnel ratios was not possible for the

school systems in the study on the basis of the nine predictor variables used. This conclusion remained the same whether the raw values or logarithmic functions were used in the regression analyses.

System size did not appear to be a significant predictor of the total administrative ratio in the school systems in the study. This finding appeared to provide supportive evidence for a similar conclusion by Reiss (1970), and non-supportive evidence for the results of a study conducted by Vithayathil (1969). Overall, system size did not account for high enough cumulative percentages of the variance in the criterion variables to be considered as a good predictor of the sizes of the personnel ratios in Alberta school systems.

Correlation Coefficients: Salary Ratios and Selected Organizational Variables

Overall, the correlation coefficients between the sixteen salary ratios and the eleven organizational variables were somewhat higher than those reported in Chapter 4 for the individual relationships between the personnel ratios and the same eleven organizational variables. When judged by the magnitude of the correlation coefficients, for every one of the sixteen salary ratios examined, system size was relatively less important that at least one of the other variables considered in the explanation of the variation in the sizes of the salary ratios in Alberta school systems.

Total administrative salaries per pupil. Statistically significant, positive correlation coefficients were obtained between the administrative salary ratio and each of the following variables: number of central office departments, operating budget per pupil, square miles

per school, supplementary requisition mill rate, total number of schools, mean teacher qualifications, supplementary requisition per pupil, total number of pupils, total number of staff, mean school size, and pupils per square mile.

Total support salaries per pupil. Statistically significant, positive correlation coefficients were obtained between the support salary ratio and each of the following variables: number of central office departments, mean teacher qualifications, total number of schools, square miles per school, total number of pupils, total number of staff, and supplementary requisition mill rate.

Total central office salaries per pupil. Statistically significant, positive correlation coefficients were obtained between the central office salary ratio and each of the following variables: number of central office departments, supplementary requisition per pupil, operating budget per pupil, square miles per school, total number of schools, total number of pupils, and total number of staff.

Total non-instructional salaries per pupil. Statistically significant, positive correlation coefficients were obtained between the non-instructional salary ratio and each of the eleven variables. Most of the correlation coefficients were quite low.

Total instructional salaries per pupil. Although all of the correlation coefficients between the instructional salary ratio and each of the eleven variables were positive, most were quite low, and only three were statistically significant. Positive, statistically significant correlation coefficients were obtained between the

instructional salary ratio and each of the following variables: supplementary requisition per pupil, operating budget per pupil, and the number of central office departments. The correlation coefficient between the instructional salary ratio and mean teacher qualifications (.07), was suprisingly low. Perhaps the mean number of years of teaching experience, differences in basic salary schedules, and/or differences in mean class size, should be considered as independent variables in future studies of this type.

Personnel and Salary Ratios and Organizational Size

At least one of the eight variables other than size was more highly correlated with every one of the 32 personnel and salary ratios than were any of the three measures of school system size. Thus, system size appeared to be a relatively less important factor in the explanation of the variation in the sizes of the various personnel and salary ratios in Alberta school systems than at least one of the other eight variables considered.

An indication of the complexity of the relationships involved in the explanation of the variation in the sizes of the personnel ratios in Alberta school systems may be given by the following frequency count of the number of the 16 personnel ratios (Table 10, page 86) that were significantly correlated ($p \leqslant 0.05$) with each of the following organizational variables: square miles per school-12, the number of central office departments-11, mean teacher qualifications-10, operating budget per pupil-10, total number of schools-10, supplementary requisition per pupil-9, supplementary requisition mill rate-9, total number of pupils-7, total number of staff-7, mean school size-6, and

pupils per square mile-1.

The frequency count of the number of the 16 salary ratios that were significantly correlated with each of the following 11 variables were: the number of central office departments-14, square miles per school-13, total number of schools-12, total number of pupils-12, total number of staff-12, mean teacher qualifications-11, supplementary requisition mill rate-10, pupils per square mile-9, operating budget per pupil-8, supplementary requisition per pupil-8, and mean school size-8. These results appeared to both justify the selection of these variables for examination, and to support Klatsky's (1970) contention that the issues involved in the explanation of the variation in personnel ratios in organizations of different sizes are more complex than they originally appeared to be. However, most of the correlation coefficients obtained in this study, particularly those involving the personnel ratios, were quite low.

In the stepwise multiple regression analyses which used both raw values and logarithmic functions, neither system size alone, nor system size in combination with the other predictor variables used, accounted for sufficiently high enough cumulative percentages of the variance in the criterion variables to be considered as good predictors of the sizes of personnel ratios in Alberta school systems. These findings suggested two possible alternatives for consideration. First, the relationships involved may be relatively complex ones involving more variables than were considered in this study. That is, as Reiss (1970:3) has suggested, unidentified factors in organizations influence the size of personnel ratios; when these factors are identified, the different results can be explained. Second, the relationships between

the sizes of each of the personnel ratios and the other variables considered may not be linear. The determination of the shape of these relationships was beyond the scope of the present study.

The review of the literature in Chapter 2 contained a number of suggestions which appeared to be worthy of consideration in future studies of the variation in personnel ratios. For example, Reiss (1970:28) has speculated that "irrationality in organizations," "the administrative style of leaders," and "Blau's (1970) Formal Theory of Differentiation in Organizations" may help to explain the variation in personnel ratios in school systems. Or, perhaps, as Pondy (1967:47) has suggested, the administrative and other personnel ratios are variables subject to administrative discretion:

> . . . that is, the number of administrative personnel employed in an organization is chosen so as to maximize the achievement of the goals of the dominant managerial coalition.

Differences in the quantity and/or quality of the services provided in school systems of different sizes and different types of jurisdiction may also be associated with the variation in personnel and salary ratios in school systems. Sabulao and Hickrod (1971:191) suggested that larger school systems may provide a "different mix of services" than do smaller school systems. According to Klatsky (1970:437), differences in the types of coordination mechanisms (personal administration, staff specialists, impersonal) used in school systems of different sizes and differing degrees of functional differentiation may be associated with the variation in personnel and salary ratios in school systems.

Differences in the efficiency of operations (Tosi and Patt, 1967; Carter, 1968; Sabulao and Hickrod, 1971) of school systems of different sizes and different types of jurisdiction may also be associated with

the variation in personnel and salary ratios in school systems.

Government financial policies such as the types of grants (per pupil and per teacher versus "total operating package" grants) offered in provincial Foundation Programs, and/or the recent decision in Alberta (1970) to require local plebiscites for increases in school system expenditures that exceed a certain minimum, may also be associated with the variation in the personnel and salary ratios in school systems. For example, the British Columbia Teachers' Federation (1969:2) attributed a recent increase in in-school support staff in school systems in that province to changes in Foundation Program grants, and stated further, that:

> . . . the introduction of the 'total operating grant package'-unrelated to teachers' certification or experience-may well encourage trustees and superintendents to experiment with different personnel utilization patterns for both professional and non-professional staff.

Blau's (1970) "Formal Theory of Differentiation in Organizations" appears particularly worthy of empirical investigation in school systems.

Percentages of Personnel and Salary Costs in The Provincial Elementary and Secondary Education System

Department of Education and local school system personnel respectively represented 2.78% and 97.22% of the total number of personnel involved in operating the provincial elementary and secondary education system. The distribution of salary costs was very similar to the distribution of personnel: Department of Education and local school system personnel respectively received 2.49% and 97.51% of the total salaries paid to personnel who operate the provincial elementary and secondary education system.

Of all the Department of Education and local school system

personnel included in the study, 20.86% were non-instructional and 79.14% were instructional personnel. The distribution of salary costs was again very similar to the distribution of personnel: non-instructional personnel received 20.12% and instructional personnel received 79.88% of the total salaries paid to all personnel included in the study.

Of the total number of personnel in the Department of Education and the 139 school systems in the study, 92.23% were "in-school" personnel and 7.77% were "central office" personnel. The distribution of salaries was again similar to the distribution of personnel: 92.12% of salaries were paid to "in-school" personnel and 7.88% were paid to "central office" personnel.

Interviews with Superintendents and "Alternates"

Staff shortages. The three in-school staff shortages most frequently reported by the respondents were for additional personnel to provide (a) diagnostic, remedial, counselling and psychological services, (b) teacher aide services, and (c) library/audio-visual media services. Relatively few shortages of classroom teachers for either particular subject areas or grade levels were reported by the respondents.

The three most frequently reported central office staff shortages were for additional personnel to provide (a) curricular services, (b) general administrative services, and (c) psychological and counselling services.

Government financial policy, school board policy, and evolving need were most frequently reported as the reasons for both the in-school

and central office staff shortages.

Staff priorities. The three highest instructional staff priorities reported by the respondents were for additional personnel to provide (a) in-school psychological, remedial and counselling services, (b) in-school curriculum development and supervision services, and (c) in-school library/audio-visual media services. The three highest non-instructional staff priorities were for (a) teacher aides, (b) in-school clerical personnel, and (c) buildings and maintenance personnel.

Changes in personnel utilization. The superintendents appeared to favour increased staff differentiation. The two changes in personnel utilization most frequently reported by the respondents were the provision of increased paraprofessional assistance for teachers, and replacement or redefinition of the role of the assistant principal.

Reallocation of central offfice and in-school services. The respondents appeared to be generally satisfied with the current distribution of services between central offices and schools.

Size of school unit. A majority of the respondents appeared to be generally satisfied with the present size of their school systems. However, 18 of the 43 superintendents reported that their systems were too small, in terms of the number of pupils, to offer adequate educational services. Declining enrolments since the widespread introduction of the contraceptive pill, the rural-urban shift of population, the increasing complexity of secondary education, and the relatively rapid changes in school programs were stated as reasons that these systems had too few pupils. No respondent considered his system

too large either geographically or in terms of the number of pupils.

If the decline in school enrolments continues to occur in rural areas, and if this decline is accompanied by a drop in the level of educational services, then consideration of alternative systems for the delivery of an adequate level of educational services in rural areas may soon become essential. One alternative might be the reorganization of smaller school systems into larger units of school administration. However, constitutional guarantees to religious minorities and populations which are too widely dispersed over large geographic areas may make such a solution impractical. The "regional office of education" concept may not prove to be any more viable than the larger unit of school administration in some areas as they are one step further removed from the teaching-learning situation than local school system personnel, and they face the same problems of large distances to travel with large amounts of the time of personnel devoted to travelling from point to point. In some areas, where the population distribution is particularly sparse, it may only be possible to maintain an adequate level of educational services at considerably higher costs than in areas with a more dense population distribution.

A more viable short-range alternative might be the sharing of the costs and services of highly qualified specialist personnel among a number of small school systems in a single geographic area, with personnel such as psychologists, speech therapists, and remedial specialists planning a program for the group of school systems and spending part of their time, in fairly long stretches such as two weeks or more at a time, in each system. These areas would probably have to be smaller than the huge areas currently covered by the four Regional

Offices of Education which are located outside of Calgary and Edmonton.

If the numbers of specialist personnel employed in school systems in Alberta can be taken as an indication of the level of services provided, then aside from the excellent services offered by the Alberta Guidance Clinic, almost no special education, diagnostic, psychological, or remedial services are offered at all in the majority of smaller school systems in Alberta. Superintendents cited the needs for such services among their highest priorities. Perhaps these and other essential educational services could be provided in school systems if groups of school systems, such as those in the St Paul-Bonnyville, or in the Wainwright-Vermillion-Kitskoty areas, shared the services of specialist personnel. The grouping of the school systems should be relatively easy to arrange and might even be done on a voluntary basis by school system officials. Such a concept might negate the need for regional offices of education or considerably change their functions. Such a practice is already being tried out in Alberta as a number of groups of smaller school systems are sharing the services of superintendents. The idea could even be extended to include the sharing of such specialist personnel as secretary-treasurers among a group of smaller systems.

A third possible and more long-range alternative might be the delivery of multiple services such as education, health and welfare, and manpower services through a single delivery system in rural areas.

Central Office Organizational Structure

There appeared to be relatively little variation in the organizational structure of the central offices of the school systems in

the study. When the data were classified according to the organizational structure categories developed by Hickcox and Ducharme (1971), 131 systems were categorized as the "functional" type, one system was the "tiered" type and there were no systems of either the "pure area" or "combination" types. When the differences in the sizes of the school systems in the two studies were taken into account, the results of the present study, outlined above, appeared to support those obtained by Hickcox and Ducharme (1971).

Implications of the Study

One of the findings of the study was that some of the other variables considered appeared to be relatively more important in the explanation of the variation in the personnel and salary ratios in Alberta school systems than did any of the three measures of system size. However, this does not mean that system size is unimportant, but possibly that system size has been overemphasized, and other variables underemphasized, in previous Canadian studies which attempted to explain the variation in personnel and salary ratios in school systems. The results of this study suggested that, in addition to size, square miles per school, the number of central office departments, mean teacher qualifications, operating budget per pupil, and supplementary requisition per pupil, are relatively important variables in the explanation of the variation in personnel and salary ratios in Alberta school systems. In view of these findings, the policy makers at both the provincial and local school system levels of operation might consider the above variables among the other factors they examine when setting the parameters within which local school systems will be staffed.

School systems with larger supplementary requisitions per pupil employed proportionately greater numbers of both instructional and non-instructional personnel than did systems with smaller supplementary regquisitions per pupil. In addition, school systems with larger operating budgets per pupil employed proportionately greater numbers of both instructional and non-instructional personnel than did systems with smaller operating budgets per pupil. For both of the above relationships, the magnitude and rank order of the correlation coefficients suggested that, with increases in the availability of funds, the priorities of the school systems in the study for adding staff were first for instructional and second for non-instructional personnel. Are changes in the methods of financing education in Alberta warranted in view of the apparent differences in the availability of funds among school systems in Alberta?

School systems with relatively few schools distributed throughout relatively large geographic areas tended to be associated with higher ratios of non-instructional personnel than did systems in which schools were not so widely dispersed. This finding may mean that (1) there are some "diseconomies of scale" associated with school systems of relatively large geographic area, and (2) that it may only be possible to maintain an adequate level of educational services in such systems at a higher cost than in school systems in which schools are not so widely dispersed.

School systems with larger numbers of central office departments had higher ratios of support and non-instructional staff than did systems with fewer numbers of central office departments. As the number of central office departments was larger in larger school systems

this conclusion appeared to provide supportive evidence for Blau and Schoenherr's (1971:90) conclusion that the structural complexities generated by large size raise the non-instructional ratios. Future studies might attempt more refined measures of the structural complexity of school systems at both the central office and school levels of operation. For example, Blau and Schoenherr (1971:90) used the number of levels, number of divisions, and number of sections per division, as three measures of structural complexity in their study.

The following three results were observed when the school systems were grouped by type of administrative jurisdiction: (1) the group of divisions had the highest mean ratios of personnel per 1,000 pupils in all of the non-instructional personnel categories; (2) the group of separate districts had the lowest mean ratios of personnel per 1,000 pupils in the non-instructional, instructional, and total personnel categories; and (3) the group of counties had the lowest mean ratios of personnel per 1,000 pupils in the central office administrative and total administrative categories, and the highest mean ratio of instructional staff per 1,000 pupils. The differences in the mean values of the personnel ratios between groups of divisions and counties are difficult to explain because the two groups included systems which are similar in terms of geographic size, the number of central office departments, mean teacher qualifications, and in terms of the number of pupils. The availability of funds may be an important factor in the explanation of the variation in the above personnel ratios in school systems grouped by type of jurisdiction. Statistically significant differences occurred in mean operating budget per pupil, and mean supplementary requisition per pupil, between groups of separate

districts and divisions, and between separate districts and counties. Divisions had the highest mean supplementary requisition per pupil and the highest mean operating budget per pupil while separate districts had the lowest. In addition, the variation in the mean values of the personnel ratios among groups of school systems in the type of jurisdiction categorization (and probably also among groups of systems in the size categorization) may be associated with differences in the quantity and/or quality of the services offered (Sabulao and Hickrod, 1971), differences in administrative discretion in the setting of staffing priorities (Pondy, 1969), differences in the extent to which services are centralized or decentralized (American Association of School Administrators, 1971), differences in the efficiency of operation of school systems (Carter, 1968), and/or differences in the type of coordination mechanisms used in school systems of different sizes and different types of jurisdiction (Klatsky, 1970).

The smallness in size of some school systems may also be associated with the variation in the values of personnel ratios in school systems. The respondents from 18 of the 43 school systems in which interviews were conducted indicated that their systems were too small, in terms of the number of pupils, to provide an adequate level of educational services. Government financial policy, local school board policy, and evolving need for additional and/or new services, may also be associated with the variation in the values of the personnel ratios in Alberta school systems, as the respondents in the 43 systems most frequently reported these three factors as the reasons for both their central office and in-school staff shortages.

Special care needs to be taken in the interpretation of the correlation coefficients because of the possible effect of (a) the disproportionately large size of the four large urban school systems in size groups 1 and 2, and (b) the large gaps within the size range of the school systems.

Recommendations For Further Study

The data gathered for the present study could be analyzed to determine and compare the personnel and salary ratios in the multiple overlapping school jurisdictions in single geographic areas in Alberta. The data could also be analyzed to determine and compare rural and urban differences in personnel and salary ratios in Alberta school systems.

Since most of the correlation coefficients obtained between each of the personnel and salary ratios and each of the eleven variables examined were quite low, and since the cumulative percentages of variance which could be accounted for in the major personnel ratios were relatively small, further studies might be undertaken to identify and determine the importance of other variables which might be associated with the sizes of personnel and salary ratios in school systems. A number of such suggestions were given on page 198.

Since there were tendencies for the majority of the personnel and salary ratios examined in this study to increase as system size increased, and since the larger systems tended to employ proportionately greater numbers of non-instructional staff, and proportionately fewer numbers of instructional staff, the data gathered for the present study could be analyzed using the methods suggested by Sabulao and Hickrod (1971) to determine the optimum size of school systems relative to

salary costs and/or numbers of personnel in the various personnel categories.

A study of the different types of coordination mechanisms (personal administration, staff specialists, impersonal) used in school systems of different sizes and differing degrees of functional differentiation and the variation in personnel and salary ratios associated with each type probably would be very useful in the explanation of differences in staffing practices in school systems.

An examination and comparison of the need for and the variety, costs, and level of the educational services provided in different school systems and the numbers and salary costs of the personnel needed to provide them would probably be useful both in the explanation of the variance in personnel and salary ratios in school systems, and in justifying the different expenditure levels in different school systems.

In view of the reported desire of superintendents for increased staff differentiation, there appears to be a need for the development and field trial of different models of staff differentiation suitable for Alberta school systems of different sizes.

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APPENDICES

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September 23, 1971

On July 19, 1971 the Minister of Education announced that a study would be conducted, entitled "An Examination of Non-Instructional Positions, Functions and Costs in School Jurisdictions in Alberta".

The Director of the study is Dr. E. A. Holdaway, Associate Professor, Department of Educational Administration, University of Alberta. He is being assisted by the following Supervisory Committee:

1) Dr. J. E. Reid, Director of Operational Research, Department of Education.
2) Dr. B. T. Keeler, Executive Secretary, Alberta Teachers' Association.
3) Mr. L. Williams, Executive Secretary, Alberta School Trustees' Association.

Four major methods will be used to collect the data and opinions upon which Dr. Holdaway will make recommendations concerning non-instructional staffing in school jurisdictions of different size and type.

. . . . . .

1. Central office questionnaire to be completed by all superintendents (enclosed).
2. In-school staff questionnaire concerning opinions related to adequacy of numbers of non-instructional staff--a sample of about 1,000 will be used.
3. Interviews with a sample of central office and in-school staff throughout Alberta concerning use of non-instructional staff--these will be conducted by Dr. Holdaway and Mr. Thomas Blowers, a doctoral student in Educational Administration.
4. Questionnaire to all school trustees concerning opinions related to adequacy of numbers of staff.

Your assistance is requested in completing the enclosed questionnaire. The data should describe the situation in your district for the month of September, 1971. I appreciate the amount of work involved in completing the questionnaire, but hope that you will be able to return it to Dr. Reid by November 1, 1971. The Minister expects a preliminary report in February, 1972.

Yours very truly,

E. K. Hawkesworth
Associate Deputy Minister of Education

EKH/eik

Enclosure

Department of
Ed·u·ca·tion
Government of Alberta

Executive Building, 10105 - 109 Street, Edmonton, Alberta

Telephone: 229-3517 AC403, TELEX: ALTAEDCOMM, TWX: ED ADMIN EDM

On September 23, 1971, I wrote to you requesting completion by October 31, 1971, of a questionnaire describing numbers and salaries of staff employed by your jurisdiction. To date your return has not been received by Dr. J. E. Reid, Director of Operational Research, Department of Education.

The Minister of Education expects that a return will be obtained from every school jurisdiction. Should an additional copy of the questionnaire be required or should you require assistance in its completion, please contact one of the following:

Dr. E. A. Holdaway - 432-3690
Dr. J. E. Reid - 482-6411

If your return is already in the mail, please disregard this letter.

Thank you for your assistance.

Yours sincerely,

E. K. Hawkesworth
Deputy Minister of Education

EKH/eik

Department of
Ed·u·ca·tion
Government of Alberta

Executive Building, 10105 - 109 Street, Edmonton, Alberta

Telephone: 229-3517 AC403, TELEX: ALTAEDCOMM, TWX: ED ADMIN EDM

I wish to thank you for completing the questionnaire sent to you on September 23, 1971. The time you and your staff put into providing the information is very much appreciated.

Dr. E. A. Holdaway of the Department of Educational Administration, University of Alberta, is now analyzing the data.

Yours sincerely,

E. K. Hawkesworth
Deputy Minister of Education

EKH/eik

SCHOOL SYSTEM PERSONNEL QUESTIONNAIRE

Name of school system: _____

Province: Alberta _____ British Columbia _____

PLEASE NOTE:

1. This questionnaire 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. J.E. Reid
Director of Operations Research
Devonian Building
Jasper Avenue and 112 Street
Edmonton, 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

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

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	DO YOU CONSIDER THIS SERVICE ESSENTIAL 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>

_____

_____

STAFFING ADEQUACY INTERVIEWS-PARTICIPATING SCHOOL SYSTEMS

COUNTIES

1. Beaver # 9
2. Camrose # 22
3. Grande Prairie # 1
4. Lethbridge # 26
5. Newell # 4
6. Red Deer # 23
7. St. Paul # 19
8. Strathcona # 20

SCHOOL DIVISIONS

1. Bonnyville # 46
2. Calgary # 41
3. Drumheller # 62
4. Foothills # 38
5. Medicine Hat # 4
6. Northland # 61
7. Peace River # 10
8. Pincher Creek # 29
9. Spirit River # 47
10. Taber # 6
11. Wainwright # 32
12. Willow Creek # 28
13. Yellowhead # 12

SEPARATE SCHOOL DISTRICTS

1. Calgary CS 1
2. Drumheller CS 25
3. Edmonton CS 7
4. Lethbridge CS 9
5. Medicine Hat CS 21
6. Peace River CS 43
7. Red Deer CS 17
8. St. Albert PS 6
9. Taber CS 54
10. Wetaskiwin CS 15

PUBLIC SCHOOL DISTRICTS

1. Banff # 102
2. Bonnyville # 2665
3. Calgary # 19
4. Canmore # 168
5. Edmonton # 7
6. Grande Prairie # 2357
7. Lethbridge # 51
8. Medicine Hat # 76
9. Red Deer # 104
10. St. Albert # 3
11. St. Paul # 2228
12. Wetaskiwin # 264

TABLE 29

RANGES, STANDARD DEVIATIONS, AND WEIGHTED PROVINCIAL MEANS OF SELECTED PERSONNEL AND "OTHER" VARIABLES IN 132 ALBERTA SCHOOL SYSTEMS

VARIABLE NUMBER	RANGE	STANDARD DEVIATION	WEIGHTED PROVINCIAL MEAN*
V171 CO Admin. Staff/1000 Pupils	0.49-9.02	1.08	1.82
V177 In-school Admin. Staff/1000 Pupils	0.00-4.83	0.89	2.76
V148 Total Admin. Staff/1000 Pupils	1.46-10.00	1.23	4.58
V175 CO Support Staff/1000 Pupils	0.00-4.15	0.87	1.85
V173 In-school Support Staff/1000 Pupils	0.00-15.75	2.82	4.77
V152 Total Support Staff/1000 Pupils	0.00-17.07	3.10	6.63
V150 Total CO Staff/1000 Pupils	0.49-10.98	1.38	3.68
V154 Total Non-instr. Staff/1000 Pupils	1.46-24.09	3.71	11.20
V156 Total Instr. Staff/1000 Pupils	33.35-90.45	6.81	46.62
V157 Total Staff/1000 Pupils	42.62-95.45	7.77	57.83
V169 Pupils/Instructional Staff	11.06-29.98	2.63	21.45
V147 Total Admin. Staff/100 Staff	3.23-14.39	1.97	7.92
V149 Total CO Staff/100 Staff	0.89-14.89	2.07	6.36
V151 Total Support Staff/100 Staff	0.00-26.14	4.99	11.46
V153 Total Non-instr. Staff/100 Staff	3.23-35.95	5.63	19.38
V155 Total Instr. Staff/100 Staff	64.05-96.77	5.63	80.62
V98 Mean Teacher Qualifications	1.00-4.14	0.46	3.57
V99 No. of Central Office Depts.	1.00-9.00	1.67	2.60
V96 Total Number of Schools	1.00-174.0	20.91	9.00
V97 Area in Square Miles	1.00-80,000.0	6,972.10	1,420.
V144 Total Number of Pupils	22.00-80,366.0	9,934.82	3,125.
V145 Pupils/Square Mile	0.03-789.5	140.22	2.20
V146 Square Miles/School	0.70-2,666.7	280.17	154.5

*The weighted provincial means were weighted for the number of pupils in each school system for each of the reported variables, except for V98 Mean Teacher Qualifications, which was weighted for the number of instructional staff in each system.

TABLE 30

RANGES AND STANDARD DEVIATIONS OF SELECTED PERSONNEL AND "OTHER" VARIABLES IN TWENTY-NINE COUNTIES

VARIABLE NUMBER	RANGE	STANDARD DEVIATION
V171 CO Admin. Staff/1000 Pupils	0.97-2.72	0.49
V177 In-school Admin. Staff/1000 Pupils	0.97-3.47	0.62
V148 Total Admin. Staff/1000 Pupils	2.66-5.48	0.70
V175 CO Support Staff/1000 Pupils	0.44-3.28	0.60
V173 In-school Support Staff/1000 Pupils	0.91-11.91	1.94
V152 Total Support Staff/1000 Pupils	2.31-12.35	1.87
V150 Total CO Staff/1000 Pupils	1.71-5.33	0.79
V154 Total Non-instr. Staff/1000 Pupils	5.21-17.83	2.33
V156 Total Instr. Staff/1000 Pupils	44.16-57.01	3.37
V157 Total Staff/1000 Pupils	51.60-69.82	4.30
V169 Pupils/Instructional Staff	17.54-22.64	1.35
V147 Total Admin. Staff/100 Staff	4.43-8.74	1.10
V149 Total CO Staff/100 Staff	2.85-7.78	1.20
V151 Total Support Staff/100 Staff	4.10-17.69	2.61
V153 Total Non-instr. Staff/100 Staff	9.26-25.53	3.16
V155 Total Instr. Staff/100 Staff	74.47-90.74	3.16
V98 Mean Teacher Qualifications	2.68-3.63	0.25
V99 No. of Central Office Departments	1.00-6.00	1.24
V96 Total Number of Schools	5.00-23.0	N/A
V97 Area in Square Miles	567.00-3,000.0	N/A
V144 Total Number of Pupils	1,036.00-8,673.0	N/A
V145 Pupils/Square Mile	0.48-15.30	2.69
V146 Square Miles/School	24.7-320.0	72.36

TABLE 31

RANGES AND STANDARD DEVIATIONS OF SELECTED PERSONNEL AND "OTHER" VARIABLES IN TWENTY-NINE SCHOOL DIVISIONS

VARIABLE NUMBER	RANGE	STANDARD DEVIATION
V171 CO Admin. Staff/1000 Pupils	0.96-9.02	1.50
V177 In-school Admin. Staff/1000 Pupils	0.98-4.83	0.85
V148 Total Admin. Staff/1000 Pupils	3.29-10.00	1.40
V175 CO Support Staff/1000 Pupils	0.00-3.64	0.64
V173 In-school Support Staff/1000 Pupils	0.00-15.32	2.70
V152 Total Support Staff/1000 Pupils	1.18-17.07	2.94
V150 Total CO Staff/1000 Pupils	1.60-10.98	1.67
V154 Total Non-instr. Staff/1000 Pupils	5.94-24.09	3.63
V156 Total Instr. Staff/1000 Pupils	41.24-62.56	4.43
V157 Total Staff/1000 Pupils	50.79-74.04	5.80
V169 Pupils/Instructional Staff	15.98-24.25	1.78
V147 Total Admin. Staff/100 Staff	5.56-13.56	1.97
V149 Total CO Staff/100 Staff	2.56-14.89	2.17
V151 Total Support Staff/100 Staff	2.21-25.32	4.11
V153 Total Non-instr. Staff/100 Staff	10.64-35.74	4.68
V155 Total Instr. Staff/100 Staff	64.26-89.36	4.86
V98 Mean Teacher Qualifications	2.40-3.55	0.26
V99 No. of Central Office Depts.	2.00-5.00	1.00
V96 Total Number of Schools	2.00-30.00	N/A
V97 Area in Square Miles	50.00-80,000.	N/A
V144 Total Number of Pupils	249.00-5,075.	N/A
V145 Pupils/Square Mile	0.03-33.04	6.22
V146 Square Miles/School	10.00-2,666.7	512.02

TABLE 32

RANGES AND STANDARD DEVIATIONS OF SELECTED PERSONNEL AND "OTHER" VARIABLES IN THIRTY PUBLIC SCHOOL DISTRICTS

VARIABLE NUMBER	RANGE	STANDARD DEVIATION
V171 CO Admin. Staff/1000 Pupils	0.79-4.55	0.85
V177 In-school Admin. Staff/1000 Pupils	0.00-4.72	1.08
V148 Total Admin. Staff/1000 Pupils	2.09-6.39	1.10
V175 CO Support Staff/1000 Pupils	0.00-2.99	0.94
V173 In-school Support Staff/1000 Pupils	0.00-15.75	3.44
V152 Total Support Staff/1000 Pupils	0.00-15.75	3.66
V150 Total CO Staff/1000 Pupils	0.79-4.88	1.16
V154 Total Non-instr. Staff/1000 Pupils	2.09-21.65	4.30
V156 Total Instr. Staff/1000 Pupils	38.58-90.45	9.66
V157 Total Staff/1000 Pupils	42.62-95.45	9.62
V169 Pupils/Instructional Staff	11.06-25.92	2.99
V147 Total Admin. Staff/100 Staff	3.23-11.24	1.91
V149 Total CO Staff/100 Staff	1.52-9.09	1.99
V151 Total Support Staff/100 Staff	0.00-26.14	5.86
V153 Total Non-instr. Staff/100 Staff	3.23-35.95	6.79
V155 Total Instr. Staff/100 Staff	64.05-96.77	6.79
V98 Mean Teacher Qualifications	1.50-4.14	0.58
V99 No. of Central Office Depts.	1.00-8.00	2.08
V96 Total Number of Schools	1.00-174.	N/A
V97 Area in Square Miles	1.00-260.	N/A
V144 Total Number of Pupils	22.00-80,366.	N/A
V145 Pupils/Square Mile	0.88-789.50	236.29
V146 Square Miles/School	0.70-100.00	32.01

TABLE 33

RANGES AND STANDARD DEVIATIONS OF SELECTED PERSONNEL AND "OTHER" VARIABLES IN FORTY-FOUR SEPARATE SCHOOL DISTRICTS

VARIABLE NUMBER	RANGE	STANDARD DEVIATION
V171 CO Admin. Staff/1000 Pupils	0.49-5.72	1.13
V177 In-school Admin. Staff/1000 Pupils	0.00-4.22	0.92
V148 Total Admin. Staff/1000 Pupils	1.46-7.97	1.40
V175 CO Support Staff/1000 Pupils	0.00-4.15	0.98
V173 In-school Support Staff/1000 Pupils	0.00-8.96	2.58
V152 Total Support Staff/1000 Pupils	0.00-8.96	2.89
V150 Total CO Staff/1000 Pupils	0.49-8.21	1.50
V154 Total Non-instr. Staff/1000 Pupils	1.46-13.68	3.44
V156 Total Instr. Staff/1000 Pupils	33.35-75.70	6.86
V157 Total Staff/1000 Pupils	42.76-87.65	7.65
V169 Pupils/Instructional Staff	13.21-29.98	3.02
V147 Total Admin. Staff/100 Staff	3.26-14.39	2.33
V149 Total CO Staff/100 Staff	0.89-11.66	2.40
V151 Total Support Staff/100 Staff	0.00-18.75	5.45
V153 Total Non-instr. Staff/100 Staff	3.26-27.00	6.09
V155 Total Instr. Staff/100 Staff	73.00-96.74	6.09
V98 Mean Teacher Qualifications	1.00-3.89	0.55
V99 No. of Central Office Depts.	1.00-9.00	1.51
V96 Total Number of Schools	1.00-76.00	N/A
V97 Area in Square Miles	4.00-280.0	N/A
V144 Total Number of Pupils	96.00-32,038.	N/A
V145 Pupils/Square Mile	0.85-432.33	79.27
V146 Square Miles/School	1.20-280.00	45.28

TABLE 34

RANGES, STANDARD DEVIATIONS, AND WEIGHTED PROVINCIAL MEANS OF SELECTED SALARY AND OTHER FINANCIAL VARIABLES IN 132 ALBERTA SCHOOL SYSTEMS*

VARIABLE NUMBER	RANGE	STANDARD DEVIATION	WEIGHTED PROVINCIAL MEAN
V172 CO Admin. $/Pupil	0.31-6.97	0.86	2.09
V178 In-school Admin. $/Pupil	0.00-6.19	1.03	3.75
V159 Total Admin. $/Pupil	1.37-8.85	1.35	5.84
V176 CO Support $/Pupil	0.00-1.49	0.34	0.83
V174 In-school Support $/Pupil	0.00-11.10	1.22	1.82
V163 Total Support $/Pupil	0.00-11.55	1.33	2.64
V161 Total CO $/Pupil	0.31-7.66	1.03	2.92
V165 Total Non-instr. $/Pupil	1.37-17.68	2.29	8.48
V167 Total Instr. $/Pupil	22.55-59.39	4.99	36.61
V168 Total Staff $/Pupil	27.05-62.68	5.94	45.09
V181 Supp. Req. Mill Rate	0.00-23.28	4.92	12.08
V182 Operating Budget Per Pupil	508.93-2,216.67	226.28	890.45
V183 Supp. Req./Pupil	0.00-449.94	73.55	101.64
V158 Admin. $/Staff Member	26.10-151.80	21.67	101.00
V160 CO Staff $/Staff Member	6.20-103.90	15.87	50.50
V162 Support $/Staff Member	0.00-201.50	22.35	45.70
V164 Non-instr. $/Staff Member	26.10-308.50	36.49	146.70
V166 Instr. $/Staff Member	444.60-808.70	61.64	633.20

*Salary ratios were for the month of September, 1971 only, and operating budgets and supplementary requisitions were for the 1971 calendar year.

TABLE 35

RANGES AND STANDARD DEVIATIONS OF SELECTED SALARY AND OTHER FINANCIAL VARIABLES IN TWENTY-NINE COUNTIES*

VARIABLE NUMBER	RANGE	STANDARD DEVIATION
V172 CO Admin. $/Pupil	1.00-2.64	0.46
V178 In-school Admin. $/Pupil	1.78-4.04	0.58
V159 Total Admin. $/Pupil	3.11-6.04	0.68
V176 CO Support $/Pupil	0.22-1.38	0.32
V174 In-school Support $/Pupil	0.29-3.32	0.62
V163 Total Support $/Pupil	0.89-3.63	0.62
V161 Total CO $/Pupil	1.25-3.68	0.64
V165 Total Non-instr. $/Pupil	4.13-9.67	1.14
V167 Total Instr. $/Pupil	29.57-42.32	3.35
V168 Total Staff $/Pupil	35.14-49.87	3.77
V181 Supp. Req. Mill Rate	5.00-19.51	4.03
V182 Operating Budget/Pupil	799.01-1,185.64	84.71
V183 Supp. Req./Pupil	28.11-187.48	35.32
V158 Admin. $/Staff Member	51.90-101.90	11.33
V160 CO Staff $/Staff Member	20.90-65.00	10.22
V162 Support $/Staff Member	15.30-52.00	9.08
V164 Non-instr. $/Staff Member	68.80-138.80	16.46
V166 Instr. $/Staff Member	543.50-693.10	42.74

*Salary ratios were for the month of September, 1971 only, and operating budgets and supplementary requisitions were for the 1971 calendar year.

TABLE 37

RANGES AND STANDARD DEVIATIONS OF SELECTED SALARY AND OTHER FINANCIAL VARIABLES IN THIRTY PUBLIC SCHOOL DISTRICTS

VARIABLE NUMBER	RANGE	STANDARD DEVIATION
V172 CO Admin. $/Pupil	0.46-3.88	0.75
V178 In-school Admin. $/Pupil	0.00-6.19	1.32
V159 Total Admin. $/Pupil	1.80-6.98	1.47
V176 CO Support $/Pupil	0.00-1.49	0.38
V174 In-school Support $/Pupil	0.00-5.47	1.10
V163 Total Support $/Pupil	0.00-5.47	1.24
V161 Total CO $/Pupil	0.46-4.30	0.96
V165 Total Non-instr. $/Pupil	1.80-12.44	2.47
V167 Total Instr. $/Pupil	26.04-59.39	6.20
V168 Total Staff $/Pupil	28.13-62.68	6.71
V181 Supp. Req. Mill Rate	0.00-19.85	5.11
V182 Operating Budget Per Pupil	637.82-2,216.67	287.53
V183 Supp. Req./Pupil	0.00-383.32	81.14
V158 Admin. $/Staff Member	26.10-122.10	25.89
V160 CO Staff $/Staff Member	8.90-79.80	16.83
V162 Support $/Staff Member	0.00-90.80	20.69
V164 Non-instr. $/Staff Member	26.10-206.60	41.71
V166 Instr. $/Staff Member	444.60-756.90	74.56

TABLE 38

RANGES AND STANDARD DEVIATIONS OF SELECTED SALARY AND OTHER FINANCIAL VARIABLES IN FORTY-FOUR SEPARATE SCHOOL DISTRICTS

VARIABLE NUMBER	RANGE	STANDARD DEVIATION
V172 CO Admin. $/Pupil	0.31-3.78	0.84
V178 In-school Admin. $/Pupil	0.00-5.52	1.10
V159 Total Admin. $/Pupil	1.37-7.83	1.49
V176 CO Support $/Pupil	0.00-0.95	0.31
V174 In-school Support $/Pupil	0.00-2.28	0.78
V163 Total Support $/Pupil	0.00-2.89	0.94
V161 Total CO $/Pupil	0.31-3.78	1.00
V165 Total Non-instr. $/Pupil	1.37-9.64	2.06
V167 Total Instr. $/Pupil	22.55-49.84	4.83
V168 Total Staff $/Pupil	27.05-58.77	5.80
V181 Supp. Req. Mill Rate	1.09-22.92	4.92
V182 Operating Budget Per Pupil	508.93-1,410.71	134.55
V183 Supp. Req./Pupil	4.16-143.42	30.45
V158 Admin. $/Staff Member	30.40-145.40	24.96
V160 CO Staff $/Staff Member	6.20-73.80	16.86
V162 Support $/Staff Member	0.00-51.20	17.28
V164 Non-instr. $/Staff Member	30.40-169.70	35.04
V166 Instr. $/Staff Member	464.70-808.70	68.00