SMITH, Clifford Basil. A STUDY OF THE
OPTIMUM SIZE OF SECONDARY SCHOOLS.

The Ohio State University, Ph.D., 1960
Education, administration

University Microfilms, Inc., Ann Arbor, Michigan
A STUDY OF THE OPTIMUM SIZE OF
SECONDARY SCHOOLS

DISSERTATION
Presented in Partial Fulfillment of the Requirements for
the Degree Doctor of Philosophy in the Graduate
School of The Ohio State University

By
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* * * * * *

The Ohio State University
1960

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ACKNOWLEDGMENTS

The author wishes to express his sincere appreciation to the many people who aided in the development and completion of this study. He is especially indebted to his adviser, Dr. M. J. Conrad, for his guidance and assistance in this study and throughout the doctoral program. Special thanks are due Dr. Egon Guba for his valuable assistance in the statistical approach to the study.

A note of appreciation is extended to Dr. Lewis Harris and staff members of the Ohio School Boards Association; the many principals throughout the State who participated in the study; staff members of the Department of Secondary Education in the State Department of Education; and to the members of the School Plant Division and Central Office of the Bureau of Educational Research and Service, The Ohio State University, whose cooperation and constructive criticism were necessary and helpful in the development of this project. Finally, recognition is due to his wife Julia for her inspiration, devotion, and understanding during the development of the study.

C. B. S.
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CHAPTER 1

INTRODUCTION

The United States has been, and continues to be, a rapidly growing nation. During the years since its birth many changes have taken place as a result of the demands made by this rapid growth "melting pot."

Education of the people of this nation appeared as one of the early needs faced by the people. As a result of this need and the rapid growth of the country, the public school system has grown so rapidly that today, next to government, it is the largest business in the nation. Although it still remains a state function, there are local and nation-wide implications associated with the problems of educating the people.

Urbanization, improved communications, improved transportation, increased birth rates, increased productivity, improved technical know-how, research on child growth and development, and increasing data about the learning process are only a few of the changes that are responsible for the continued growth of the schools and the modification of educational thinking and practices.

With the emergence of changing conditions and the belief that young people should have a greater opportunity to develop their potential, the question of how to best meet their needs was, and
still remains, a real issue. The "3 R's" and the one-teacher, common school district were found to be no longer satisfactory to meet the demands placed on education. A major step in solving some of the problems came with the establishment of the public secondary school program in the United States. This program has been under close scrutiny since its origin and is still considered to be a prime target for many critics of educational practices. The rapid growth of the public secondary school program in both scope and enrollment has been instrumental in triggering many of the criticisms leveled at our educational system.

It has been stated that the public secondary school has neglected in many respects to meet the demands of its owner, the public. Failure to meet these needs has resulted in a resistance by the public, and the task of achieving the desired objectives of modern education has been increased. Involved in this resistance are many factors, three of which evolve as major problems; housing the increased enrollments, increasing cost of the public school program, and an effective school program to meet the needs of boys and girls.

The increase in school enrollments is emphasized in a recent report in Overview. According to this report the total school and college enrollments increased from 31 million to about 45 million during the last decade. The current increase is somewhat more than two million per year and this is expected to continue during the next 10 years. Although there will be a substantial increase in the elementary school enrollments in the years ahead, the number of pupils

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in the secondary schools will increase by nearly 75 per cent and the institutions of higher learning will experience a doubling of current enrollments. This quantitative aspect is directly related to building needs and the increased cost of the public school program. It must be pointed out, however, that the quantitative aspects are also closely related to the qualitative aspects. This is aptly stated in a doctoral study made by Conrad when he stated,

To the problem of providing quantitatively adequate facilities to meet expanding secondary school enrollment is added the problem of building to meet the changing needs of the secondary school program. Thus we find the secondary school faced with both quantitative needs. We need not only additional rooms to house our increasing enrollments but also additional rooms which are adapted to needs of the modern secondary school curriculum.2

In order to objectively face the issues and deal realistically with them, there is a need for continued research and study of the curricular or qualitative aspects of the public school program. Equally as important and perhaps more realistic to the general public is the tremendous growth in public school enrollments and the shortage of housing, especially at the secondary school level.

Communities are thus faced with the problem of providing the necessary school plant facilities to house the increased enrollments as well as the desired educational program. More often than not, one of the first questions to be answered is: How large should the high

school center be to do the best job of providing the best educational program for the youth of the school district?

This question has been a consideration in every reorganization, school building needs, and educational planning study that this writer has been involved in during the past three years as a member of the School Plant Division of the Bureau of Educational Research and Service. School, governmental, and community people are anxious to find a solution to this question. In fact, government agencies have been so interested in the problem that certain restrictions have been placed on the granting of foundation funds if certain enrollment requirements are not met. These restrictions deal with the small schools. In the opinion of most educators, the consolidation of small school districts to enable larger enrollments and a more complete program is needed throughout the nation. However, many of these same educators would agree that schools can be too large as well as too small to provide the best educational opportunities for young people.

The "bigger the better" concept that has been widely held for many years has been challenged during recent years. As a result of further study concerning school size and the changing population patterns, the enrollments of very small schools during the past 30 years have been getting larger and the very large schools are becoming smaller. Some studies show that, up to a point, larger schools are more economical and usually result in offering a better educational program. Herrick suggests that a school which is too large or too small can impair the effectiveness of the educational program. He lists the following
favorable and unfavorable factors that tend to be more prevalent in
schools of larger enrollment:

1. Greater variety of courses offered with more frequency and regularity and with greater adaptation of content and method to the varying abilities of different groups of pupils.

2. More extensive and balanced programs of pupil activity (interscholastic athletics, intramural athletics, hobby clubs, literary groups, musical organizations, student councils, and so forth).

3. More adequate provision of lunchrooms, health examinations, counseling, psychological assistance, and other special services.

4. Greater success with some exceptions, in recruiting and holding qualified teachers and in providing the educational leadership necessary to keep them growing professionally.

5. More adequate provisions at reasonable cost of necessary building facilities and equipment of certain types.

The failure of the very large schools to achieve a high quality of education seems to be related casually to the following:

1. The increased difficulty of administration, with the accompanying tendency of the principal to neglect his function as a leader because of preoccupation with operating the machinery.

2. The increased difficulty of unified staff planning and attack upon problems that should be of school-wide concern, i.e., the greater tendency for each teacher or department to operate independently rather than as part of a school-wide team.

3. The increased tensions and fatigue of teachers in a large school with more activity and noise, more formalization of operating procedures, and more conflicting demands upon their time and energy.
4. The increased difficulty of focusing effective attention upon the problems and needs of the individual pupil, especially in schools where the instruction of a given child is the responsibility of a number of different teachers during the same semester or year.

5. The less favorable psychological reaction of the pupil to the school situation, including the awe or even fright, and the tension of the young child in a very large school, and the misbehavior of the older child whose identity is lost in the mob.3

While evidence seems to point to many of the advantages of a large school, one must be cognizant of the meaning of large as it is applied to the secondary school size. Oliver sounded a note of caution when he stated:

The truth of the situation is that a huge school on clocklike routine and formality can be just as ineffective in wholesome development of the individual as the school traditionally characterized by a narrow curriculum, a limited social environment, and inadequate teaching.4

It would appear that there must be a middle-of-the-road or desirable secondary school size range in which the needs of the pupils can be met and yet not so large that an "institutional air" prevails. To adequately consider the many factors and problems involved in the issue of optimum school size, school officials must involve educators


and lay public in determining the number of pupils to be housed, the desired educational program, and the expected outcomes of such a program. It then becomes the responsibility of the elected school officials to make the decision as to how large the secondary school should be.

Many factors are involved in determining secondary school size. A number of general statements can be found in the literature concerning factors that contribute to the effectiveness of a given school. In 1959 the Research Division of the National Education Association published a statement that summarizes very well the reason for a look at the factor of school size as related to program.

Desirable school size is determined by many factors, not all of which are present in every situation. If schools are rated on academic achievement of pupils alone, little difference can be found in large and small schools. Today's schools, however, seek to do more than develop confidence in the basic skills; they attempt to provide for individual differences, to promote vocational and social effectiveness, and to make available medical, testing, and counseling services. Such goals call for more and more special facilities and personnel, and school size has tended to increase.5

How large the school center must be to accomplish the desired educational objectives and yet not be so large that the undesirable factors related to bigness begin to outweigh and the advantages gained over the small secondary school is the issue. Alexander and

Saylor, suggest that we have no conclusive evidence as to what the desirable size for the secondary school is. Other writers such as Edmonson and Englehardt suggest that there is no optimum size for different types of secondary schools.

From the excerpts, findings, and opinions shown above, it can be seen that there is a divergence in the conclusions drawn about optimal secondary school size. It is for this reason, and because the need exists for additional information concerning secondary school size, cost, and factors that are related to the effectiveness of the school program, that this study is being made.

**Scope of the Study**

This study attempted to determine (1) the relationship, if any, of secondary school size to certain cost factors; (2) the relationship of school size to certain program effectiveness factors; (3) the effect of selected community characteristics on the relationship of school size to cost and certain program factors; and (4) whether there is an optimum size range for three- and four-year secondary schools in Ohio.

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Certain limitations were arbitrarily placed on this study to make it more definitive and meaningful. These limitations are as follows:

1. The investigation was limited to all certified operational public three- and four-year secondary schools in the State of Ohio whose records were available at the State Department of Education. This limitation was desirable because it offered a ready source of data and allowed for an equitable range of school districts throughout the State of Ohio. The inclusion of the six-year secondary schools would have resulted in a top-heavy, small, and local district secondary school sample. Also, it would have involved certain program factors associated with grades 7 and 8 that are not comparable to the upper secondary grades. For instance, many schools offer few, if any, elective subjects in these grades and operate on a rather rigid schedule as compared to the upper secondary school level. To resolve the differences was considered to be beyond the scope of this study.

2. The study assumes certain effectiveness factors while realizing that there may be other factors related to the effectiveness of the school program.

3. The significance of the relationships were attached to the summation of factors rather than to any single factor.

**Proposed Plan of Attack**

The design of this study is descriptive-survey. It will review previous studies and literature pertinent to the issue of secondary school size. An evaluation of these materials will be made and conclusions drawn.
Basic research data used in this investigation will be processed and analyzed to determine the relationship, if any, of size to per pupil cost and to the assumed effectiveness factors used. The effect of selected community characteristics on the relationship of school size to certain variables will be explored and conclusions drawn.

An outline of the plan of attack in developing this study included the following phases:

1. Selection of an appropriate problem of suitable dimension and interest to the investigator
2. Review of previous studies and literature pertinent to the subject of secondary school size
3. Development of hypotheses and outline of the study
4. Development of instruments and data forms to be used in collecting and processing data
5. Processing, analysis, and interpretation of data
6. Summary and development of conclusions
7. Recommendations

Sources and Collection of Data

Background data were obtained from previous studies and professional literature pertinent to the subject. Certain research data were secured from the 1959-60 Annual Principal's Reports available at the State Department of Education and recorded according to size intervals of two hundred. Raw data obtained from this source included: type of district and organizational plan, school size, pupil-teacher
ratio, number of pupils carrying five or more course units, number of teaching aids, number of library volumes used per year, total salary costs for professional personnel, salary cost for administration and special-service personnel, degree obtained by teachers, years teaching experience of teachers, teacher and principal certification, degree attained by principal, years in the present school by the principal, total number years experience of principal, and the number of semester hours in education by the principal.

Additional data were obtained by means of a questionnaire to the high school principal of each of the 404 schools whose records were available for this study. Of these, a return of 352, or approximately 89 percent, was obtained. Information concerning pupil discipline, teacher turnover, special services offered, population classification of the school community, family income, occupational classification, and the number of course offerings available were secured from this source. The number of schools for each interval from the initial sample and from the questionnaires returned is shown in Table 1. Although the questionnaire was tested by the principals from two city, two exempted village, and three local school districts, the data obtained relevant to level of achievement were found to be insufficient in content and were not included in this study. A copy of the data form and questionnaire is shown in Appendixes A and C.
Table 1
Schools by Size Interval in the Initial Sample and in the Questionnaires Returned

<table>
<thead>
<tr>
<th>Size interval</th>
<th>Number of schools</th>
<th>Initial sample</th>
<th>Questionnaires returned</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-199</td>
<td>87</td>
<td>67</td>
<td></td>
</tr>
<tr>
<td>200-399</td>
<td>109</td>
<td>96</td>
<td></td>
</tr>
<tr>
<td>400-599</td>
<td>69</td>
<td>63</td>
<td></td>
</tr>
<tr>
<td>600-799</td>
<td>39</td>
<td>37</td>
<td></td>
</tr>
<tr>
<td>800-999</td>
<td>21</td>
<td>17</td>
<td></td>
</tr>
<tr>
<td>1,000-1,199</td>
<td>23</td>
<td>22</td>
<td></td>
</tr>
<tr>
<td>1,200-1,399</td>
<td>15</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>1,400-1,599</td>
<td>12</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>1,600-1,799</td>
<td>13</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>1,800-1,999</td>
<td>7</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>2,000-2,199</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>2,200-2,399</td>
<td>2</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>2,400-2,599</td>
<td>4</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>2,600-2,799</td>
<td>2</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2,800-2,999</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>3,000-3,199</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>3,200-3,399</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>404</td>
<td>352</td>
<td></td>
</tr>
</tbody>
</table>

Treatment of Data

The raw data were tabulated so that the small schools could be properly assessed and compared to larger schools on each factor. The items were processed into averages, percent of the total, per-unit value, or in proportion to each 1,000 pupils of total enrollment.
The data for certain community characteristics were treated somewhat differently. A classification of occupations was devised from the expanded North-Hatt scale. An index devised from the values assigned to each job type in that study served as the nucleus for determining occupational classifications. These indexes, when applied to the raw data, provided a means of classifying the district primarily into prestige groups. Certain other classifications were developed for family income and for populational classification of communities. The approach to the development of each factor or characteristic used in this study will be defined appropriately later in the text.

The raw data were recorded on IBM cards to provide for more efficient analysis and for future use of the data.

The possible linear relationship of school size to all factors included in this study, except the percent of principals with a masters degree or beyond and the percent of principals with six through twenty years of experience, was first tested by plotting the value of each frequency on coordinate graph paper. A freehand curve and visual analysis showed the relationship to be something other than linear. Since it was difficult to determine from the freehand method the proper relationship that existed, a more detailed measure of central tendency and dispersion was needed. The median, as a measure of central tendency, and the first and third quartiles, as a measure of dispersion, were calculated and plotted according to size intervals.

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to show the relationship of school size to each of the factors used in the study except the percent of principals with a masters degree or beyond and with six through twenty years of experience. Because of the limited number of schools with enrollments in excess of 2,000 the first and third quartiles were not computed for those schools. Although the data are limited beyond this point, the consistency in some cases was such that the relationship was considered to be significant.

The relationship of school size to certain cost and program effectiveness factors was tested by grouping the schools according to various community characteristics and analyzing the data in a manner similar to that used in the treatment of the basic data. A measure of dispersion was not used for defining these relationships.

In a summary on curvilinear regression Blair appraises the class averages approach for defining existing relationships between variables.

Most relationships between variables in the physical as well as in the social sciences are not straight line, but conform to some type of curvilinear function.

Curvilinear lines may be computed from class averages and drawn into coordinate graphs of the plotted data. Such curves are often excellent devices and by reading off the estimated values of the data from the class average curved line, values may be obtained comparable to standard error of estimate and the coefficients of determination and correlation.\(^{10}\)

Order of Presentation

Chapter 2 contains a general overview of previous studies and literature related to the subject of school size. It also includes a more detailed discussion and summary of two significant studies on the subject of optimal school size. Many of the studies indicate the importance of the relationship of school size to cost. This aspect is discussed and evaluated in Chapter 3 of this investigation.

The relationship of selected effectiveness factors to school size was analyzed and principal findings shown in Chapters 4, 5, 6, and 7. The effect of selected community characteristics on the relationship of school size to certain factors was tested and is presented in Chapter 8. The concluding chapter contains a summary of findings derived from the literature and the study, the major conclusions, and recommendations. Suggestions for areas of additional research are also included in this chapter. A bibliography and appendix containing copies of the data form, questionnaire, and the report of the high school principal are presented.
CHAPTER 2

REVIEW OF LITERATURE RELATED TO THE SIZE OF SECONDARY SCHOOLS

A General Overview of the Literature

Only a relatively few research studies have been made about the subject of optimal secondary school size. However, one can find numerous subjective articles in the professional and nonprofessional literature concerning how large a high school should be. Conclusions drawn range from minimum enrollments of 100 pupils to schools of unlimited size.

The question of the size of a secondary school is current in the discussion of school problems. This point was expressed by Livingston when he stated:

One of the most widely discussed questions and one on which every educator holds an opinion is that of desirable school size for the modern American high school. The question of optimum size is considerably more complex than the multiplicity of opinion would indicate.¹

Thus, it would appear that there may be many factors involved in determining optimum secondary school size. Some factors have been isolated and studies made to determine the relationship of the selected factors to that of school size. Some of these factors are: cost, staff relations, community relations, educational opportunities, pupil

¹ A. H. Livingston, "Is There an Optimum Size High School?" Progressive Education (September, 1956), p. 156.

16
adjustments, trends, academic success and achievement, administration of school, and educational program.

Perhaps most numerous of the factors studied was that of cost. Of these studies, one of the severest cost indictments against the very small school came from the Illinois School Problems Commission\(^2\) when it suggested that the cost is much less than half as much to provide a good program in a school of seven hundred as to provide an inferior program for an enrollment of less than one hundred pupils. Paul Mort, one of the best known specialists in the area of school finance, has expressed the opinion that the level of financial support is the most powerful of all factors which influence the quality of the schools. "Of 300 factors studied, this proved to be most significant."\(^3\) However, he is willing to agree that size is a very important factor and one which influences the quality of the school program.

McLure's study\(^4\) of school cost in Mississippi disclosed that a desirable minimum enrollment of seven hundred pupils is a point where the greatest financial efficiency is attained. On the other hand, he concluded that slightly higher enrollments--1,000 to 1,200 may be required to provide all the educational services desired in a given


community. Associated Public School Systems, an affiliate of the Institute of Administrative Research of Teachers College, in the article, *Does Money Make A Difference?* discussed the factor of cost as related to quality. It was stated that: "Evidence from studies made in the relationship between cost and quality show that in schools as in most other places when you spend more you get more."\(^5\) This statement does not imply that increased school costs automatically make better schools. It does suggest, however, that with enough money to hire better qualified teachers and administrators, to provide better facilities, to buy adequate supplies, and to provide a desirable educational program to meet the needs of the youth of the district, that the quality of education will be raised.

Cornell discusses the cost factor in relation to building size. He points out that the high cost of a small school results not from the square foot cost but from the per pupil cost resulting from poor utilization of the school plant which in turn is the result of an inadequate school enrollment. A brief summary of Cornell's thinking on the relationship of high school size to building costs can be found in the following statement.

On the face of it, it would seem logical that the cost per pupil of constructing a high school would be less for a larger school than for a smaller one. A small school must allow "minimum" spaces for such purposes as the auditorium, the gymnasium, and the principal's office which are in the "overhead" category. The principal for example, must have, let us say, at least 200 square feet for his office whether he is in a high school of 100 or a high school of 500 pupils. The minimum spaces thus mount up to the small school, reflecting high proportions

\(^5\) "Relations Between Cost and Quality in Public Education," *Education Digest*, November, 1958, p. 29.
of the total space budget. Moreover, the small school has difficulties in utilization of its spaces. Small schools must have small classes; for instance, in third-year mathematics or third-year modern language, and there are not enough sections of special subjects and activities such as science, shop, and music to fully utilize these spaces most every period of the day.

The main common denominator of cost (other than variations due to type of construction and design) is the space allocation. Hence, to the extent that the above observations are defensible, to that extent does a larger school cost less per pupil. Experience shows that this is significantly true up to a certain point. As a matter of fact, the actual space budgets per pupil in schools constructed in the United States are increasingly less as the size of school increases.

The experience of assessing the adequacy of spaces in many schools suggests, however, that a good part of the savings in space costs per pupil in large high schools is not genuine economy. What often happens is that the larger schools are made larger by adding more standard classrooms without adequately providing comparable auxiliary spaces.

One could easily defend a larger number of administrative, guidance, and supervisory persons per 100 pupils, for example, in the larger school than in the smaller school. In other words, there is reason to expect that part of the cost of construction of large high schools is false economy.  

The report of the Ohio School Survey Committee released the following findings concerning economic effect of the small school:

Small high schools usually cost more per pupil than large high schools. The maintenance of unnecessary small high schools usually results in robbing the elementary school in order to meet accreditation requirements for the high school. In districts with a high school of 101 to 200, the median expenditure per elementary pupil was $130 and per high school pupil $271. In districts with high schools of 501 to 1,000, the median expenditure per elementary pupil was $187 and per high school pupil $253.


A doctoral study\(^8\) was made in 1958 at Stanford University on the subject of staff relations and school size. The investigation was limited to 17 four-year high schools and included such factors as: communication, group cooperation, teacher effectiveness, staff participation, supervision, and teacher load and routine. The schools used in the study were divided into four categories, i.e., 800-1,199, 1,200-1,599, 1,600-1,999, and 2,000 or above. Based on the limited scope and sample of the study, findings indicated that the optimum size of a four-year high school for staff relations is one with an enrollment of between 1,200-1,599. The study, however, concluded that the conditions favoring staff relations in one size high school over another are not great enough to warrant major sacrifices in achieving a specific size.

Two other studies, utilizing the same sample and categories, were also conducted at Stanford University. One of the studies dealt with size of high school as related to curricular offerings\(^9\) and the other investigated the relationship of high school size to community relations.\(^{10}\) The study on curricular offerings concluded that the optimum size of a four-year high school would be in the enrollment range of 1,200-1,599 pupils.


The study on School-Community Relations also suggested an optimal size of 1,200-1,599 but also concluded that the data from the study were not conclusive enough to warrant the recommendation of any one size school in preference to another.

A study\textsuperscript{11} conducted in Ohio found that small high schools are not offering the breadth of educational opportunity, as shown by course offerings, found in larger high schools. This is shown in tabular form below.

Table 2

Comparison of Number of Units of Study Offered in Large and Small High Schools in Ohio

<table>
<thead>
<tr>
<th>Subject area</th>
<th>28 schools with enrollments under 50</th>
<th>22 schools with enrollments of 301-500</th>
</tr>
</thead>
<tbody>
<tr>
<td>Art</td>
<td>.00</td>
<td>.68</td>
</tr>
<tr>
<td>Commercial</td>
<td>2.48</td>
<td>6.20</td>
</tr>
<tr>
<td>English</td>
<td>3.57</td>
<td>4.23</td>
</tr>
<tr>
<td>Foreign language</td>
<td>.64</td>
<td>2.59</td>
</tr>
<tr>
<td>Mathematics</td>
<td>1.61</td>
<td>3.23</td>
</tr>
<tr>
<td>Music</td>
<td>.71</td>
<td>2.08</td>
</tr>
<tr>
<td>Science</td>
<td>2.30</td>
<td>3.50</td>
</tr>
<tr>
<td>Social studies</td>
<td>2.75</td>
<td>3.96</td>
</tr>
<tr>
<td>Vocational subjects</td>
<td>3.21</td>
<td>6.64</td>
</tr>
</tbody>
</table>


It can be noted that schools under 50 do not offer as rich a program as schools over three hundred. In the small school the courses are offered on alternate years, making scheduling of the program very difficult for some students.

It was concluded in the Ohio School Survey Report that the quality of the schools increased as the size of the school increased.

It was not until the 500 pupil level was reached that a majority of the high schools received the "satisfactory" rating for quality. However, since the unsatisfactory schools were generally smaller, only 55 per cent of the pupils were enrolled in them and 45 per cent were in schools which appeared to meet the standards of a satisfactory program.12

The quality or effectiveness of the school program as related to size is further indicated in the 1959 Report of the Educational Council.13 The study attempted to determine the relationship between academic achievement of students in college and the size of high school from which they were graduated. The academic ability of the students was considered as a factor in the investigation.

Although the study had certain limitations, it tended to show that students who were graduated from high schools with less than 250 pupils enrolled, were generally less well prepared on entering college and made

12Ohio School Survey Committee, op. cit., pp. 82-83.

a poorer college record than students who graduated from high schools
with an enrollment of 250 or more pupils.

Perhaps one of the most popular studies in the past decade was that
done by Conant. His observations led to the opinion that approximately
four out of every five high schools in the United States are too small
to provide an adequate variety of courses. The indictment against these
high schools which he classes as the small high school is found in the
following statement:

The enrollment of many American public high schools is too
small to allow a diversified curriculum except as exorbitant
expense. The prevalence of such high schools--those with
graduating classes of less than one hundred students--con-
stitutes one of the serious obstacles to good secondary edu-
cation throughout most of the United States. I believe such
schools are not in a position to provide a satisfactory edu-
cation for any group of their students--the academically
talented, the vocationally oriented, or the slow reader.
The instructional program is neither sufficiently broad nor
sufficiently challenging. A small high school cannot by its
very nature offer a comprehensive curriculum. Furthermore,
such a school uses uneconomically the time and efforts of
administrators, teachers, and specialists, the shortage of
whom is a serious National problem.

Financial considerations restrict the course offerings of
the small high schools. As the curriculum is narrowed, so
is the opportunity for a meaningful program. Unless a
graduating class contains at least one hundred students,
classes in advanced subjects and separate sections within
all classes become impossible except with extravagently
high costs.14

There are many disadvantages of the small high school. On the
other hand, there are potential disadvantages in having a high school
so large that the pupil may assume the role of a "product" and be

14 James B. Conant, The American High School Today (New York:
forgotten because of the formalized organization that becomes necessary for the administration of the school.

A study conducted by the National Education Association on pupil behavior concluded that sheer "bigness" of the educational enterprise and trouble with pupils seem to go hand in hand.

In a doctoral study made at the University of Nebraska, Hoover pointed out that although many educational leaders have deplored the existence of small high schools, typical graduates of large high schools are not at all convinced that high schools should be large.

Much work needs to be done in the area of achievement and academic success as related to school size. A doctoral study made by Dickerson found that the rate of withdrawal from the University of Arkansas was significantly greater for the students coming from the small high school. However, it should be noted that schools of over three hundred pupils were considered in the study to be large schools. The study also found that students from the large high schools had a significantly higher


16 F. W. Hoover, "The Relationship Among Attitude of University of Nebraska Freshmen Toward Twelve Major Issues in Secondary Education and Seven Background and Status Factors," Abstracts of Doctoral Dissertations (Lincoln: The University of Nebraska, 1941), p. 185.

mean in both reading comprehension and mental ability, as measured by the American Council on Education Psychological Test, than those students from schools with enrollments of less than three hundred pupils.

The trend appears to be toward larger secondary schools; however, Fitzwater's study found that there is no real unanimity on the size that a high school should be. He found the recommended minimum for four-year high schools in Minnesota and South Dakota to be 100 pupils; Illinois and Wisconsin a minimum of 300; and Pennsylvania 360 for a junior high school and 450 for a senior high school. The National Commission on School District Reorganization recommended a minimum of 75 pupils for each grade group or 450 pupils for a six-year high school.

The trend is toward the elimination of the very small and the very large high schools. This can be seen very clearly in figures published by the United States Department of Health, Education, and Welfare. The change in number and percent of all public secondary day schools by enrollment for the years 1930 and 1952 are shown in Table 3.

The greatest change, according to Table 3, is noted in schools with fewer than one hundred pupils enrolled—a decrease of approximately 24 percent during this period. The number of schools with enrollments

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Table 3

Number and Percent of Public Secondary Day Schools by Enrollment, 1930 and 1952

<table>
<thead>
<tr>
<th>Enrollment</th>
<th>1930</th>
<th></th>
<th>1952</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number of schools</td>
<td>Percent of total</td>
<td>Number of schools</td>
<td>Percent of total</td>
</tr>
<tr>
<td>1-99</td>
<td>12,007</td>
<td>53.9</td>
<td>7,117</td>
<td>30.0</td>
</tr>
<tr>
<td>100-199</td>
<td>4,603</td>
<td>20.7</td>
<td>6,025</td>
<td>25.4</td>
</tr>
<tr>
<td>200-299</td>
<td>1,633</td>
<td>7.4</td>
<td>3,103</td>
<td>13.0</td>
</tr>
<tr>
<td>300-499</td>
<td>1,478</td>
<td>6.7</td>
<td>3,106</td>
<td>13.1</td>
</tr>
<tr>
<td>500-999</td>
<td>1,421</td>
<td>6.4</td>
<td>2,757</td>
<td>11.6</td>
</tr>
<tr>
<td>1,000-2,499</td>
<td>934</td>
<td>4.2</td>
<td>1,536</td>
<td>6.5</td>
</tr>
<tr>
<td>2,500 or more</td>
<td>161</td>
<td>0.7</td>
<td>102</td>
<td>0.4</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>22,237</td>
<td>100.0</td>
<td>23,746</td>
<td>100.0</td>
</tr>
</tbody>
</table>


In excess of 2,500 pupils is also declining. It would appear that schools are considered to be either too "small" or too "big." This assumption has been verified in the studies made by Woodham21 and the New York State Education Department.22

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The New York Study

Perhaps the most significant study that attempted to establish the relationship of school size to cost and certain assumed effectiveness factors was that done in 1959 by research experts of the New York State Department of Education. The object of the study was to determine, if possible, an optimal size range for six-year high schools in the State of New York. A total of one hundred schools, representing secondary school enrollments from 87 to 1,338 pupils, was selected for the investigation. An alternate sample of one hundred was made for checking purposes.

The major variables selected for study were size, cost, and certain factors assumed to affect the educational opportunity available. The size variable included the total registration of pupils in grades 7 through 12 in the schools selected for the sample. The cost variable was based on a per pupil basis and included such factors as transportation, special school program services, and apportioning the resultant costs between secondary and elementary programs according to teacher salary ratio. According to the researchers, the study found that the relationship between school size and cost was best described by a quadratic relationship. The study concluded that an enrollment of approximately seven hundred pupils represented the most economical size for secondary schools. It also concluded that there are significant forces other than enrollment affecting the operating costs of schools. In seeking to clarify some of these forces, an examination of a third variable was made. The third variable of the study
educational opportunity--was made up of 20 indicators which were classified into three main groups. The group classifications and indicators are shown below.

(a) Institutional Characteristics

1. Number of major course sequences offered
2. Scope and variety of courses
3. Number of activities provided
4. Variety of standardized tests used
5. Number of types of services provided
6. Number of graduates entering degree--granting institutions, per 1,000 pupils
7. Pupil retention rate
8. Number of Regent's Examinations taken per 1,000 pupils
9. Length of school year
10. Class size

(b) Library Characteristics

11. Number of volumes in library
12. Number of volumes per pupil
13. Number of periodicals provided
14. Number of periods per day library is open

(c) Teaching staff Characteristics

15. Proportion of teachers with M.A. or beyond
16. Proportion of teachers without B.A.
17. Years of teaching experience
18. Proportion of male teachers
19. Pupil-teacher ratio
20. Teacher-supervisor ratio

A summary of the findings relative to these indexes of educational opportunity is presented.

Analysis of the institutional characteristics indicated that schools with an enrollment of less than 500 appeared in general to be at a disadvantage in attempting to provide the opportunities represented by these characteristics. In the degree to which these schools were able to provide these opportunities, they were paying a premium for them. The analysis further indicated that paying the premium was not enough to boost the opportunities provided to the level of the larger schools.

It was found that the cost was lowest in proportion to number of courses offered in schools of approximately seven hundred pupils.

The analyses of library characteristics in terms of cost and size showed about the same results as the institutional characteristics.

The analyses of teaching staff characteristics indicate a significant relationship to size and cost. Schools with enrollments of 550 to 850 pupils appear to have an advantage in providing economically an adequate and desirable staff.

The study showed that the characteristics or factors listed above varied with school size but that the point of greatest economy or the

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23 Ibid., pp. 4-5.

24 Ibid., pp. 30-31.
lowest cost in relation to breadth of educational opportunity appeared in the size interval of 688 to 756 pupils. It should be noted that as the size of a school goes beyond the 688-756 size interval, the per pupil cost of school operations increases as the enrollment is increased. When the cost factor is removed, schools with enrollments above 850 offer more in major course sequences, scope and variety of courses, activities, services, class size (proportion of classes with 10-35 pupils), volumes in library, and proportion of teachers with a Master's degree or beyond.

The study concluded that,

The results of the present study would seem to indicate that schools with a secondary enrollment of less than 500 pupils are operating at a disadvantage in terms of certain indices of educational opportunity and are operating uneconomically compared with schools somewhat larger. The most economical size for the secondary school would seem to be between 600 and 800 pupils. In this interval, also, the indices of educational opportunity showed generally to greatest advantage relative to cost.25

The Florida Study

The study was an investigation to determine the relationship between the size of secondary schools, the per pupil cost, and the breadth of educational opportunity in the State of Florida.

The sample included 290 of the 305 public secondary schools in the State. Of this total, 202 were white secondary schools and 88 were Negro schools. Each of the 67 county school administrative units was represented by one or more schools. The enrollment of the schools involved

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25 Ibid., p. 71.
in the study ranged from 19 to 2,385 for white secondary schools and 24 to 1,650 for Negro.

The investigation is concerned primarily with the determining quantity of educational opportunity available in schools of various sizes and at varying cost per pupil and is not concerned with determining the quality of educational opportunity except to the extent that measure of the quantity of educational opportunities present some indication of the quality.\textsuperscript{26}

The per pupil cost for instruction was arrived at by dividing the total salaries paid instructional and special service personnel by the total membership of the school. Each school, regardless of size, was counted as one frequency. The cost per pupil per unit of educational opportunity was obtained by dividing the per pupil cost for instruction by the total number of units of educational opportunity for each school.

The schools were classified according to race, type of organization, and size. The relationships sought were determined for three, four, and six-year white schools and for Negro secondary schools.

A formula was devised which defined a unit of educational opportunity as a quantitative measure based upon subject offerings and special services provided. A full unit of educational opportunity was defined as a subject offered for a full term, except physical education which was valued at one-half unit. Subjects not offered for a full term and special services were determined according to their full-time equivalence.

\textsuperscript{26} Woodham, \textit{op. cit.}, p. 145.
The cost per pupil per unit of instruction was calculated by means of the formula $C = \frac{S}{MU}$ where $S$ equals the total salaries for instructional and special personnel, $M$ the total school membership, and $U$ the total number of units of educational opportunity.

On the basis of an analysis of the average cost per pupil, Woodham indicated that cost decreased up to an enrollment of 350 pupils and showed little relationship beyond this point. It is likely that the lack of relationship beyond 350 was due to improvement in quality that takes place in many schools with larger enrollments. For three- and four-year schools the desired minimum, as indicated by the study, was 250 pupils. Without the size factor the cost per pupil does not provide a reliable indication of the breadth of educational opportunity. For example, the smaller schools not only have higher per pupil costs but provide fewer units of educational opportunity.

If the adequacy of school size is based upon cost per pupil per unit of opportunity, the minimum size necessary for six-year schools to provide a broad program at a reasonable cost is five hundred pupils. A more desirable minimum is 750 pupils. 27

The study showed a sharp increase in educational opportunity as size increased to three hundred, with less increase from three hundred to five hundred, and considerable leveling off beyond 550. With the available data, it was deemed impossible to state how large a school should be before the breadth of educational opportunity completely levels off or decreases.

27 Ibid., pp. 78-79.
Woodham made some analysis of the relationship between quantity of educational opportunity and quality. Although the study was not designed to include this factor, there was an indication that the quality of educational opportunity is related to quantity in a positive sense.

The major findings of the Florida study as related to secondary-school size follow:

1. Variations in the breadth of opportunity exist in the secondary schools regardless of the type of organization and size.
2. There are inequalities in the breadth of educational opportunity in schools which have substantially equivalent support.
3. A positive relationship exists between the size of secondary schools and the number of units of educational opportunity provided.
4. Secondary school size is more closely related to breadth of educational opportunity than is per pupil cost.

Woodham concluded that,

1. The breadth of educational opportunity is directly related to the size of the schools.
2. The cost per educational unit decreases as school size increases. However, the decrease beyond five hundred is only slight and Woodham suggests that an enrollment of seven hundred pupils is desirable.
3. The division of a school center is justified at 1,500 pupils. In some circumstances, 1,200 is justified without materially affecting cost per pupil or the breadth of educational opportunity.
Principal Findings from the Literature

The principal findings from the related literature are as follows:

1. Few research studies have been made to determine optimal secondary school size. Of those made, the major consideration has been on cost and the disadvantages of the very small school.

2. Some writers suggest that there is no conclusive evidence as to what a desirable school size is and other writers propose that there is none.

3. There are advantages and disadvantages to a large school. There is reason to expect, however, that part of the purported economy of large high schools is false economy.

4. Schools with enrollments under three hundred are paying a premium for an inferior educational program.

5. Some studies propose optimal secondary school size of 700-800 and others suggest 1,200-1,500 when different variables are considered.

6. Desirable school size is determined by many factors not all of which are present in every situation. This condition suggests, therefore, that an optimal school size is likely to be a size range rather than a fixed number.
CHAPTER 3

THE RELATIONSHIP OF SCHOOL SIZE TO CERTAIN COST FACTORS

Introduction

Rationale

The American public schools are free in the sense that they are available to all the citizenry. They are not, however, free to the taxpayer. The cost of development, maintenance, and operation of the public school program constitutes a major portion of the local tax dollar. Since the burden of providing and supporting the American public school enterprise falls on the local district, one of the major considerations by its taxpaying citizens is that of cost.

The public wants and deserves the best educational program possible for the dollar spent. The value received for the money expended is also important to school officials who are charged with the responsibility of efficient school operation. Thus, the cost factor is an important consideration in the determination of how large a secondary school should be in order to provide the best possible educational program within the financial capabilities of the district.

Basic Assumptions

The major cost item in the operation of the public schools is that of professional staff salaries. Because of the lack of complete cost data, the cost for professional staff salaries is assumed in this study.
as a significant measure of the total school cost. The cost for salaries paid to administrative and special service personnel is assumed as a significant cost indicator for those services.

The scope of course offerings per grade in a school is assumed as a measure of the breadth of educational opportunity available to the youth of the community. It is also assumed that schools with the lowest cost per pupil per unit of educational opportunity are offering the most for the money spent.

Per Pupil Cost for Professional Staff Salaries

Collection and Treatment of Data

The total cost of salaries for such professional staff as administrative, regular and special teacher, guidance, library, and other personnel directly related to the instructional program in each school was secured from the 1959 annual principal's report. The per pupil cost was then calculated by dividing the total of all the staff salaries by the school enrollment. This treatment of the basic data was necessary in order that schools of various enrollments could be compared on this cost factor.

The cost per pupil obtained for each school in the study was subsequently plotted, as was each cost factor used in the study, on coordinate graph paper according to school size. A visual analysis of the data by means of a freehand curve was made. Because of the skewedness of the data the median of each size interval was determined and used as a measure of central tendency. The first and third quartiles
were used as a measure of dispersion. These measures were superimposed on the plotted data and are presented in Figure 1 to illustrate the existing relationship between school size and the cost per pupil for professional staff salaries.

**Relationship of School Size to Cost Per Pupil for Staff Salaries**

Figure 1 shows the relationship of cost per pupil for staff salaries to school size to be markedly curvilinear. A sharp decrease is noted in the cost per pupil up to 200-400. From this size interval to 1,200-1,400 there appears to be only a slight reduction in per pupil cost followed by an increase up to 1,800-2,000. Beyond 2,000 the data are too limited and variable to suggest any definable relationship.

**Cost Per Pupil for Administrative and Special Service Personnel**

**Collection and Treatment of Data**

The cost for administrative and special service personnel consists of the total salaries paid to professional staff personnel allied with the instructional program but who perform duties other than regular classroom instruction. These data, obtained from the report of the high school principal, include such personnel as administrative, guidance, psychological, testing, and special teacher.

The total salary of these staff members was divided by the total enrollment to change it to a cost per pupil in order that this factor could be compared with the other schools in the study. As in the previous
Figure 1
The Relationship of School Size to the Cost Per Pupil for Professional Staff Salaries

[Graph showing the relationship between school size in hundreds and per pupil cost in dollars]
section, the data were plotted and tested for a linear relationship by means of a freehand curve. The median for each size interval was used to determine the relationship of school size to the cost per pupil for administrative and special personnel. The dispersion of the data up to 2,000 was shown by a quartile range. A graphic presentation of the data is shown in Figure 2.

Relationship of School Size to the Cost Per Pupil for Administrative and Special Service Personnel

The data shown in Figure 2 indicate little definable relationship between school size and the cost per pupil for special staff personnel. However, it should be noted that a sharp decline occurs in this cost factor up to the 200-400 size interval. It is possible that this decline would be accentuated substantially if all schools in the 0-200 size interval provided financially for administrative and special service personnel. Basic data show that the schools indicated at zero cost on the graph are operating under the supervision of a full-time teacher.

Cost Per Pupil Per Unit of Educational Opportunity

Collection and Treatment of Data

The raw data for establishing the breadth of educational opportunity were obtained by means of a questionnaire to the principal of each high school in the sample. These data consist of the total number of course offerings available in the school program. In order to make the data for three-and four-year schools comparable it was necessary
Figure 2
The Relationship of School Size to the Cost Per Pupil
for Special Service Personnel
to reduce the total number of course offerings to a per grade group basis as a measure of the breadth of educational opportunity in a given school.

The cost per pupil per unit of educational opportunity was obtained by dividing the cost per pupil for professional staff salaries, as determined earlier in the study, by the number of course offerings available per grade group.

The cost per pupil obtained from this procedure was then plotted on coordinate graph paper. For a measure of central tendency the median of each size interval was used. A quartile range was used to show the degree of dispersion of these two variables. The data showing the relationship of school size to the cost per pupil per unit of educational opportunity are presented in Figure 3.

**Relationship of School Size to the Cost Per Pupil Per Unit of Educational Opportunity**

The relationship of school size to the cost per pupil per unit of educational opportunity is best described as being of a curvilinear reciprocal nature. That is to say, the cost per pupil continues to decrease as school size increases.

The cost per pupil shows a sharp decline up to 400-600 and a much less rapid decline from that interval to 1,000-1,200. Beyond this size interval there appears to be only a very slight decrease in the cost per pupil per unit of educational opportunity.

The only substantial deviation from the reciprocal relationship of these two variables appears at the 1,600-1,800 size interval where an increase is indicated followed by a continued decrease with school size.
Figure 3
The Relationship of School Size to the Cost Per Pupil
Per Unit of Educational Opportunity
Principal Findings of the Relationship of School Size to Cost

The principal findings of the data relating school size to cost are as follows:

1. The sharp decline in cost per pupil shows that schools with enrollments less than 200 to 400 are paying a premium for their educational program.

2. The decrease in cost as the school size increases is relatively small in the 400 to 1,400 size range.

3. Except for the cost per pupil per unit of educational opportunity, there appears to be a tendency for cost to rise in the 1,400 to 2,000 size range.

4. Although the number of schools in the sample beyond 2,000 do not permit major conclusions to be drawn, there is no indication of a drop in cost beyond this point.
CHAPTER 4

THE RELATIONSHIP OF SCHOOL SIZE TO CERTAIN PUPIL FACTORS

Introduction

Rationale

The public school program in the United States exists primarily for the growth and development of the pupils who attend. Therefore, factors which affect pupils will affect the educational program being offered. These factors are many and varied.

In the interest of effective teaching and pupil guidance such factors as teacher load, pupil load, and social environment, must be considered. These factors also have program implications and are related to program effectiveness in a positive way.

Basic Assumptions

A major task of the public schools is that of providing for the individual differences of the students. The teaching load must be considered if more careful attention to these differences is to be provided. This study assumes the over-all pupil-teacher ratio as a measure of the teaching load of instructional personnel.

Another indicator of program effectiveness is that of the pupil course load. In order that the needs of the students are met, a variety of course offerings are necessary. It is assumed in this study that
schools, with a larger percent of the pupils taking five or more units of course work, are doing a better job of meeting the needs and challenges of able students.

Discipline, as an indicator of social environment, is both an administrative and instructional problem. Where discipline problems are numerous the instructional program suffers. This is true because the teacher and the administrator must devote time to discipline problems that should be used for improvement of instruction. In this study the suspension of students from school and the estimated percent of pupils considered to be troublemakers are assumed as measures of discipline. It is further assumed that schools with less discipline problems are in a better position to offer a more effective instructional program.

Pupil-Teacher Ratio

Collection and Treatment of Data

The pupil-teacher ratio, as used in this study, was computed from basic data obtained from the annual report of the high school principal. The pupil-teacher ratio for each school was calculated by dividing the total number of full-time equivalent teachers by the enrollment. This approach was necessary because the pupil-teacher ratio as shown in the annual report included administrative and other non-instructional elements which were not considered to be a part of the teacher load.

The ratio resulting from the procedure above was then plotted on coordinate graph paper according to the school size. A test for linear relationship was made by means of a freehand curve. The median, as a measure of central tendency, and the first and third quartile, up to
2,000, as a measure of dispersion, were superimposed on the plotted data to show the relationship of school size to the pupil-teacher ratio. This graphic presentation is shown in Figure 4.

**Relationship of School Size to Pupil-Teacher Ratio**

According to Figure 4 the relationship of school size to pupil-teacher ratio is described by a sharp rise in the number of pupils per teacher in schools up to approximately 600 followed by a less rapid increase up to the 1,200 to 1,400 size interval. Beyond this point there appears to be a leveling off in the number of pupils per teacher.

It is interesting to note that, beginning with schools of 1,000 or more pupils enrolled, the pupil-teacher ratio in the sample schools of Ohio exceeds the 1959-60 national average ratio of 22.2 pupils per teacher.  

**Pupil Course Load**

**Collection and Treatment of Data**

The number of pupils in each school carrying five or more units of course work was obtained from the annual report of the high school principal. This number was then divided by the total school enrollment to determine the percent of the pupils carrying five or more units of course work. This was necessary in order that this factor could be compared to schools of various sizes.

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Figure 4
The Relationship of School Size to
the Pupil-Teacher Ratio
Again, as in the previous sections, the data were plotted on coordinate graph paper and analyzed by means of a class averages curve as determined by the median of each size interval.

The data showing the relationship of school size to the pupil course load are presented in Figure 5.

**Relationship of School Size to Pupil Course Load**

The data indicate that there is little, if any, relationship between school size and the number of pupils carrying five or more units of course work. There may be a slight tendency, however, to increase with size up to 1,200 to 1,400 after which no definable relationship appears evident.

**Pupils Suspended from School**

**Collection and Treatment of Data**

The number of pupils suspended from school during the 1958-59 school year was obtained by means of a questionnaire sent to the principal of each school in the study. Since the number of suspensions in some schools was small, there was a need for a refinement of the raw data so that the relationship would appear with more clarity. To accomplish this the number of suspensions per 1,000 pupils enrolled was calculated for each school in the study. Also, this treatment of the raw data made it possible to compare this factor to schools of various sizes.

The number of pupils suspended per 1,000 enrolled was then plotted on coordinate graph paper and tested for a linear relationship by the application of a freehand curve. A more accurate measure of the value of the data was needed. The median was calculated for each size interval
Figure 5
The Relationship of School Size to the Pupil Course Load
as a measure of central tendency and the first and third quartiles were
determined as a measure of dispersion. These data showing the relation­
ship of school size to the number of pupils per 1,000 suspended from
school are presented in Figure 6.

Relationship of School Size to Pupil Suspensions

Data in Figure 6 indicate that there is an increase in the rate of
pupils suspended from school as the size of the school increases. A
slight dropoff is noted at the 1,000-1,200 interval after which the in­
crease is more substantial. Although the number of schools in the study
exceeding 2,000 pupils is small, there is an indication that discipline
problems continue to increase considerably in schools beyond 2,000.

Pupils Considered to be Troublemakers

Collection and Treatment of Data

The percent of the total enrollment in each school in the sample
considered by the principal to be troublemakers was obtained by means
of a questionnaire. These data were plotted graphically and tested
with a freehand curve for a linear relationship. For a more accurate
measure of central tendency, the median was calculated for each size
interval. The first and third quartiles were used as a measure of
dispersion. The data showing the relationship of school size to the
percent of pupils considered to be troublemakers is presented in
Figure 7.
Figure 6
The Relationship of School Size to Pupil Suspensions
Figure 7
The Relationship of School Size to Pupils Considered to be Troublemakers
Relationship of School Size to Pupils Considered to be Troublemakers

Data in Figure 7 would suggest that there is little or no relationship of school size to pupils as troublemakers until perhaps the 1,000-1,200 size interval after which there appears to be a slight increase to include the 1,600-1,800 size interval. Beyond this point a decrease with school size is shown. Although the number of schools beyond 2,000 is small, a downward trend is apparent.

It should be pointed out that the percent of the total enrollment, as obtained from the questionnaire, does not appear to offer a unit of measure that is adequate to show realistic trends in the relationship between these two variables. From the plotted data it can be noted that with few exceptions the percent of pupils considered to be troublemakers occur in whole numbers which allows for little variations. It should also be noted that the lack of a definable relationship on this factor is inconsistent with the analysis of pupil suspensions shown earlier in this study and to the relationship of discipline problems to school size found in the earlier studies referred to in Chapter 2.

Principal Findings of the Relationship of School Size to Pupil Factors

The principal findings of the data relating school size to pupil factors are as follows:

1. The pupil-teacher ratio increases as school size increases. However, the increase in the number of pupils per teacher is less pronounced beyond the 1,000-1,200 size interval.
2. There appears to be little, if any, definable relationship between school size and the pupil course load.

3. The number of pupil suspensions increase as school size increases. Following a slight increase to 800-1,000, a dropoff is noted in pupil suspensions at the 1,000-1,200 size interval after which the increase is substantial as school size increases.

There appears to be little, if any, relationship of school size to pupils considered to be troublemakers until after the 1,000-1,200 interval where a possible slight increase is noted followed by a decrease as school size increases. It should be noted, however, that the percent of the total enrollment considered to be troublemakers does not appear to be an adequate unit of measure to properly assay the relationship between this variable and secondary school size.
CHAPTER 5

RELATIONSHIP OF SCHOOL SIZE TO CERTAIN TEACHER FACTORS

Introduction

Rationale

The teacher ranks second only to the pupil as an important element of the public school program. Without the pupil there would be no need for a program and without the teacher there would be none. It has often been said "as the teacher goes so goes the school." In other words, the educational program is no stronger than the teaching staff responsible for the instruction that takes place. The learning environment is directly related to the attitudes and capabilities of the teacher. If the teacher morale is low and undesirable situations are common, the instructional program suffers as does the pupil.

Preparation, self-improvement, experience, job satisfaction, and professional attitude are all important aspects of a teacher's role as the leader of instruction. These aspects are important enough that standards of certification as well as salary schedules are based upon them. It is necessary to include available teacher factors as a part of the consideration of the relationship of program effectiveness to school size.
Basic Assumptions

Quality of teachers is a very important factor of program effectiveness. This study assumes teacher certification and preparation to be indicators of quality. It is also assumed that schools with a higher percentage of teachers holding professional or permanent teaching certificates are better equipped to offer an effective instructional program; that schools employing temporary certificated personnel are reducing the effectiveness of the instructional program proportionately to the number of such personnel on the staff; and that the larger the percentage of teachers with a masters degree or beyond in a school the greater the potential for quality instruction.

Experience is an element of maturation. New ideas and improved instruction are the result of experience in job performance and satisfaction. However, experience appears to be most valuable up to a point and then begins to lose its effect. This is substantiated in a study of research findings by Marsh and Wilder where they found that,

Effectiveness bears a curvilinear relationship to age and experience...It appears that a teacher's rated effectiveness increases at first rather rapidly with experience and then more slowly up to 5 years and beyond. Then there is a leveling off and the teacher may show little change in rated performance for the next 15 to 20 years, after which, as in most occupations, there tends to be a decline.1

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It is assumed in this study that schools with proportionately more teachers with six but not more than twenty years of teaching experience are better equipped to offer a more effective instructional program.

Teacher turnover is the result of many factors. Job satisfaction, salaries, administrative leadership, working conditions, and community factors are only a few of the elements which affect teacher turnover. Teacher turnover is considered to be an indicator of morale and stability in a school system. These factors are related to program effectiveness. It is assumed in this study that schools with less teacher turnover are better able to provide a more effective educational program.

**Teachers with Professional and Permanent Certification**

**Collection and Treatment of Data**

The number of teachers holding professional and permanent certification was obtained from the annual report of the high school principal. For purposes of relating these data to schools of various sizes a percent of the total number of teachers in a given school with professional or permanent type teaching certificates was calculated. These data were then plotted on coordinate graph paper and tested for a linear relationship by means of a freehand curve fitted to the data. For a more accurate measure of central tendency the median for each size interval was calculated and is presented in Figure 8 to show the relationship between school size and the percent of teachers with professional or permanent certification. The first and third quartile, as a measure of dispersion, is also shown.
Figure 8
The Relationship of School Size to Teachers with Professional or Permanent Certification

![Graph showing the relationship between school size in hundreds and the percent of total staff with professional or permanent certificates. The graph includes data points and trend lines illustrating the distribution.](image-url)
Relationship of School Size to Teachers with Professional or Permanent Certification

The data in Figure 8 show a rapid increase in the number of teachers with professional and permanent certification as school size increases up to the 800-1,000 size interval. This rapid increase is followed by a leveling off up to 2,000 after which a possible decline is suggested.

Temporary Certificated Teachers

Collection and Treatment of Data

The number of teachers in each school in the sample with temporary certification was secured from the annual report of the high school principal. A percent of the total staff holding temporary teaching certificates was calculated in order that the value could be compared to other schools.

The percent of teachers for each school with temporary teaching certificates was plotted on coordinate graph paper according to size intervals of two hundred and tested for a linear relationship by means of a freehand curve. The median of each size interval was calculated, plotted, and drawn as a measure of central tendency. A quartile range was used to show the dispersion of the data. The data showing the relationship of school size to the percent of teachers holding temporary certification are presented in Figure 9.

Relationship of School Size to Temporary Certificated Teachers

Figure 9 shows a sharp decline, up to the 400-600 size interval, in the percentage of the total teaching staff with temporary teaching
Figure 9
The Relationship of School Size to Temporary Certificated Teachers
certification. This decline is followed by only a slight further decrease up to 1,200-1,400 where a leveling off is observed up to the 1,600-1,800 interval. Beyond this point there appears to be a possible slight increase with school size.

**Teachers with Masters Degree or Beyond**

**Collection and Treatment of Data**

The number of teachers with a masters degree or beyond was obtained from the annual report of the high school principal. A percent of the total number of teachers on a staff with a masters degree or beyond was calculated in order that this factor could be related to the other schools in the study. The percent of teachers for each school was plotted graphically according to size intervals of two hundred and tested for a linear relationship. The median of each size interval, as a measure of central tendency, and the first and third quartile as a measure of dispersion, were calculated. These measures were superimposed on the plotted data in Figure 10 to show the relationship of school size to the percent of the teaching staff with a masters degree or beyond.

**Relationship of School Size to Teachers with a Masters Degree or Beyond**

The data in Figure 10 shows a rapid increase in the percentage of the total teaching staff with a masters degree or beyond up to the 1,000-1,200 size interval. Beyond this point the data indicate a leveling off through the 1,800-2,000 size interval.
Figure 10
The Relationship of School Size to Teachers with a Masters Degree or Beyond
Teaching Experience

Collection and Treatment of Data

The number of teachers with six but not more than twenty years of teaching experience was obtained from the annual report of the high school principal. This number in each school was changed to a percentage of the total staff to permit application of this factor to various size schools.

The percent of teachers in each school with six through twenty years of experience was then plotted by size intervals of two hundred on coordinate graph paper and tested for a linear relationship. The median, as a measure of central tendency, was calculated for each size interval and superimposed on the plotted data. A quartile range was used to show the dispersion of the data. The data showing the relationship of school size to the percent of the teaching staff with six through twenty years of teaching experience are presented in Figure 11.

Relationship of School Size to Teaching Experience

Figure 11 shows little or no relationship, up to the 1,200-1,400 size interval, between school size and the percent of the total teaching staff with six through twenty years of teaching experience. Beyond this interval the percentage of teachers in this category decreases as school size increases up to 2,200-2,400.
Figure 11
The Relationship of School Size to Teaching Experience
Teacher Turnover

Collection and Treatment of Data

The number of teachers who had left the school staff since January 1, 1959, for reasons other than retirement was obtained from the principal of each school in the sample by means of a questionnaire. January 1, 1959, was used as a cut-off point because it covered a period when teachers would most likely leave or transfer to other jobs and would require a minimum of file checking by the respondent. The teacher turnover in each school was divided by the number of the total teaching staff and the percent of teacher turnover per school obtained. Since a greater percentage of older teachers may be in certain schools the retirement factor was considered to be a more important factor in the teacher turnover in some schools than others and was not considered in determining the number of teachers who had left the school. Other factors related to teacher turnover were assumed to be proportionate to the size of the school staff.

The percentage of the teacher turnover was plotted graphically and tested for a linear relationship by means of a freehand curve. A more accurate measure of the central tendency was obtained by using the median for each size interval. The dispersion of the data was shown by applying the first and third quartiles. The data showing the relationship of school size to teacher turnover are presented in Figure 12.

Relationship of School Size to Teacher Turnover

Figure 12 shows that teacher turnover decreases rapidly with school size up to the 800-1,000 size interval. Beyond this point there is an
Figure 12
The Relationship of School Size to Teacher Turnover
indication that teacher turnover increases as school size increases to the 1,800-2,000 interval.

Principal Findings of the Relationship of School Size to Teacher Factors

The principal findings of the data relating certain teacher factors to school size as follows:

1. All teacher factors except teacher experience show a definable relationship to school size up to 800-1,200.

2. The percent of the teaching staff with professional or permanent certification and the percent of the teaching staff with a masters degree or beyond increase substantially up to the 800-1,200 size range. A leveling off followed by a possible decline as school size increases is observed beyond this point.

3. The percent of temporary certificated teachers and percent of teacher turnover decreases at a rather rapid rate to the 800-1,000 size intervals after which a leveling off or a possible slight increase is noted.

4. Little, if any, relationship of school size to the percentage of teachers with six through twenty years of teaching experience is shown up to 1,200-1,400 after which a slight decline is noted as school size increases. The lack of consistency of the data and the small number of very large schools are not sufficient to indicate a definitive relationship for schools beyond 2,000.
CHAPTER 6

RELATIONSHIP OF SCHOOL SIZE TO CERTAIN ADMINISTRATOR FACTORS

Introduction

Rationale

Leadership is important to the successful operation of any enterprise, especially public schools. The role of the administrator, as leader, in a public secondary school is a complex one. Along with the major task of curriculum improvement, he is charged with such other responsibilities as professional growth of the staff, office management, school public relations, and the efficient operation of the total school program. The development and exercising of administrative leadership is closely related to preparation, training, and experience. There is little doubt that factors relating to the qualifications of the high school principal have an effect on program effectiveness.

Basic Assumptions

Certain factors such as semester hours in education, acquirement of a masters degree or beyond, years in present school, and experience of the principal are assumed to be measures of effective school leadership and thus are program effectiveness factors.

It is assumed in this study that additional hours of education courses are an aid to a better understanding on the part of school
administrators of their role in curriculum improvement; that schools operating under the leadership of an administrator without a masters degree are being deprived of certain benefits that would result from additional preparation and training; and that more years of service, to a point, by the principal in the same school is indicative of job satisfaction and the opportunity to do a better job of curriculum improvement and staff leadership. It is also assumed that, as with teachers, schools with principals having six but not more than twenty years of experience are doing a more effective job.

Semester Hours in Education

Collection and Treatment of Data

The number of semester hours in education for each principal was obtained from the annual report of the high school principal and tabulated according to school size. These data were then plotted on coordinate graph paper and tested for a linear relationship by means of a freehand curve. To more accurately determine the relationship between the two variables the median was calculated for each size interval as a measure of the central tendency. This measure and the first and third quartiles as a measure of dispersion were superimposed on the plotted data. The data showing the relationship of school size to the number of semester hours a principal has acquired in education courses are presented in Figure 13.
Figure 13
The Relationship of School Size to Semester Hours in Education by the Principal

School size in hundreds

Semester hours in education
Relationship of School Size to the Number of Semester Hours in Education by the Principal

Although the pattern of the data as shown in Figure 13 is somewhat irregular there appears to be an upward trend to the 1,000-1,200 size interval after which the data show little relationship of school size to the number of semester hours a principal has acquired in education.

Principals with Masters Degree or Beyond

Collection and Treatment of Data

A determination as to whether the high school principal has acquired a masters degree or beyond was obtained from the annual report of the high school principal and tabulated according to size interval. The number of principals within each size interval who had acquired the minimum of a masters degree was then divided by the total number of principals in the interval and a percent of the total obtained. The percent was then plotted graphically according to the size interval.

The data showing the relationship of school size to the percent of principals with a masters degree or beyond are presented in Figure 14.

Relationship of School Size to the Percent of Principals with a Masters Degree or Beyond

The relationship of school size to the percent of principals with a masters degree or beyond shows an overall increase with school size up to the 1,000-1,200 size interval and indicates no relationship beyond that point. The increase is rapid up to the 400-600 size interval followed by a less pronounced rise up to the 1,000-1,200 size interval where a leveling off occurs as a result of all principals having acquired the minimum of a masters degree.
Figure 14
The Relationship of School Size to Principals with Masters Degree or Beyond
Years in Present School

Collection and Treatment of Data

The number of years a principal has spent in the present school was secured from the annual report of the high school principal and plotted graphically according to size intervals. A test for a linear relationship was made by means of a freehand curve fitted to the plotted data. For a more accurate determination of the relationship, the median as a measure of central tendency, and the first and third quartiles as a measure of dispersion, were calculated and superimposed on the plotted data. The data showing the relationship of school size to the number of years a principal has been in the present school are presented in Figure 15.

Relationship of School Size to Years by the Principal in the Present School

The data in Figure 15 indicate a slight decline up to the 400-600 size interval in the number of years a principal has remained in the present school. Beyond this interval there appears to be a moderate increase with school size up to 1,800-2,000 after which a rapid increase is suggested.

Experience of the Principal

Collection and Treatment of Data

The total number of years of professional experience for each of the high school principals was obtained from the annual report of the principal and tabulated according to size intervals of two hundred. The findings of Marsh and Wilder\(^1\) which show the most effective years of an occupation to

Figure 15
The Relationship of School Size to the Number of 
Years in the Present School by the Principal

![Graph showing the relationship between school size and years in the present school by the principal.]

School size in hundreds

Years by principal in present school
be six through twenty, were applied to this variable in order to appraise the experience of the principal. The percentage of the total number of principals with six but not more than twenty years of experience, in each size interval, was calculated and plotted graphically.

The data showing the relationship of school size to the percentage of principals with six through twenty years of experience are presented in Figure 16.

Relationship of School Size to the Experience of the Principal

Figure 16 shows an increase up to 400-600, followed by a decline in the percentage of principals with six through twenty years experience. The rather sharp decline from the 400-600 interval is modified somewhat with a leveling off at the 600-1,000 range before continuing to decrease as school size increases.

Principal Findings of the Relationship of School Size to Certain Administrator Factors

The principal findings of the relationship of school size to certain administrator factors are as follows:

1. A definable relationship with school size is shown for all administrator factors used in the study.

2. Up to the 1,000-1,200 size interval advantages increase with size for such administrator factors as the percentage of principals with a masters degree or beyond and the number of semester hours a principal has acquired in education. Beyond that interval no relationship is found in
Figure 16
The Relationship of School Size to Experience of the Principal

Percent of principals with six through twenty years experience

School size in hundreds
the percentage of principals with a masters degree or beyond and no definable relationship is observed in the number of semester hours by the principal.

3. The percentage of principals with six through twenty years of experience increases with school size up to the 400-600 size interval after which a substantial decrease is noted as school size increases. The number of years a principal has remained in the present school increases moderately up to 1,600-1,800 after which the data tend to show a substantial increase as school size increases.
CHAPTER 7

RELATIONSHIP OF SCHOOL SIZE TO CERTAIN INSTITUTIONAL FACTORS

Introduction

Rationale

The breadth of educational opportunity in a given school is related to many factors. Certain factors closely related to the pupils, teachers, and the administrator have been discussed earlier in this study. Although all of the factors used are related to each other in some degree, it was assumed that some were more closely related to certain school elements than to others. Another element is that of the institution or school itself. Such factors as available teaching aids, use of the library, breadth of educational opportunity, available administrative and special service personnel, and the ability to pay salaries adequate to hold qualified teachers, are considered to be institutional in nature.

These institutional factors are directly related to program effectiveness. The breadth of educational opportunity as determined by the scope of the course offerings and the availability of special services is indicative of the type of educational program being offered. The quality of teachers and the adequacy of teaching materials to do the best possible job are very important considerations as to how well the school is able to meet the needs of its youth and community.
Basic Assumptions

It is assumed in this study that the number of course offerings available per grade is a measure of the breadth of educational opportunity and the ability of a school to meet the needs of the pupils; that the quantity of special service personnel and instructional aids is indicative of a school's capacity to provide the most effective educational program; and that the more the library is used by pupils the more effective the instructional program.

One of the most important elements in an effective instructional program is that of quality teachers. The ability of a school to obtain and retain this type of personnel is closely related to the more favorable salary schedule. It is therefore assumed in this study, that schools that pay higher salaries attract and retain more qualified and better satisfied teachers which results in an improved quality of instruction.

Breadth of Educational Opportunity

Collection and Treatment of Data

The total number of course offerings available in the school program was obtained by means of a questionnaire to the principal of each school in the sample. This number was then reduced to the number of course offerings per grade as a measure of the breadth of educational opportunity available and to permit comparison of this factor to schools of various sizes. These data were then plotted on coordinate graph paper according to size interval and tested for a linear relationship by means of a freehand curve. For a more accurate measure of central tendency the median was calculated for each size interval and superimposed on the plotted data. The first
and third quartiles were calculated as a measure of dispersion and treated in a similar manner. From these data the relationship of school size to the breadth of educational opportunity is shown in Figure 17.

**Relationship of School Size to the Breadth of Educational Opportunity**

Data in Figure 17 show that the breadth of educational opportunity increases as school size increases up to the 1,400-1,600 size interval after which there appears to be a leveling off or possible decline through the 1,800-2,000 interval.

**Teaching Aids Available**

**Collection and Treatment of Data**

The raw data, obtained from the annual report of the high school principal, consist of a tabulation of the number of radios, record players, projectors, and television units owned by the schools. In order that the factor could be compared to other schools the number of teaching aids was reduced to the number of units per 1,000 pupils enrolled. The data obtained by this procedure were then plotted graphically according to size intervals of two hundred and tested for a linear relationship. For a more accurate measure of central tendency the median for each size interval was calculated and superimposed on the plotted data. The dispersion of the plotted data was shown by means of a quartile range. The data showing the relationship of school size to the number of teaching aids available per 1,000 pupils are presented in Figure 18.
Figure 17
The Relationship of School Size to the Breadth of Educational Opportunity

Course offerings per grade group

School size in hundreds
Figure 18
The Relationship of School Size to the Number
of Teaching Aids Available
Relationship of School Size to the Number of Teaching Aids Available

The data in Figure 18 show a curvilinear reciprocal relationship between school size and the number of teaching aids per 1,000 pupils available to a school. As school size increases the number of teaching aids per 1,000 pupils decreases.

A sharp decline in the number of teaching aids per 1,000 pupils is shown up to 200-400. A much less rapid decrease is noted from this interval to 1,000-1,200 after which further decrease is very small.

Administrative and Special Service Personnel Available

Collection and Treatment of Data

The full-time equivalence of such personnel as administrative, guidance, psychological, remedial, and special teaching was obtained by means of a questionnaire to the principal of each school in the study. Since some schools reported the various services as overlapping it was necessary to tabulate the administrative and special services as a single unit of service. The data were then reduced to the number of units per 1,000 pupils enrolled in order that the factor could be compared to other schools in the study and to provide for a unit of measure more adequate for defining the relationship of the variables involved. These data were then plotted graphically according to size intervals of two hundred. A freehand curve test of the plotted data revealed the data to be curvilinear. For a more accurate determination of central tendency the median of each size interval was calculated and superimposed on the plotted data. The first and third quartiles were placed on the scatter diagram to show the dispersion of the
data. The data showing the relationship of school size to the number of administrative and special service personnel available are presented in Figure 19.

**Relationship of School Size to Administrative and Special Service Personnel Available**

Data in Figure 19 indicate little, if any, relationship of school size to administrative and special service personnel available up to the 800-1,000 size interval. Beyond that interval a decrease with school size may be noted to 1,600-1,800 followed by little, if any, definable relationship.

**Pupil Use of the Library**

**Collection and Treatment of Data**

Library circulation for the 1959-60 school year was obtained from the annual report of the high school principal. In order that the factor could be compared to all schools, a yearly pupil usage factor was developed by dividing the total circulation by the number of pupils enrolled. The number of volumes used per pupil per year was then plotted on coordinate graph paper and tested for a linear relationship by means of a freehand curve. For a more accurate measure of central tendency, the median for each size interval was calculated. This measure of central tendency and a quartile range to show the dispersion of the data were then superimposed on the plotted data. The data showing the relationship of school size to pupil use of the library are shown in Figure 20.
Figure 19
The Relationship of School Size to Administrative and Special Service Personnel Available
Figure 20
The Relationship of School Size to Pupil Use of the Library

[Graph showing the relationship between school size and pupil use of the library, with a scatter plot and trend lines.]
Relationship of School Size to Pupil Use of the Library

The data in Figure 20 indicate no definable relationship of school size to the number of library volumes used per pupil per year up to the 1,200-1,400 size range. From that range there appears to be a slight decrease in the pupil use of the library as school size increases.

Teacher Salaries

Collection and Treatment of Data

The sum of all teacher salaries for each school in the sample was obtained from the annual report of the high school principal. From this total the average teacher salary was calculated in order that this factor could be related to schools of various sizes. These data were then plotted graphically according to size intervals of two hundred and tested for a linear relationship. The median of the data in each size interval was calculated as a more accurate measure of central tendency. A quartile range was determined as a measure of dispersion. The data showing the relationship of school size to teacher salaries as indicated by these measures are presented in Figure 21.

Relationship of School Size to Teacher Salaries

Data in Figure 21 indicate an increase in teacher salaries as school size increases.

The rate of increase in teacher salaries as school size increases is rapid up to the 1,000-1,200 interval after which it is much less rapid to the 1,800-2,000 interval. Beyond that point there appears to be no definable relationship.
Figure 21
The Relationship of School Size to Teacher Salaries
Principal Findings of the Relationship of School Size to Certain Institutional Factors

The principal findings of the relationship of school size to certain institutional factors are as follows:

1. A definable relationship is shown between school size and all institutional factors except administrative and special service personnel available and pupil use of the library. Little, if any, relationship is shown for size and administrative and special service personnel up to 800-1,000 after which a decrease with school size is noted. No definable relationship is shown for pupil use of the library except a possible decrease with school size after 1,000-1,400.

2. An increase in the breadth of educational opportunity and teacher salaries is noted up to the 800-1,200 size range after which a leveling off is noted. Little, if any, advantages are found beyond this point.

3. The number of teaching aids per pupil decreases as school size increases. However, the decrease is very slight from 1,200 to 2,000 and beyond.

4. Although the data are limited beyond 2,000 there are evidences of a leveling off or possible downward trend in pupil use of the library and the number of teaching aids available.
CHAPTER 8

THE EFFECT OF SELECTED COMMUNITY CHARACTERISTICS ON THE
RELATIONSHIP OF SCHOOL SIZE TO COST AND
PROGRAM EFFECTIVENESS FACTORS

Introduction

The relationship of school size to cost and selected program effectiveness factors has been reported in earlier sections of this study.

The purpose of this chapter is to test the effect of selected underlying influences on the previously determined relationships. For example, the relationships determined earlier in the study may well be effected by community factors, as was suggested by the National Education Association's study\(^1\) on pupil behavior.

Selected community characteristics were used to ascertain the influence, if any, of these external elements on the relationship of school size to cost and certain program effectiveness factors. The selection and classification of each of these characteristics was determined after a study of sociological terms and after conferences with sociologists. The community characteristics selected for this further study include population classification, family income and occupational classification.

The population classification was divided into four groups designed to characterize the school community according to population density.

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With the advent of urban growth in Ohio, the rural and urban classification used for the 1950 Federal census was not considered to be adequate to properly describe the type of school community being studied. The four population groups used in this study were: urban-city--part of a city of 50,000 or more; urban-fringe--a densely settled community, including incorporated and unincorporated areas around cities of 50,000 or more; urban--incorporated cities or villages with 5,000 to 50,000 inhabitants; and rural--all areas not described above.

The communities in which the various sized schools were located were further classified according to family income. This was done by indicating the income range of the majority of families in the school community. The income ranges used were: under $3,000, $3,000 to $4,999, $5,000 to $6,999, $7,000 to $8,999, and $9,000 and above.

Occupational classification as used in this study was developed from the expanded North-Hatt Scale\(^2\) of community prestige. The classification of this community characteristic included three major groups--professional and managerial workers; white collar and skilled workers; and service, semi-skilled, and unskilled workers. The assignment of occupations to these groups was made possible by using the numerical weight assigned to each occupation by the North-Hatt Scale.

By plotting the schools in the sample according to size intervals of two hundred and the appropriate classification within each community characteristic, the relationship of school size to cost and certain program effectiveness factors was further evaluated.

Population Classification

Collection and Treatment of Data

The collection and treatment of the data for the cost and program effectiveness factors used in this section were discussed earlier in the study.

Data pertaining to population classification were obtained by means of a questionnaire sent to the principal of each school in the study. The number of schools per size interval for each type of community is shown in Table 4.

Table 4

Schools Per Size Interval by Population Classification

<table>
<thead>
<tr>
<th>Size interval</th>
<th>Rural</th>
<th>Urban</th>
<th>Urban-fringe</th>
<th>Urban-city</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-199</td>
<td>66</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>200-399</td>
<td>79</td>
<td>12</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>400-599</td>
<td>20</td>
<td>32</td>
<td>9</td>
<td>2</td>
</tr>
<tr>
<td>600-799</td>
<td>5</td>
<td>20</td>
<td>8</td>
<td>4</td>
</tr>
<tr>
<td>800-999</td>
<td>1</td>
<td>8</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>1,000-1,199</td>
<td>0</td>
<td>11</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>1,200-1,399</td>
<td>0</td>
<td>11</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>1,400-1,599</td>
<td>0</td>
<td>5</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>1,600-1,799</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>11</td>
</tr>
<tr>
<td>1,800-1,999</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>2,000-2,199</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2,200-2,399</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>2,400-2,599</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>2,600-2,799</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>2,800-2,999</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>3,000-3,199</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>3,200-3,399</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>171</td>
<td>100</td>
<td>36</td>
<td>45</td>
</tr>
</tbody>
</table>
The data on each factor in the study, except the percent of principals with a masters degree or beyond, were isolated according to the population classification of the community—urban-city, urban-fringe, urban, or rural. These data were then plotted graphically using the median of the data in each size interval as a measure of central tendency. An investigation of the basic data revealed that approximately 90 percent of the principals without a masters degree were in rural school communities with schools of less than six hundred pupils. In light of this information and because the principals in all schools beyond 1,000 pupils have a masters degree or beyond, this factor was not treated in this section.

The effect of population classification on the relationship of school size and certain program effectiveness factors is shown graphically in Figures 22 through 41. Each figure includes the previous size-factor relationship for all schools as well as the relationships according to the four population classifications.

Cost Factors

The earlier findings on the cost-size relationship showed a rapid decrease in per-pupil cost up to approximately five hundred followed by a continued slight decrease and finally a leveling off after the 1,000-1,400 range. The effect of population classification on these previously determined relationships is shown in Figures 22, 23, and 24.

Figure 22 shows a much sharper decrease in the per pupil cost up to 400-600 in rural communities than that shown in other population classifications. However, the previously determined relationship of school
size to cost per pupil for total staff salaries is not altered signifi-
cantly by grouping the schools according to certain population classi-
fications.

Figure 23 shows little if any difference in the previously deter-
mined relationship of school size to the cost per pupil for adminis-
trative and special service personnel.

According to the data in Figure 24 the cost per pupil per unit of
educational opportunity decreases as school size increases. Population
classification appears to have little, if any, effect on the relation-
ship of school size to this factor.

Pupil Factors

The pupil factor-size relationship shown earlier in the study
indicated an increase with size in the pupil-teacher ratio and in pupil
suspensions. Other pupil factors showed little or no relationship to
school size. The effect of population classification on these established
relationships is shown in Figures 25 through 28.

The data in Figure 25 support the relationship previously determined
between school size and the pupil-teacher ratio.

The data in Figure 26 indicate no significant difference in the
relationship determined earlier between school size and the number of
pupils taking five or more units of course work. A possible exception
to this is the rapid increase up to 600-800 in rural communities.

Figure 27 shows a decrease in suspensions of pupils in urban-city
schools up to the 1,200-1,400 size interval after which a decided in-
crease is observed as school size increases. Except for the decline
Figure 22
Effect of Population Classification on the Relationship of School Size to the Cost Per Pupil for Professional Staff Salaries
Figure 23
Effect of Population Classification on the Relationship of School Size to the Cost Per Pupil for Professional Service Personnel
Figure 24
Effect of Population Classification on the Relationship of School Size
to the Cost Per Pupil Per Unit of Educational Opportunity
Figure 25
Effect of Population Classification on the Relationship of School Size to the Pupil-Teacher Ratio.

All Schools

Rural

Urban

Urban-Fringe

Urban-City

Number of pupils per teacher

School size in hundreds
Figure 26
Effect of Population Classification on the Relationship of School Size to the Pupil Course Load

All Schools

Rural

Urban

Urban-Fringe

Urban-City
noted above there is little, if any, effect of population classification on the previously determined relationship of school size to the number of pupils suspended from school.

Except for a decline in the number of troublemakers in the urban-city schools with enrollments up to 1,000-1,200 there is little indication from the data shown in Figure 28 to suggest a substantial deviation from the relationship of school size to the number of pupils considered to be troublemakers as determined earlier in the study.

Teacher Factors

Earlier in the study a definable relationship between school size and all teacher factors except teacher experience was found as school size increased to 800-1,200 after which a leveling off was evident. Beyond 1,200-1,400 a possible slight increase with school size is noted for all teacher factors except teaching experience which shows a decline. The effect of population classification on the relationships previously established between school size and certain teacher factors is shown in Figures 29 through 33.

Except for the higher percent of teachers with professional or permanent type teaching certification in urban-city schools up to eight hundred there is little to indicate from data in Figure 29 that there is a deviation from the previously determined relationship of school size to the percent of the teaching staff with permanent or professional certification.
Figure 27
Effect of Population Classification on the Relationship of School Size to PupilSuspensions

<table>
<thead>
<tr>
<th>Population Classification</th>
<th>School Size in Hundreds</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Rural</td>
<td>10</td>
</tr>
<tr>
<td>Urban</td>
<td>0</td>
</tr>
<tr>
<td>Urban-Fringe</td>
<td>5</td>
</tr>
<tr>
<td>Urban-City</td>
<td>20</td>
</tr>
</tbody>
</table>
Figure 28
Effect of Population Classification on the Relationship of School Size to Pupils Considered to be Troublemakers
The data in Figure 30 indicate no change in the previously determined relationship between school size and the percentage of temporary certificated teachers.

Figure 31 shows that the percentage of teachers with a masters degree or beyond decreases as school size increases in the urban-city schools. With this exception no change in the established relationship between school size and teachers with a masters degree or beyond is suggested.

A significant decrease in the percent of teachers with six through twenty years of experience is noted in urban-city schools up to the 1,000-1,200 interval. With this exception there is no indication from data in Figure 32 that the relationship of school size to this factor is materially altered.

According to data in Figure 33 there appears to be little, if any, change in the previously determined relationship of school size to teacher turnover.

**Administration Factors**

Earlier in the study a definable relationship was found to exist between school size and the administrator factors used in the study. The effect of population classification on these relationships is shown in Figures 34 through 36.

Figure 34 indicates little, if any, deviation from the previously established relationship of school size to the number of semester hours a principal has acquired in education.

Data in Figure 35 indicate no change in the previously determined relationship of school size to the number of years experience by the
Figure 30
Effect of Population Classification on the Relationship of School Size to Temporary Certificated Teachers
Figure 31
The Relationship of School Size to Teachers with a Masters Degree or Beyond

Percent of total Leeching staff with a masters degree or beyond

All Schools

Rural

Urban

Urban-Fringe

Urban-City

School size in hundreds
Figure 32
Effect of Population Classification on the Relationship of School Size to Teaching Experience

All Schools

Rural

Urban

Urban-Fringe

Urban-City

Percent of total teaching staff with six through twenty years experience

School size in hundreds
Figure 33
Effect of Population Classification on the Relationship of School Size to Teacher Turnover

Percent of total staff who left the school since January 1, 1959

School size in hundreds

Urban-City

Urban-Fringe

Urban

Rural

All Schools
Figure 34
Effect of Population Classification on the Relationship of School Size to Semester Hours in Education by the Principal

All Schools

Rural

Urban

Urban-Frings

Urban-City

School size in hundreds

Semester hours in education
Figure 35
Effect of Population Classification on the Relationship of School Size to the Number of Years by the Principal in the Present School

All Schools

Rural

Urban

Urban-Pringe

Urban-City

School size in hundreds

Years by Principal in present school
principal in the present school. Although the pattern shown in the urban-city schools is radically irregular, no change in the relationship is suggested.

Data in Figure 36 show that the previously determined relationship of school size to the percent of principals with six through twenty years of experience is not altered except in the urban-city schools where no principals with six through twenty years experience were found in schools up to 1,400-1,600.

**Institutional Factors**

A definable relationship between school size and all institutional factors used in the study, except pupil use of the library and the administrative and special service personnel available, was shown earlier in the study. The library and service personnel factors showed little or no relationship up to the 800-1,400 size range after which a decline was noted. The effect of population classification on the previously established relationships is shown in Figures 37 through 41.

Except for the irregularity of the data for the urban-city schools, the data in Figure 37 suggest that the relationship of school size to the breadth of educational opportunity is not significantly affected by population classification.

Data in Figure 38 suggest that population classification has little, if any, affect on the relationship of school size to the number of teaching aids available.

Data in Figure 39 suggest little, if any, change in the reciprocal relationship of school size to the number of administrative and special
Figure 36
Effect of Population Classification on the Relationship of School Size to Experience of the Principal

Percent of principals with six through twenty years experience

School size in hundreds

Rural

Urban-Fringe

Urban-City
Figure 37
Effect of Population Classification on the Relationship of School Size to the Breadth of Educational Opportunity

Course offerings per grade group

School size in hundreds
Teaching aids per 1,000 pupils

Figure 38
Effect of Population Classification on the Relationship of School Size to the Number of Teaching Aids Available

All Schools

Rural

Urban

Urban-Papings

Urban-City

School size in hundreds

2  4  6  8  10  12  14  16  18  20  22  24  26  28  30  32  34
Figure 39
Effect of Population Classification on the Relationship of School Size to Administrative and Special Service Personnel Available

School size in hundreds

Administrative and special service units per 1,000 pupils

Rural

Urban

Urban-Fringe

Urban-City

All Schools
service personnel available. An exception to this is the pattern shown in the urban-city schools up to the 1,000-1,200 size interval which indicates an increase to 600-800 followed by a rapid decline.

Except for the sharp decline in library usage in urban-fringe schools up to six hundred the data in Figure 40 indicate little change in the relationship of school size to pupil use of the library.

Figure 41 shows that except for a decline in teacher salaries as school size increases up to 1,400-1,600 in urban-city schools, there is little change in the relationship of school size to teacher salaries established earlier in the study.

Family Income

Collection and Treatment of Data

The collection and treatment of the data relating size to cost and program effectiveness factors were discussed earlier in the study.

Data pertaining to this community characteristic were obtained by means of a questionnaire sent to the principal of each school in the sample.

An analysis of the data received revealed a clustering about the $5,000-$6,999 income group which was assumed to be a medium or average of the total. Low and high income groups were then determined. The high group was a combination of the two highest income classifications and the low income group consisted of the two lowest income classifications. The number of schools per size interval for the low, medium, and high income groups is shown in Table 5.
Figure 60
Effect of Population Classification on the Relationship of School Size to Pupil Use of the Library

- All Schools
- Rural
- Urban
- Urban-Fringe
- Urban-City

Volumes per Pupil per Year vs. School size in hundreds
Figure 41
Effect of Population Classification on the Relationship of School Size to Teacher Salaries

All Schools

Rural

Urban

Urban-Frings

Urban-City

School size in hundreds

Salary in dollars
### Table 5
Schools Per Size Interval by Family Income Classification

<table>
<thead>
<tr>
<th>Size interval</th>
<th>Income group</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low</td>
<td>Medium</td>
<td>High</td>
<td></td>
</tr>
<tr>
<td>0-199</td>
<td>50</td>
<td>12</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>200-399</td>
<td>49</td>
<td>39</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>400-599</td>
<td>22</td>
<td>35</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>600-799</td>
<td>8</td>
<td>25</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>800-999</td>
<td>8</td>
<td>6</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>1,000-1,199</td>
<td>8</td>
<td>7</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>1,200-1,399</td>
<td>2</td>
<td>12</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>1,400-1,599</td>
<td>2</td>
<td>7</td>
<td>1</td>
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<tr>
<td>1,600-1,799</td>
<td>2</td>
<td>6</td>
<td>3</td>
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</tr>
<tr>
<td>1,800-1,999</td>
<td>1</td>
<td>3</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>2,000-2,199</td>
<td>0</td>
<td>0</td>
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<tr>
<td>2,200-2,399</td>
<td>1</td>
<td>1</td>
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<tr>
<td>3,000-3,199</td>
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<td>0</td>
<td>0</td>
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<tr>
<td>3,200-3,399</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

Total 154 154 32

The effect of family income on the relationship of school size to the following cost and program effectiveness factors is shown in this section of the study.

1) Cost per pupil per unit of educational opportunity

2) Pupil-teacher ratio

3) Pupil suspensions
4) Pupils considered to be troublemakers  
5) Teachers with a masters degree or beyond  
6) Semester hours in education by the principal  
7) Breadth of educational opportunity  
8) Teacher salaries  

The data were arrayed for each factor by size interval according to income group. The median as a measure of central tendency, was then calculated for each size interval and plotted graphically to show the effect, if any, of family income on the size-factor relationship determined earlier in the study.  

An analyses of the effect of this community characteristic on the all schools relationship of school size to the factors included in this section are presented in Figures 42 through 49. Each figure includes the previous size-factor relationship for all schools and for schools by income group.  

Cost Per Pupil Per Unit of Educational Opportunity. Figure 42 shows that family income has little, if any, effect on the all schools relationship of school size to the cost per pupil per unit of educational opportunity.  

Pupil-Teacher Ratio. Although certain inconsistencies occur in the data shown in Figure 43, there is no indication that the previously established all schools relationship of school size to pupil-teacher ratio is altered.
Figure 42
Effect of Family Income on the Relationship of School Size to the Cost Per Pupil Per Unit of Educational Opportunity

All Schools

Low

Medium

High

School size in hundreds

Cost per pupil per unit
Figure 43
Effect of Family Income on the Relationship of School Size to the Pupil-Teacher Ratio

All Schools

Low

Medium

High

Number of Pupils per Teacher

School size in hundreds

2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34
**Pupil Suspensions.** Except for a possible leveling off in the high income group, shown in Figure 44, there is little, if any, change in the earlier findings that pupil suspensions increase as school size increases. A very sharp increase with school size is noted in the low income group.

**Pupils as Troublemakers.** The data in Figure 45 indicate that family income has little, if any, effect on the all schools relationship of school size to the percent of pupils considered to be troublemakers. Although the data for the high income group is quite irregular there is nothing to indicate a change in the earlier suggested size-troublemaker relationship.

**Teachers with Masters Degree or Beyond.** The data in Figure 46 indicate that the previously established all schools relationship of school size to teachers with a masters degree or beyond is not materially affected by family income. Again the high income group indicates an inconsistency in the plotted data, however, the over-all pattern is comparable.

**Semester Hours in Education.** The data in Figure 47 indicate little, if any, effect of family income on the all schools relationship of school size to the number of semester hours in education acquired by the principal.

**Breadth of Educational Opportunity.** Data in Figure 48 indicate little, if any, effect of family income on the all schools relationship of school size to the breadth of educational opportunity available in a school.
Figure 44
Effect of Family Income on the Relationship of School Size to Pupil Suspensions

All Schools

Low

Medium

High

Pupils suspended per 1,000 enrolled

School size in hundreds

2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34
Figure 45
Effect of Family Income on the Relationship of School Size to Pupils Considered to be Troublemakers

All Schools

Low

Medium

High

Percent of total enrollment

School size in hundreds
Figure 46
Effect of Family Income on the Relationship of School Size
to Teachers with a Masters Degree or Beyond

All Schools

Low

Medium

High

Percent of total teaching staff with masters degree or beyond

School size in hundreds
Figure 47
Effect of Family Income on the Relationship of School Size to Semester Hours in Education by the Principal.
Figure 48
Effect of Family Income on the Relationship of School Size to the Breadth of Educational Opportunity

Course offerings per grade group

All Schools

Low

Medium

High

School size in hundreds
Teacher Salaries. The data in Figure 49 show little, if any, effect of family income on the all schools relationship of school size to teacher salaries.

Occupational Classification

Collection and Treatment of Data

The collection and treatment of the data for the cost and program effectiveness factors used in this section were discussed earlier in the study. The same cost and program factors as those used in the preceding section on family income were used in this portion of the study.

Data pertaining to occupational classification as a community factor were obtained by means of a questionnaire sent to the principal of each school in the sample. The data consist of the percent of the community in each of the occupational classes—professional and managerial workers; white collar and skilled workers; and service, skilled and unskilled workers.

In order that the community could be evaluated and compared to other school communities in the study, an occupational index was devised. This index was developed by arraying the numerical weight, given to each of the job classifications shown in the expanded North-Hatt Scale, according to the three occupational classifications used. The Mean of each classification was calculated and used as a multiplier to convert the percentage, shown for each occupational group, into a numerical value. The sum of these values determined the occupational prestige of each school community in the study whose questionnaire was returned. On the basis of these values the communities were classified according to low, medium, and high
Figure 49
Effect of Family Income on the Relationship of School Size to Teacher Salaries

Salary in dollars

All Schools

Low

Medium

High

School size in hundreds

Salary in dollars

2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34
occupational groups. The number of schools per size interval for each of these groups is shown in Table 6.

<table>
<thead>
<tr>
<th>Occupational group interval</th>
<th>Low</th>
<th>Medium</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-199</td>
<td>18</td>
<td>12</td>
<td>18</td>
</tr>
<tr>
<td>200-399</td>
<td>21</td>
<td>16</td>
<td>18</td>
</tr>
<tr>
<td>400-599</td>
<td>21</td>
<td>17</td>
<td>22</td>
</tr>
<tr>
<td>600-799</td>
<td>13</td>
<td>11</td>
<td>9</td>
</tr>
<tr>
<td>800-999</td>
<td>8</td>
<td>4</td>
<td>5</td>
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<tr>
<td>1,000-1,199</td>
<td>6</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>1,200-1,399</td>
<td>6</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>1,400-1,599</td>
<td>4</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>1,600-1,799</td>
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<tr>
<td>1,800-1,999</td>
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<td>2,000-2,199</td>
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<td>2,200-2,399</td>
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<tr>
<td>3,200-3,399</td>
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<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

The median for each size interval in the low, medium, and high occupational groups was calculated for each factor used in this section of the study and plotted as a measure of central tendency. The effect, if any, of this community element on the all schools relationship of school size
to cost and program effectiveness factors is shown in Figures 50 through 57. Each figure includes the previous size-factors relationship for all schools and for schools by occupational group.

Per Unit Cost of Educational Opportunity. Data in Figure 50 show that there is relatively little, if any, effect of occupational classification on the all schools relationship of school size to the cost per pupil unit of educational opportunity.

Pupil-Teacher Ratio. Data in Figure 51 show little, if any, effect of occupational classification on the all schools relationship of school size to the number of pupils per teacher.

Pupil Suspensions. All occupational groups in Figure 52 show an increase in pupil suspensions as school size increases. Thus, the all schools relationship of school size to the number of pupils suspended is not affected significantly by occupational classification. However, a much more rapid rate of increase beyond 1,400-1,600 in the low occupational group is noted.

Pupils Considered to be Troublemakers. The data in Figure 53 indicate little, if any, effect of occupational classification on the all schools relationship of school size to the number of pupils considered to be troublemakers as determined earlier in the study.

Teachers with a Master's Degree or Beyond. The data in Figure 54 indicate little, if any, effect of occupational classification on the all schools relationship of school size to the number of teachers who have acquired the minimum of a master's degree. The only possible exception is the suggested decline after 1,000-1,200 in the low occupational group.
Figure 50
Effect of Occupational Classification on the Relationship of School Size to the Cost Per Pupil Per Unit of Educational Opportunity

All Schools

Low

Medium

High

Per pupil cost in dollars

School size in hundreds
Figure 51
Effect of Occupational Classification on the Relationship
of School Size to the Pupil-Teacher Ratio

All Schools

Low

Medium

High

Number of pupils per teacher

School size in hundreds
Figure 52
Effect of Occupational Classification on the Relationship of School Site to Pupil Suspensions

Pupils suspended per 1,000 enrolled

All Schools

Low

Medium

High

School size in hundreds
Figure 53
Effect of Occupational Classification on the Relationship of School Size to Pupils Considered to be Troublemakers

All Schools

Low

Medium

High

School size in hundreds
Figure 54
Effect of Occupational Classification on the Relationship of School Size to Teachers with a Masters Degree or Beyond

All Schools

Low

Medium

High

Percent of total teaching staff

School size in hundreds
Semester Hours in Education by the Principal. From the data in Figure 55 there is little, if anything, to indicate that the all schools relationship of school size to the number of semester hours a principal has acquired is affected by occupational classification.

Breadth of Educational Opportunity. The data shown in Figure 56 indicate that occupational classification has little, if any, effect on the all schools relationship of school size to the breadth of educational opportunity.

Teacher Salaries. As established earlier in the study, the average teacher salary increases substantially to 1,000 where there is a leveling off and little advantage beyond that point. Figure 57 shows that little, if any, effect is indicated by occupational status on the all schools relationship of school size to the teacher salary factor.

Principal Findings of the Effect of Selected Community Characteristics on the Relationship of School Size to Certain Cost and Program Effectiveness Factors

The principal findings of the effect of selected community characteristics on certain previously established size-factor relationships are as follows:

1. The data indicate that, except in degree, there is little effect of population classification on the previously determined all schools relationship of school size to cost and certain program effectiveness factors. Population classification does appear, however, to have an effect on the relationship of school size to pupil suspensions and pupils considered to be troublemakers in that a decrease up to 1,000-1,400 is
Figure 55
Effect of Occupational Classification on the Relationship of School Size to Semester Hours in Education by the Principal

All Schools

Low

Medium

High

School size in hundreds
Figure 56
Effect of Occupational Classification on the Relationship of School Size to the Breadth of Educational Opportunity

Course offerings per grade group

School size in hundreds

Low
Medium
High
All Schools
Figure 57
Effect of Occupational Classification on the Relationship of School Size to Teacher Salaries

- Low
- Medium
- High

Salary in dollars

School size in hundreds
noted on these factors in the urban-city schools. The previously established relationship on these factors showed either an increase or possibly a leveling off at this size range.

2. The data indicate that family income has very little, if any, effect on the all schools relationship of school size to selected cost and program effectiveness factors established earlier in this study.

3. The data also indicates that occupational classification has little effect on the previously determined all schools relationship of school size to certain cost and program effectiveness factors.
CHAPTER 9

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

The Study

Three major problems face the supporters of the American public schools: increasing enrollments, increasing cost, and the most effective program to meet the needs of youth. Thus, we find the public schools faced with both quantitative and qualitative needs. Continued research, study, and know-how are needed if the challenge is to be faced and results obtained.

This study is added to the current body of knowledge relative to school size in the hope that it will aid in the wise decision making that must be forthcoming if the best job of providing an adequate educational program is to be realized. It suggests advantages and disadvantages associated with the size of the secondary school. It is hoped that the study will help to solidify the thinking concerning optimal secondary school size.

The study has attempted to determine (1) the relationship, if any, of secondary school size to cost, (2) the relationship, if any, of secondary school size to certain program effectiveness factors, (3) the effect of selected community characteristics on the size-factor relationships, and (4) an optimal school size range for three- and four-year secondary schools in Ohio.
Although the study was limited to the three- and four-year senior high schools in Ohio it is anticipated that certain relationships determined will be of some consequence to schools outside the limits of this commonwealth.

Summary of Findings from the Literature

The findings from the literature are summarized as follows:

1. Few research studies have been made about school size. Of those made, the major consideration has been on cost and on the disadvantages of the very small school.

2. There are suggested advantages as well as disadvantages to a large school. There is reason to expect, however, that part of the purported economy of large high schools is false economy.

3. Schools with enrollments under three hundred are paying a premium for an inferior educational program.

4. Recommended or suggested optimal school sizes range from 700 to 1,600, depending on the variables involved.

Summary of Principal Findings from the Study

The principal findings from the study are summarized as follows:

1. Schools with enrollments of less than 200-400 pupils are paying a premium for their educational program. A continued slight decrease in cost per pupil up to the 1,000-1,400 size range is evident after which a leveling off or a possible increase is noted as school size increases. Few, if any, advantages and some disadvantages in per pupil cost begin to appear after 1,400.
2. Little, if any relationship is found between pupil course load and pupils who are considered to be troublemakers. It should be noted, however, that the data appear to be inadequate to properly define the relationship of pupils considered to be troublemakers to school size. The pupil-teacher ratio and the number of pupil suspensions increase as school size increases. However, the increase in the number of pupils per teacher is less pronounced beyond the 1,000-1,200 size interval while the number of pupil suspensions increase rapidly beyond that interval. It would appear that little if anything is gained on pupil factors by having schools larger than 1,000 to 1,200.

3. An evaluation of the teacher factors used in the study shows that on all factors except teacher experience there are increased advantages as school size increases to the 800-1,200 size interval after which a leveling off occurs on all factors except teacher turnover which shows a possible slight increase after the 800-1,000 size interval. Teacher experience shows little if any relationship to school size up to 1,200-1,400 after which a slight decline is noted as school size increases.

4. There is a favorable increase on most administrator factors as school size increases to the 1,000-1,200 size interval after which there appears to be little, if any, gain as school size increases further. An exception to this finding is the optimal size interval of 400-600 when the experience of the principal is considered.

5. A study of the relationship of institutional factors to school size would suggest an optimal size range of 800 to 1,200. Beyond this
range there are certain advantages, however, when all factors are considered, the advantages of having a school larger than 1,200 are outweighed by the disadvantages that are apparent. Little, if any, relationship was shown to exist up to 800-1,200 in the pupil use of the library and the administrative and special service personnel available.

6. Community characteristics as a whole have little effect on the relationship of school size to cost and certain program effectiveness factors. An exception to this is the effect of population classification on factors of discipline; a decrease in urban-city schools is noted up to 1,000-1,400. With this exception and certain other very slight differences, primarily of degree, the previously determined relationships between school size and selected factors is not materially affected.

Major Conclusions

The findings of the study indicate, that when all factors are considered, 800 to 1,200 is the size range at which favorable factors approach the maximum and unfavorable factors approach the minimum. The data also show that schools with enrollments of less than 200-400 pupils are paying a premium for an inferior program. However, the cost and program advantages of a majority of the factors increase as school size increases to the 800-1,200 size range after which little, if anything, is gained and disadvantages on most factors begin to appear. Therefore, it is concluded that the optimal size range for three- and four-year secondary schools in Ohio is 800 to 1,200 pupils.
Recommendations

This study has been concerned with the determination of optimal school size for three- and four-year secondary schools. The investigation of certain cost and program effectiveness factors has resulted in the following recommendations. It is the hope that these recommendations will be instrumental in the development of secondary schools that will best meet the needs of the youth they are to serve.

IT IS RECOMMENDED that the findings of this study be evaluated by school communities when the number and size of secondary schools are being considered.

IT IS RECOMMENDED that continued research in the area of optimum school size be carried on; that other external influences be used to test the size-factor relationships; and that a more thorough investigation be made, employing nationwide data, of selected factors from this study.
APPENDIX A

Copy of data form used at the State Department of Education to collect basic data from the Report of High-School Principal for the 1959-60 school year.
<table>
<thead>
<tr>
<th>Code No.</th>
<th>Question</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Name of school</td>
</tr>
<tr>
<td>2.</td>
<td>Address of school</td>
</tr>
<tr>
<td>3.</td>
<td>Name of principal</td>
</tr>
<tr>
<td>4.</td>
<td>Type of district and organizational plan</td>
</tr>
<tr>
<td>5.</td>
<td>School enrollment</td>
</tr>
<tr>
<td>6.</td>
<td>Pupil-teacher ratio</td>
</tr>
<tr>
<td>7.</td>
<td>Number of pupils carrying five or more units</td>
</tr>
<tr>
<td>8.</td>
<td>Highest degree attained by (principal) BA MA PhD NONE</td>
</tr>
<tr>
<td>9.</td>
<td>Number of credit hours credit in education (principal)</td>
</tr>
<tr>
<td>10.</td>
<td>Years experience in present school (principal)</td>
</tr>
<tr>
<td>11.</td>
<td>Total years experience (principal)</td>
</tr>
<tr>
<td>12.</td>
<td>Degree attained (No. of teachers) BA MA PhD NONE</td>
</tr>
<tr>
<td>13.</td>
<td>Average number of years teaching experience (teachers)</td>
</tr>
<tr>
<td>14.</td>
<td>Total salaries for certificated professional personnel</td>
</tr>
<tr>
<td>15.</td>
<td>Per pupil cost (14+5)</td>
</tr>
<tr>
<td>16.</td>
<td>Total salaries for certificated administrative and special personnel</td>
</tr>
<tr>
<td>17.</td>
<td>Total number of teachers</td>
</tr>
<tr>
<td>18.</td>
<td>Number of teachers holding professional and permanent certificates</td>
</tr>
<tr>
<td>19.</td>
<td>Number of teachers holding temporary certificates</td>
</tr>
<tr>
<td>20.</td>
<td>Teaching aids (No. of projectors, record players, radios, and TV sets)</td>
</tr>
</tbody>
</table>
APPENDIX B

STATE OF OHIO
DEPARTMENT OF EDUCATION

REPORT OF HIGH SCHOOL PRINCIPAL

This form is to be filled out by the Principal of the High School. One copy is to be retained at the High School and the other two sent to the Superintendent. The Superintendent will retain one copy for his office and send the ORIGINAL to the State Department of Education, Division of Elementary and Secondary Education, not later than OCTOBER 10.

I. GENERAL INFORMATION: Enrollments of the High School on October 1, 1959.

<table>
<thead>
<tr>
<th>Grade</th>
<th>Boys</th>
<th>Girls</th>
<th>Total</th>
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<tr>
<td>7</td>
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<td></td>
<td></td>
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<td>12</td>
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<tr>
<td>Total</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Ungraded</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Graduates, 1959: Boys... Girls... Total...

Teaching Load

a. Total number of full-time teachers employed in this school

b. Total number of part-time teachers

Include here

(1) teachers who teach only part-time in the high school and
(2) staff members reported in d below who also teach one or more classes.

c. Full-time equivalency of part-time teachers

Divide the total number of periods taught daily by all part-time teachers by the average number of periods taught daily by all full-time teachers. Carry to one decimal place.

d. Estimated full-time equivalency of teaching services rendered to this secondary school by superintendent, principal, vice-principal, and other supervisory officers

e. Pupil-teacher ratio:

<table>
<thead>
<tr>
<th>(Col. 1)</th>
<th>(Col. 2)</th>
<th>(Col. 3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total employment</td>
<td>Total teaching staff (sum of a, c, and d)</td>
<td>Pupil-teacher ratio, column 1 - volume 2 (carry to one decimal place)</td>
</tr>
</tbody>
</table>

II. ADMINISTRATION.

a. No. of days school was in session last year

b. Approximate date of closing, school year 1959-60

c. Length of your usual class period exclusive of time allowed for changing of classes

d. No. of ______ minute periods per week for one unit in Physics Chemistry Biology Art Agriculture Home Economics Shop For ½ Unit Typing

e. No. of pupils carrying five or more units

f. No. of units required for graduation

g. Testing Program: General Ability Scholarship Aptitude

h. Do you have a guidance program?

i. Summer High School: Opening date Closing date Total enrollment Name of Director Maximum credit allowed in new work Length of class periods Amount of tuition charged No. of clock hours for one unit of credit

j. Is the elementary school housed in the building with the high school?

III. LIBRARY.

No. of separate library rooms... Seating capacity... Expenditure for books...

H. S. (1958-59)... For periodicals...

Name of librarian

Semester hours of training in Library Science

Institutions

Total volumes... Non-Fiction

Circulation (1958-59)...

No. of periodicals... No. of newspapers...

Does the school have bookmobile service?

Is the public library adjacent to the school building?
### IV. Qualifications of High School Teachers and Supervisors

<table>
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<tr>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
<th>(6)</th>
<th>(7)</th>
<th>(8)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name of High School and Address</td>
<td>Degree Earned</td>
<td>Years of Experience</td>
<td>Last Grade Taught</td>
<td>Number of Students Taught</td>
<td>Last Individual Subject Taught</td>
<td>Reason for Leaving</td>
<td>Teacher's Name</td>
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<tr>
<td>Superintendent—County, City, or Parish—Parochial</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td>Local Bd. Head (County System)</td>
<td>Address</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Principal</td>
<td>Address</td>
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<tr>
<td>Teachers</td>
<td>Address</td>
<td></td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

**PLEASE INCLUDE ADDRESSES DURING SCHOOL YEAR**
V. DATA ON TEACHERS WHO DID NOT TEACH IN THIS SCHOOL LAST YEAR. (Instead of writing the teacher's name, indicate the number of that teacher on the list given under Item IV on preceding page):

<table>
<thead>
<tr>
<th>No of Teacher</th>
<th>LAST YEAR'S TEACHING</th>
<th>IF NOT TEACHING LAST YEAR</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>School</td>
<td>Subject or Grades</td>
</tr>
<tr>
<td></td>
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</tbody>
</table>

VI. PRINCIPAL OR EXECUTIVE HEAD. (If new this year)

VII. TEACHING AIDS.

A. Equipment owned. (List number of each)

(1) Projectors: 16 MM motion picture, sound, filmstrips, 2 x 2 slide, microprojector, opaque, overhead transparency.

(2) Recorders: disk, tape, record player.

(3) Radio, television receiver.

B. Materials owned. (List number of each)

(1) Motion picture films.

(2) Filmstrips.

(3) 2 x 2 slides.

(4) Records: disk, tape.


(6) Maps of Ohio: physical, outline, political.

(7) Atlases.

(8) Globes.

(9) Charts: social studies, science, other.

(10) Models: mathematics, science, other.

VIII. LIST BELOW ANY SIGNIFICANT IMPROVEMENTS MADE IN THE SCHOOL DURING THE PAST YEAR.

A — Physical

B — Curricular

C — Instructional
## IX. THE DAILY PROGRAM

Indicate in the following spaces (1) the subjects taught, using proper titles in designating each subject and indicating the grade level) whenever possible, and (2) the number of pupils enrolled in each section in the box in upper right-hand corner. Include the scheduled time for special teachers in the high school. Also give study hall, library, or other similar assignments. If a class meets fewer than five days each week, indicate the days upon which it meets. If organized as a six-year school, give the schedule of the teachers for the upper six grades. If your school has more teachers than the space provided, send copy of your printed schedule showing class enrollments.

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<tr>
<th>Name of Instructor</th>
<th>First Period</th>
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<th>Third Period</th>
<th>Fourth Period</th>
<th>Fifth Period</th>
<th>Sixth Period</th>
<th>Seventh Period</th>
<th>Eighth Period</th>
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Clerk of the Board of Education of the above-named school district, hereby certify that the salary that has been established for the 1958-1959 school year for each teacher employed by the board of education of the said school district is, to the best of my knowledge and belief, an amount not less than the amount required to be paid in accordance with the minimum salary schedule as provided for in Section 3517.08 of the Revised Code.

Signed by: [Executive Head or Principal]

Date: [Date]

Clerk of the Board of Education
APPENDIX C

Copy of the questionnaire sent to the principal of each school in the sample.
February 22, 1960

Gentlemen:

A study of the optimum size of secondary schools is being made by Mr. Smith, a member of the School Plant Division staff of the Bureau of Educational Research and Service, in cooperation with the Ohio School Boards Association. The study will attempt to determine the relationship of secondary school size to per pupil cost and to program effectiveness.

Certain data are being obtained from your annual report in the State Department but other data must be obtained from you directly. Your assistance in answering the following questions will be greatly appreciated.

1. Number of pupils suspended from school last year.
2. Per cent of pupils who are considered to be troublemakers -- the type who cause trouble frequently and/or are a continuous source of annoyance.

3. Number of teachers who have left your school staff since January 1, 1959, for reasons other than retirement.

4. Characterize your school attendance area by checking the appropriate classification:
   - Urban-City (part of a city of 50,000 or more).
   - Urban-fringe (densely settled urban fringe, including incorporated and unincorporated areas around cities of 50,000 or more).
   - Urban (includes incorporated cities or villages with 5,000 to 50,000 inhabitants).
   - Rural (all areas not described above).

5. Indicate the family income classification shown below in which the majority of the families residing in your school attendance area will fall.
   - Under $3,000
   - $3,000-$4,999
   - $5,000-$6,999
   - $7,000-$8,999
   - $9,000 and above

6. Characterize your school attendance area by estimating the per cent of the total population in each of the occupational classifications shown below.
   - Professional and managerial workers (doctors, lawyers, professional educators, farm owners, nurses, scientists, government and industrial executives, and kindred workers).
   - White collar and skilled workers (electricians, machinists, building contractors, newspaper reporters, bookkeepers, insurance agents, foremen, and kindred workers).
   - Service, semi-skilled and unskilled workers (policemen, store clerks, machine operators, practical nurses, truck drivers, laborers, farm hands, and kindred workers).

7. Number of required course offerings in your school.
8. Number of elective course offerings in your school.
Special Services Available

9. Indicate the full time equivalence for each of the services listed below. For example, three people devoting half of their time to guidance would be equivalent to 1.5 units of guidance.

- Administrative
- Adult program
- Guidance
- Health
- Psychological
- Remedial (special instruction)
- Other (please list)

Level of Achievement

10. Does your school conduct a regular testing program employing standardized tests?

- Yes.
- No.

11. If available, list the mean score by grade for each of the following achievement tests that have been administered in your school. Also, list the mean intelligence quotient for each grade.

<table>
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<tr>
<th>Grade 9</th>
<th>Grade 10</th>
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<tbody>
<tr>
<td>California</td>
<td>California</td>
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<tr>
<td>Cooperative</td>
<td>Cooperative</td>
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<tr>
<td>Iowa</td>
<td>Iowa</td>
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<tr>
<td>Ohio Every Pupil</td>
<td>Ohio Every Pupil</td>
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<tr>
<td>English</td>
<td>English</td>
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<tr>
<td>Mathematics</td>
<td>Mathematics</td>
</tr>
<tr>
<td>Science</td>
<td>Science</td>
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<tr>
<td>Intelligence quotient</td>
<td>Intelligence quotient</td>
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</tbody>
</table>

Grade II

| California       | California        |
| Cooperative      | Cooperative       |
| Iowa             | Iowa              |
| Ohio Every Pupil | Ohio Every Pupil  |
| English          | English           |
| Social Studies   | Social Studies    |
| Intelligence quotient | Intelligence quotient |

Thank you for your help in providing the data requested.

M. J. Conrad, Head
School Plant Division
Bureau of Educational Research
and Service

MJC:cam
BIBLIOGRAPHY


Hoover, F. W. "The Relationship Among Attitude of University of Nebraska Freshmen Toward Twelve Major Issues in Secondary Education and Seven Background and Status Factors." Abstracts of Doctoral Dissertations. Lincoln: The University of Nebraska, 1941.

Livingston, A. H. "Is There an Optimum Size High School?" *Progressive Education* (September, 1956), p. 156.


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Oliver, A. I. "How Big Should the Small School Be?" *School and Society.* LXIX (February, 1949), p. 127.


I, Clifford Basil Smith, was born in Masontown, West Virginia, February 17, 1918. I received my public-school education in that community. My undergraduate training was acquired at West Virginia University, which granted me the Bachelor of Science in Physical Education with high honors in 1953. The Master of Science degree was also granted by the same institution in 1954.

After four years of teaching in the secondary schools of Marion Township, now a part of the Columbus City School District, I was accepted as a research assistant in the School Plant Division of the Bureau of Educational Research and Service at The Ohio State University. I served two years in this capacity and one year as an instructor while completing the requirements for the degree Doctor of Philosophy.