

ABSTRACT OF THESIS

PER PUPIL COST OF INSTRUCTION
FOR A
DIVERSIFIED OCCUPATIONAL PROGRAM
IN
MONETT, MISSOURI

Submitted by
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In partial fulfillment of the requirements
for the Degree of Master of Science
Colorado State College
of
Agriculture and Mechanic Arts
Fort Collins, Colorado

August, 1941

S-1-08A-18-01-035



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ABSTRACT OF THESIS

Public demand for vocational training in the smaller communities has been met by offering a program of part-time cooperative training in Diversified Occupations. The addition of this department increased the instructional cost of such schools. The supply costs are nominal, due to the practice of using agencies of the community for training stations.

The problem arose in the Monett High School when administrators and teachers of academic subjects questioned the wisdom of offering a program in which the cost of instruction is apparently high. It was important that any changes or savings made be based on accurate cost information. To secure accurate cost data, it was decided to study the comparative cost of instruction in all subjects offered to all juniors and Seniors in this school. This limited the extent of the study.

The investigation received its direction by an analysis of the following problem:

What is the per pupil cost of instruction in the Diversified Occupations Program as compared to that of the academic pupil in Monett, Missouri?

- A. What are the instructional cost factors?
- B. What method can be used in determining per pupil costs?
- C. What is the amount of state and federal reimbursement the local community receives?
- D. What is the net per pupil cost of instruction for a Diversified Occupations pupil?
- E. What is the net per pupil cost of instruction for an academic pupil?
- F. How much does the Diversified Occupations pupil earn while he learns?
- G. What are the comparative results of these cost findings?
- H. How can this program be made more effective at the same investment?

Permission was secured from the superintendent and the Monett Board of Education to search the school records for instructional cost data. This information was secured from the principal's annual report to the superintendent and from the official school records. The coordinator's files were used freely to obtain such information as what the Diversified Occupations pupil earned while he was on his job. Authenticity of these data is assured because the records of the school office are audited yearly.

The materials secured from these records were the salaries of teachers, coordinator, principal and superintendent, the number of hours each teacher taught, the number of pupils enrolled in each course,

the number of hours each course was given, and the number of school days in the year. Adequate material was compiled from sources and the data transferred to simple tabulated forms. These data include instructional cost of all the subjects taken by all juniors and seniors in this school. The data secured are valid because all materials found in these files pertaining to this question were used.

In dividing the total cost of instructional activities apportionately among the respective subjects, four problems were encountered; the determination of the most satisfactory basic unit; the proper allotment of the costs for classroom teaching; the distribution of supervisory charges to the different subjects; and finally, the assignment of supply costs to subjects.

Costs of classroom instruction in a given subject were found by first determining the total number of periods assigned to each teacher per week and the periods required for each class. These two numbers, used as a fraction, represent that part of the teacher's salary which should be charged to the class in question. For example, if the teacher's salary was \$1250, his weekly assignment 25 periods, and the subject requires five periods per week, then one-fifth of his salary, or \$250, was charged. The same procedure was followed for subjects which required ten periods per week, eight

periods, five periods, etc. Study halls and library periods were given the same weight as class periods.

In the case of superintendent, principal, special supervisors, and heads of departments whose salaries exceed those of classroom teachers and who had classroom or study assignments, it was necessary to segregate the excess salary paid for special services in order to avoid an overcharge for classroom teaching.

Several difficulties arose at this point, the chief ones of which were to find a reasonable teaching rate for the higher salaried person and to determine the typical load against which to compare his assignment. It was assumed that his excess salary was paid for his special services and not because of superior teaching. The narrow range of salary schedule simplified the first difficulty mentioned, and the average assignment of periods for all teachers proved the most satisfactory solution of the second. In case of teachers who were known to be appointed for a longer period of service than the others, for example, Home Economics, Agriculture, and Diversified Occupations instructors, a proportional part of the full salary was used for the school year of 180 days.

Assignment of costs for supervision by superintendent, principal, special supervisors, and department heads involved a process of determining the amount

to be charged for this service as previously explained in the discussion of school instructional costs. Next, the number of classes taught in the school for which full credit is given was ascertained. To this was added the number of other classes for which part credit was given, the total of which was first reduced to a five-period per week basis. For example, a class in Chorus meets twice a week throughout the school year. This class requires only two-fifths as much supervision as English which meets five times a week. Other part-time classes were handled in the same way, thus, the total number of classes which were to receive supervisory charges was determined. That proportion of the principal's salary, for example, which had been allocated to supervision was then divided by this number and the cost of supervision per class thus estimated. This sum was finally added to the teaching cost for each class or pro-rated for part-time classes. Having ascertained the pro-rated salary costs of teachers and supervisors for each class and adding to this the pro-rated cost of supplies, it was possible to find the per capita cost for each class and for all class combinations in each field by substituting these data in the following formula.

$$\frac{\text{Pro-rated salaries and supply costs}}{\text{Number of pupils enrolled in class} \times \text{Number of class hours per year}} = \text{Per pupil hour cost per subject}$$

Table 5, Chapter IV shows the amount the local board of education is reimbursed in each department, and the net instructional cost to the local district. While the total per pupil costs of the vocational subjects appear higher, the net cost to the local board was very much lower.

It was found, as shown in Table 6, Chapter IV, that when the earnings of the Diversified Occupations student is considered, the cost of this department to the local community is negligible.

The factor that had the greatest influence on equated cost was the number of pupils enrolled. When the number of pupils enrolled in a certain subject is increased the per pupil hour cost is immediately lowered. It will be noted that Table 4 shows History with an enrollment of 120 pupils costs only \$0.0701 per pupil hour, while Industrial Arts with an enrollment of 30 costs \$0.1407 per pupil hour. Britton (3:28-30) found that Mathematics could be offered at an average of \$0.0349 per pupil hour (supply cost not included) in nine Wisconsin schools. It was concluded that Monett could offer the same subjects at comparable per pupil cost and that effective instruction could be given to more pupils at the same cost without impairing the progress of the pupil or lowering the standard of teaching.

The second factor considered was the number of school periods per day taught by the teacher. It was found that the average teacher assignment hours, including homeroom activities, were 6.75. Makepeace (9:25) also found that the teacher assignment hours in the Los Angeles High School, including all activities, were 7.69 average. Monett could gain 15 minutes per teacher per day by lengthening the school day teacher assignment hours to seven. This would free a total of 1125 teacher hours per school year.

A third factor having bearing on equated cost is the length of the school year. It was decided that nothing could be gained here, as the school year is set by law at 180 days and this practice is being followed.

The last factor affecting equated instructional costs is that of pro-rating the salaries of teachers and supervisors. It was found that these costs were very high when compared to the student hours taught. As a remedy for this condition, it was suggested that the school day be lengthened, enrollment be increased, or that the school schedule be so arranged that alternate classes could be given. The time freed by this procedure could be utilized to extend educational opportunities without increasing instructional costs. Pryor (16:17-18) suggests that principals organize their work so that at least one-half of their time could be

devoted to supervisory activities. It was learned that six members of the Monett faculty engaged in supervisory activities were following the practice recommended by Pryor.

It is shown by the National Occupational Conference Interim Report (12:1-40) that Guidance and Placement Programs are relatively undeveloped in comparison with other training programs throughout the nation. Myers (11:60-81) reports the United States census as showing nearly two and one-half million youth between the ages of 16 and 25 drop out of full-time school to enter, or seek to enter, unprepared, some kind of occupation.

Because of existing traditions in secondary schools, and even though Monett is offering some course content on a high level, the Counseling and Guidance Program falls far short of that desired. If the coordinator's classes were combined, he would have one period open for this service. The type of work done by the coordinator makes him particularly suited to serve as a Counseling and Vocational Guidance officer. As a result of his contacts and the immediate occupational information available to him, the coordinator should assume the responsibility of organizing and conducting a Counseling and Guidance Program. The time available would not be sufficient for him to

counsel all the students in the school, but he could contact all of those desiring his immediate advice.

The answers to questions D to H have revealed that the school schedule and budget could be so arranged that educational opportunities could be extended without additional expenditure of funds. There is opportunity to give instruction to more students in present classes and to offer additional courses, or to extend the present services without increasing the total cost of instruction.

There is a lack of information regarding the following related subjects:

1. A comprehensive Counseling and Guidance Program for small schools.
2. The effectiveness of a Diversified Occupations training program.
3. Maximum teacher, supervisor, and coordinator load.

T H E S I S

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FOR A
DIVERSIFIED OCCUPATIONAL PROGRAM
IN
MONETT, MISSOURI

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Submitted by

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In partial fulfillment of the requirements
for the Degree of Master of Science
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Agriculture and Mechanic Arts
Fort Collins, Colorado

August, 1941

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AGRICULTURE AND MECHANIC ARTS
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July 29, 1941

I HEREBY RECOMMEND THAT THE THESIS PREPARED UNDER MY
SUPERVISION BY W. Chad Cowherd
ENTITLED PER PUPIL COST OF INSTRUCTION FOR A
DIVERSIFIED OCCUPATIONAL PROGRAM IN MONETT, MISSOURI
BE ACCEPTED AS FULFILLING THIS PART OF THE REQUIREMENTS FOR THE
DEGREE OF MASTER OF SCIENCE
MAJORING IN TRADE AND INDUSTRIAL EDUCATION
CREDITS 3

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Permission to publish this thesis or any part of it
must be obtained from the Dean of the Graduate School.

ACKNOWLEDGMENT

The writer wishes to express his appreciation to members of the Colorado State College summer session faculty for their aid in writing this paper: J. B. Yingling, Associate Professor of Industrial Education, for technical advice and counsel; to Dr. Gilbert L. Betts, Supervisor of Graduate Research, for valuable suggestions in organization of materials; and to Dr. R. A. Hinderman, Director of Educational Research, for the ready assistance and guidance without which the development and completion of this study would have been impossible.

Appreciation is expressed to Miss Wilma Dunaway, Secretary to the Monett Board of Education, for assistance in compiling data.

The writer is extremely grateful to his wife, Marie, for inspiration and assistance given him during the preparation of this paper.

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PER PUPIL COST OF INSTRUCTION FOR A DIVERSIFIED
OCCUPATIONAL PROGRAM IN MONETT, MISSOURI

Chapter I
INTRODUCTION

During the past few years there has been an increasing public demand for extended advantages in vocational education (14:5). Vocational school administrators have found it increasingly difficult to secure enough local, state, and federal funds to finance their present programs. Therefore, this demand must be met by more economical use of present funds available (3:7). A vocational program of part-time cooperative training in Diversified Occupations has been conceived as a means of extending the benefits of vocational education to smaller cities and towns. Since it is impractical for small school systems to establish vocational schools with unit shops, furnished with expensive machinery and equipment, the plan of a cooperative arrangement between the school and the employers of young workers in the trades and industries, distributive, and service occupations of the community was

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formulated.

The Missouri State Plan for Vocational Education (10) provides that any city within the state with a population of 5,000 or over may set up a program of Diversified Occupations. This program is conducted by a coordinator who teaches one or two classes in Personnel Problems and Occupations. He is required to spend as much time supervising his trainees on the job as he spends in the classroom. The coordinator receives a better-than-average salary, most of which is reimbursable by state and federal funds. The local board of education must furnish a suitable room, properly equipped for the type of instructions conducted by the coordinator.

The enrollment in the Diversified Occupations classes is usually lower than that in the academic classes. Therefore, administrators of academic subjects have questioned the wisdom (or economy) of such a training program because of the apparent high cost of instruction which is evident where so few pupils take part. The facilities and time of the coordinator must be wisely utilized or the per pupil cost of the program will be prohibitive.

The problem of extending the resourcefulness of the coordinator's time, as a means of economy, has come to the attention of the administrator of the

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Diversified Occupations Program in the Monett High School, Monett, Missouri. A careful study of the costs of both vocational and general subjects may show ways of making definite savings without injury to the present program. These savings could, of course, be used to make the program more effective at the same investment.

It is important that any change in the present instructional costs should be based upon accurate cost information. (3:23-29) Information relative to cost of all subjects necessary is not available in suitable form. This cost information should show where unnecessary expenditures are being made, then those expenditures could be stopped and the savings used to make the present program more effective.

Monett is nestled in the foothills of the Ozark Mountains not far from the region made famous by Wright in his "Shepherd of the Hills". It is a four-way division point on the St. Louis and San Francisco Railroad. With a monthly payroll of \$100,000, this corporation employs over 500 people. A few of its other major industries include a creamery, cheese factory, two hatcheries, cigar factory, four large wholesale establishments, and a cold storage and ice plant which serves the four-state area, all of which employ over 2,000 people. These employees, who are engaged in some 30 occupations, heretofore, have prepared themselves by the

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apprentice or pick-up method.

In Monett the Diversified Occupations Program has been very agreeably accepted and has become a part of the school and community. School records show that while the Monett High School graduates some 100 seniors each year, the Diversified Occupations Program has been responsible for training and placing in permanent employment 25 per cent of these graduates.

Statement of the problem

The purpose of this study is to reveal the comparative per pupil cost of instruction in the Diversified Occupations Program to that of the academic or general educational program in Monett, Missouri. Ways and means will be sought by which the program of Diversified Occupations can be made more effective at the same investment of funds.

Analysis of the problem

What is the per pupil cost of instruction in the Diversified Occupations Program as compared to that of the academic pupil?

- A. What are the instructional cost factors?
- B. What method can be used in determining per pupil costs?
- C. What is the amount of state and federal reimbursement the local community receives?
- D. What is the net per pupil cost of instruction for a Diversified Occupations pupil?

- E. What is the net per pupil cost of instruction for an academic pupil?
- F. How much does the Diversified Occupations pupil earn while he learns?
- G. What are the comparative results of these cost findings?
- H. How can this program be made more effective at the same investment?

Delimitation of the problem

This study will pertain to all subjects taken by all juniors and seniors in the Monett High School for the year in which data are collected.

The term "Diversified Occupations Program" means the part-time cooperative training of juniors and seniors as an integral part of the regular high school program as set up by the Missouri State Plan for Vocational Education. (10)

The term "academic pupil" means the pupil who pursues general school subjects leading toward high school graduation and college entrance.

It is only reasonable to assume that the Diversified Occupations Program is here to stay, and that such information as will be collected in this research can be relied upon, as the Monett High School is located in a typical community engaging in trade and industry, distributive, and service occupations.

A complete cost study has been made of all

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subjects taken by all juniors and seniors in this
typical school and the following chapter will reveal
some of the pertinent research findings.

Chapter II

REVIEW OF LITERATURE

A vocational program of part-time cooperative training in Diversified Occupations has been conceived as a means of extending the benefits of vocational education to smaller cities and towns. The advantages of this type of training were quickly perceived by such communities as a means of giving youth training for employment. As is rather apparent, however, many obstacles arose that had to be overcome. The removal of these obstacles and the solution of the related problems gave rise to considerable research on the subject. A review of pertinent research has revealed information that related to the subordinate questions A and B of the study.

Findings on question A, "What are the instructional cost factors?" are given below:

Englehardt and Englehardt (6:742-52), in 1927, made an extensive study of instructional cost factors, in which they said that a better public understanding of costs and greater liability of cost facts will go a long way toward keeping the public interest and support

of the school. It is important that the records show true costs, for this cannot be accomplished until just what constitutes total costs is established, as well as a base for determining the amount. The item of service to the school is selected, then charges to each element are made. Care should be taken to allocate expenditures on a uniform basis. This requires a careful analysis of the nature of the service. Written forms and instructions governing the allocation must be prepared. Direct and indirect costs should be tabulated following correct interpretation.

Total instructional costs should be determined on the basis of the expenditures made directly for the following services which were given by the authors:

- Teaching: (Direct, pupil hour, salary expense)
- Supervision: (Indirect, teacher hour, supervisor's salary)
- Administration: (Indirect, teacher hour, administrator's salary)
- Special supplies: (Direct)
- Special room use: (Where special provisions must be made and room cannot be used for other subjects)
- Special maintenance charges: (Allotted by space assignments)
- Special operating charges: (Allotted by space assignments)
- Other special charges: (Special insurance)

As a result of this work, they summarized pertinent research findings and methods of dividing educational costs into budgetary items and reliable cost factors. They recommend the use of budgetary items and the list of cost factors given in Report

Form 8-010 Bureau of Education, Department of Interior,
1925. These budgetary items as listed in the report
are: administration, instruction, coordinate activities,
auxiliary agencies, plant operation, fixed charges,
maintenance of school plant, capital outlay, and debt
service.

The following are cost factors of instruction:

Supervision. General supervision of instruction shall be defined as that group of activities which has to do with the actual improvement of instruction through direct contact with the principal or teacher. In case a supervisor renders service . . . in more than one kind of school, charge his salary, clerk hire, and other expense of the type of school in which he gives the greater portion of his time. If his time is equally divided, charge such expenditures to both types of schools.

Instruction. This includes a statement of all items of expense concerned directly in teaching or aiding in the teaching of children, or improving the quality of teaching such as salaries, expense of teachers, institutes, cost of free text books, stationery, and other supplies used in instruction.

Supplies. Supplies are those things which, once used, are actually or constructively consumed, including writing paper, drawing paper, blank books, chalk, ink, pencils, pens, adhesives fasteners, carbon paper, rubber stamps, type-writer supplies, magazines, test tubes, filter papers, polishing and abrading supplies, drugs, chemicals, cleaners, laboratory supplies, food supplies, wood, metal, and newspapers. Freight and cartage expense should not be reported. Library books (not free) should be reported under capital outlay.

The findings of this study were used to determine the scope of instructional costs and as an aid in developing forms for recording instructional cost

data from the school office records in the present study.

O'Dell (13:102-28) in 1933, studied unit cost of school supplies in two school systems, each for a two year period and with a total enrollment of 1900 students. Many forms were used in collecting data, one of which is shown in the appendix, Form 9. This supply requisition form was an aid in developing a similar form for recording instructional supply data in the present study.

Ryan (1:313-14) in 1930, made an investigation of cost per child in the schools of New York City. He analyzed how \$100.00 was spent in the school system and reported that \$86.00 was spent for teachers's salaries, books, and paper, while only \$14.00 was spent to keep and heat and provide for the workers who care for the affairs of the system.

He lists the expenditures as follows:

Teachers' and principals' salaries - - - -	\$83.06
Supplies, text books, and library books - - - - -	2.88
Playground equipment, recreation centers - - - - -	1.01
Rental and lease for buildings, transportation of teachers and pupils - - - - -	.77
General repair to school buildings, repair and replacement of furniture - - - - -	3.89

Salaries of inspectors, custodians, cleaners, and operators, together with cost of fuel and water - - - - -	5.29
Administration salaries, including superintendent, board of examiners, directors of various activities, and supplies for these offices - - - - -	2.03
Business administration, salaries of auditors, superintendent of supplies, superintendent of construction and maintenance - - - - -	.79
General administration expenses, such as salaries of secretary to the board, and office supplies - - - - -	.25
Incidental expenses, including workmen's compensation, damage, and adjustment - -	.03

The above tabulation was useful as a method of classifying various costs of my own problem, and as an aid in computing instructional cost factors.

Research findings that have a bearing on question B, "What method can be used in determining per pupil costs?" are:

Hull (8:40) in 1934, investigated the per pupil cost of instruction in 30 Missouri high schools by analyzing the cost data of the schools from 1926 to 1932. The factors used in determining the per pupil costs are: teachers' salaries, the size of classes, number of class meetings in the weekly program of the pupil, and the number of class meetings in the weekly program of the teacher. These four factors were the ones that proved to be reliable for making comparisons

between the per pupil cost of instruction in different subjects. Hull reports that cost data from different subjects in different schools must be equated before comparisons can be made. Hull's method of equating cost data is given in the formula shown in the appendix. The simplest way to arrive at the per pupil cost is to divide the total cost of instruction by the total number of students. But in order to analyze the influence of any component parts of per pupil cost, the four elements of the formula were used.

The foregoing was indispensable to the writer in the present study by providing a partial list of cost factors and a technique for equating instructional costs for comparative purposes.

The United States Office of education (15:351) reports a special study of per capita costs in 1933 which shows that the cost of education per child per day in school has been decreased \$0.14 since 1929-30. This means a decrease of \$0.22 in per capita cost in three years. In 1930, the average cost per child per day in public elementary and high schools was \$0.628. In 1933, it is estimated the figure will be \$0.487. Comparison of data for other years shows that the decrease in 1933 is carrying per capita costs for public education to a lower level than any year since 1922. Part of this decrease is due to the greater percentage

of high school pupils in the schools. The following tabulation shows this decrease clearly.

<u>Item</u>	<u>1920</u>	<u>1930</u>	<u>1933 (est.)</u>
Current expenditure	33.0	50.2	44.7
Capital outlay	5.9	12.6	4.0
Total	38.9	62.8	48.7

This information was used more as a study for comparative purposes and to show the trends of instructional costs per pupil as the enrollment increases.

Englehardt and Englehardt (6:742-52) state that it is a common practice in the analysis of school costs to compare local expenditures with those on the selected list of comparable school systems, and that this may be misleading, since the vital factors which enter to determine educational costs may be concealed. This is due to many unavoidable variables. They state that if school expenditures are to be compared, they should contain true costs to the municipality.

Table 7 in the appendix, which is taken in part from the same source, shows the comparative current expenditures in a few of the medium sized school systems. This review aided in the setting up of a method that was used in comparing instructional cost per pupil. The

chart suggested a procedure for setting up the forms used in this study.

Arundel (2:1-26) in 1932, analyzed the total vocational and secondary school budget of Cincinnati for the purpose of securing vocational training costs. In the early analysis, the author used the equation worked out by Hull (8:40), and which is given in the appendix, in which the average per pupil cost is \$49.29. By dividing the per pupil cost by the average number of student hours, the average cost per pupil hour per subject may be obtained, thus:

$$\frac{\text{Average cost per pupil}}{\text{Computed number of hours}} = \text{Average cost of pupil hour per subject}$$

$$\text{Substituting: } \frac{\$49.29}{448} = \$0.11$$

By using this procedure, but using the total instructional costs for all subjects, Arundel reported that the pupil hour costs for vocational training was \$0.1097. He found that pupil hour costs were reliable when computing instructional costs between vocational classes because it eliminated the irregularity due to part-time students being taught and where the total number of hours was used as a basis for class time.

This method of computing average costs per pupil hour per subject was found to be ideal to use in this study, as the subject most vitally concerned is taught on a part-time basis. The results were also

valuable for comparison with my findings.

Comstock (5) in 1939, investigated and reported on 319 cities during the school year 1937-38. She found by classifying the cities into four groups that the average per pupil cost in 1938 of day full-time school was less than it was in 1930. In 1930, the variation of per pupil costs in the larger cities was \$103.18, while the per pupil costs in the smaller cities was \$75.37. These computations were made from the reports recorded by the U. S. Office of education. Table 12 in the appendix shows the cost per pupil in average daily attendance in 319 city school systems for 1938. Group IV in this table, which includes cities of less than 10,000 population, is comparable to this study and was used as a guide to estimate items and relative costs.

Britton (3:24-39) in 1940, made a study of vocational education costs of instruction in nine Wisconsin cities with populations between 25,000 and 45,000 for the purpose of extending vocational education opportunities through the control of instructional costs. He discovered that the average school records do not reveal the pro rata cost of instructional supplies and that these costs only amounted to a small per cent of the total instructional costs. Therefore, they could be ignored in his study. He found that

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the greatest factor influencing per pupil cost was the number of pupils enrolled. He lists other factors influencing per pupil cost of instruction, such as the number of school hours in the school day, the number of school days in the year, and the pro rata salaries of instructors and supervisors. Britton points out that these schools could extend their services on present budgets if they adjusted their class enrollment, class schedule, plan of teacher assignment, and re-allocate the coordinator's schedule.

Table 8 in the appendix shows the composite findings of upper, lower, and average per pupil cost of instruction in the more common subjects offered in these nine schools. The procedure and findings of this report were studied carefully, in fact, the present study parallels in many cases in procedure and comparative results.

The review of research did not reveal complete answers to any of the subordinate questions, but it did provide a number of usable forms and suggestions for those forms formulated, standards of comparison, and techniques. Complete answers to the subordinate questions were sought according to the methods described in the procedure and which follow in Chapter III.

Chapter III

MATERIALS AND METHODS

It was shown in the preceding chapter that some studies have been made of per pupil hour costs. The subordinate questions A, "What are the instructional cost factors?" and B, "What method can be used in determining per pupil cost?" have been answered in part as reported in the research study. To complete the answers to the problem comparing the per pupil cost of instruction in the Diversified Occupations Program to that of the academic pupil, required certain information that was not available in suitable form.

Source of material

This information was secured from the official school records and from the principal's annual report to the superintendent. The coordinator's files were used freely to obtain such information as what the Diversified Occupations pupil earned while he was on his job. Authenticity of these data is assured because the records of the school office are audited yearly.

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The materials secured from these records were the salaries of teachers, coordinator, principal and superintendent, the number of hours each teacher taught, the number of pupils enrolled in each course, the number of hours each course was given, and the number of school days in the year. Adequate material was compiled from these records and the data transferred to simple tabulated forms. These data include instructional cost of all the subjects taken by all juniors and seniors in this school. The data secured from this source are valid because all materials found in these files pertaining to this question were used.

Methods, devices, and techniques
used in making the study

The following methods, devices, and techniques were applied to the above sources to secure answers to the unanswered subordinate questions. The methods employed were fashioned from the research studies reported by Arundel (2:1-26), Clark (4:15), and Hull (3:40). The procedure for equating instructional costs as given in Chapter II was developed from these investigations.

To supplement the methods mentioned above, a device was formulated after the one used by O'Dell (13:102-28), in which he studied educational supply costs. The tabulation forms used in this study were taken from O'Dell's work and modified to fit existing conditions

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in collecting necessary data.

The technique reported by Englehardt and Englehardt (6:742-52) was used to select instructional cost factors. This report on the breakdown of budgetary items and a list of cost factors is given in Report Form 8-010 in 1925. The cost factors given in Chapter II were used to delimit this study.

The review of research gave partial answers to subordinate questions A, B, and E. The complete answer to question C was secured from the local school clerk's records. These data were tabulated on Form 3 in the appendix, and are shown as percentage of the total salary pro-rated to each subject. The procedure which follows was used to secure the remaining information needed to solve this problem.

The interview was used to secure proportionate salaries and supply costs. For example, the superintendent and clerk were not wholly informed as to just what constitutes instructional expenditures. After explaining to them the instructional cost factors as given by Englehardt and Englehardt (6:742-52), the necessary data were compiled and tabulated as described in the following pages.

In dividing the total cost of instructional activities apportionately among the respective subjects, four problems were encountered; the determination of

the most satisfactory basic unit; the proper allotment of the costs for classroom teaching; the distribution of supervisory charges to the different subjects; and finally, the assignment of supply costs to subjects.

Subject instructional costs should be computed on the basis of average daily attendance in the given classes during the year in which the subject is taught, but since very little variation of attendance was found between different classes, the number of students in each class, at the time of this report, was used in the computations. The use of this basis permits an accurate report on the costs for one year only. In this study, full-year costs were used, hence the following tables should be understood as based on the assumption of constant enrollment in each subject for the year. Since relative rather than absolute costs are of special concern, this procedure was considered satisfactory.

Costs of classroom instruction in a given subject were found by first determining the total number of periods assigned to each teacher per week and the periods required for each class. These two numbers, used as a fraction, represent that part of the teacher's salary which should be charged to the class in question. For example, if the teacher's

salary was \$1250, his weekly assignment, 25 periods, and the subject requires five periods per week, then one-fifth of his salary, or \$250, was charged. The same procedure was followed for subjects which required ten periods per week, eight periods, five periods, etc. Study halls and library periods were given the same weight as class periods.

In the case of superintendent, principal, special supervisors, and heads of departments whose salaries exceed those of classroom teachers, and who had classroom or study assignments, it was necessary to segregate the excess salary paid for special services in order to avoid an overcharge for classroom teaching.

Several difficulties arose at this point, the chief ones of which were to find a reasonable teaching rate for the higher salaried person and to determine the typical load against which to compare his assignment. It was assumed that his excess salary was paid for his special services and not because of superior teaching. The narrow range of salary schedule simplified the first difficulty mentioned, and the average assignment of periods for all teachers proved the most satisfactory solution of the second. In case of teachers who were known to be appointed for a longer period of service than the others, for example, Home Economics, Agriculture, and Diversified Occupations instructors, a proportional part of the full salary was used for the

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school year of 180 days.

Assignment of costs for supervision by superintendent, principal, special supervisors, and department heads involved a process of determining the amount to be charged for this service as previously explained in the discussion of school instructional costs. Next, the number of classes taught in the school for which full credit is given was ascertained. To this was added the number of other classes for which part credit was given, the total of which was first reduced to a five period per week basis. For example, a class in chorus meets twice a week throughout the school year. This class required only two-fifths as much supervision as English which meets five times per week. Other part-time classes were handled in the same way, thus, the total number of classes which were to receive supervisory charges was determined. That proportion of the principal's salary, for example, which had been allocated to supervision was then divided by this number and the cost of supervision per class thus estimated. This sum was finally added to the teaching cost for each class or pro-rated for part-time classes. Having ascertained the salary costs of teachers and supervisors for each class and adding to this the pro-rated expense of supplies, it was possible to find the per capita cost for each class

and for all class combinations in each field.

Form 1, as shown in the appendix, was used to collect the salaries chargeable to instructional costs of the subjects listed. Form 2 was likewise used to collect supply costs. These cost entries were carefully checked for error. Where supplies were used for other than juniors and seniors, only that proportionate amount was charged to the latter. The technique reported by Englehardt and Englehardt (6:742-52) for pro-rating teacher and supervisor salaries was applied to the data tabulated.

Computations on the data secured on Forms 1 and 2 were fashioned after the formula given by Hull (8:40). The per cent of reimbursable costs had to be deducted in order to secure the net per pupil cost which answers questions D and E.

Question F was answered by merely tabulating on Form 4, the data found in the coordinator's files. These figures, of course, were reduced to averages.

These results were inspected to find similarities and differences in the two fields as called for in questions G and H. The methods and techniques just described were applied to these sources to provide data needed to solve this problem. The findings are given in Chapter IV.

Chapter IV

FINDINGS

In Chapter II of this study, the problem of finding the comparative per pupil cost of instruction in the Diversified Occupations Program to that of the academic pupil was partially answered by using the technique reported by Englehardt and Englehardt (6:742-52) to pro-rate the teachers' and supervisors' salaries. While the procedure reported by O'Dell (13:102-28) on unit cost of school supplies was followed to pro-rate the supply costs.

The study was delimited by first using only those pupils of the same classification, and second, by including only the one school in question.

The problem was answered by further using the instructional cost equating method reported by Arundel (2), Clark (4), and Hull (8) as reported in Chapter II. Each of the findings given in the following pages will be used to complete answers to the remaining questions D to H.

Table 1 shows the subjects and the total pupil hours studied.

Table 1.--SUBJECTS AND TOTAL PER PUPIL HOURS

Subject or department	Number of students	Class hrs. per day	Days per year	Total hours
Art- - - - -	14	1	180	2,520
Agriculture	30	2	"	10,800
Commercial - -	60	1	"	10,800
Diversified Occupations	30	4	"	21,600
English - - -	120	1	"	21,600
History - - -	120	1	"	21,600
Home Economics	40	1.5	"	10,800
Industrial Arts - - - -	30	1	"	5,400
Mathematics -	40	1	"	7,200
Music - - - -	90	1.25	"	20,050
Physical Education -	180	.5	"	16,200
Physical Science - -	83	1	"	14,940

The subjects in some cases have been combined into departments. Agriculture includes both vocational and general. Commercial subjects are listed as such, but include Shorthand, Typing, Bookkeeping, General Office Practice, and accounting. English includes Public Speaking, Expression, and Dramatics. History includes the entire field of social studies. Home Economics includes vocational and general. Industrial

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Arts includes Mechanical Drawing, Woodwork, and Machine Shop. Mathematics includes Algebra, Geometry, and Advanced Arithmetic. Music includes Band, Orchestra, Drum Corp, and Chorus. Diversified Occupations includes not only the Related Content and Personnel Problems class work, but also supervision of instruction on the job. Physical Education includes all classes in physical training and hygiene, but does not include coaching. Physical Science includes Physics, Chemistry, Biology, and Senior Science.

Due to the uniform attendance in different subjects, 180 days are used as a basis for the school year. There is also some variation in the weight of different subjects. Agriculture is offered two hours per day for only one unit of credit, and Diversified Occupations is offered four hours per day for two units of credit. Music and Physical Education carry only one-half unit for each hour of classroom instruction. All other subjects carry one unit of credit for each hour spent in recitation. Home Economics meets one and one-half hours per day, but the credit is so arranged as to earn one unit of credit per hour of classroom instruction. Art, which is offered for a total of 2,520 hours, ranks lowest in the number of hours offered in any one subject, while English and History were both offered for 21,600 hours and with an enrollment of 120 pupils each.

Diversified Occupations, with an average enrollment of only 30 pupils, was offered for 21,600 hours of instruction. A similar enrollment of 30 pupils was offered for 5,400 hours in Industrial Arts. The wide difference in total number of hours offered is due to the fact that some pupils meet more than once in the same department.

Table 2.--PRO-RATED SALARIES OF TEACHERS AND SUPERVISORS

Subject or department	Teachers' salaries	Principals' salary	Superintendents' salary	Total salaries
Art - - - - -	\$ 250.00	\$ 15.50	\$ 6.50	\$ 272.00
Agriculture -	1000.00	30.00	10.50	1040.50
Commercial -	750.00	90.00	31.50	871.50
Diversified Occupations	2000.00	30.00	10.50	2040.50
English - - -	1050.00	130.50	49.50	1230.00
History - - -	1050.00	130.50	49.50	1230.00
Home Economics -	1000.00	44.00	15.00	1059.00
Industrial Arts - - -	500.00	34.50	11.50	546.00
Mathematics -	400.00	45.00	15.50	460.50
Music - - - -	1600.00	178.50	56.00	1834.50
Physical Education -	750.00	189.50	64.50	1004.00
Physical Science - -	900.00	89.50	32.50	1031.00
Total - - - -	11250.00	997.50	353.00	12619.50

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The pro-rated salaries of teachers, principals, and superintendent are shown in Table 2. This table shows cost data for all subjects offered to juniors and seniors in the Monett High School. The method of reading the table is as follows: Select the subject for which information is desired. The subjects are listed alphabetically in the column on the left. By reading to the right, the total pro-rated cost for teachers' salaries is given. The second column shows the total pro-rated cost of the principals' salaries. The third column shows the pro-rated superintendent's salary, while the last column on the right is the total of all salaries. For example, English costs \$1050.00 for teachers' salaries, \$130.50 for principals' salaries, \$49.50 for superintendent's salary, and at a total cost of all pro-rated salaries of \$1230.00. Tables 3, 4, and 5 on other pro-rated costs are read in the same way.

In Table 2, it will be noted that Diversified Occupations has the highest pro-rated teacher's salary, while Art has the lowest. Physical Education and Music receive the highest portion of principals' salaries, where Agriculture and Diversified Occupations rank lowest. By glancing at Table 1, it will be seen that those subjects having a higher enrollment rank highest in cost of supervision. With the exception of Physical Education, the total salary costs and the teacher salary

costs are in parallel proportion. The highest supervision cost is Physical Education, and is due to the school practice of having one-half hour periods or one-fourth credit per class hour. It is interesting to see that while the superintendent's salary is much higher than that of the combined salaries of the principals, the pro-rated principals' salaries are higher. The superintendent's duties are divided among all grades, while the principals' duties are only concerned with the high school.

The total amount spent for teachers' salaries was \$11,250.00 for the year, while \$997.50 were paid out for principals' salaries. The superintendent's pro-rated salary of \$353.00 was lowest, while the total salary costs were \$12,619.50 for all subjects offered to all juniors and seniors during the year. These pro-rated salary costs constitute about 86 per cent of the total instructional costs.

Table 3 shows the pro-rated instructional supply costs. These costs constitute approximately 14 per cent of the total instructional costs. Therefore, it is very important that they be included in the study because true results are desired. Teachers' supplies were highest in Agriculture at \$34.00, and Diversified Occupations ranked lowest at \$2.00. Pupils' supplies at \$4.00 was lowest in Art, and highest in Music at \$187.50.

Table 3.--PRO-RATED INSTRUCTIONAL SUPPLY COSTS

Subject or department	Teachers' supplies	Pupils' supplies	Room supplies	Total supply costs
Art - - - - -	\$ 8.50	\$ 4.00	\$ 28.50	\$ 41.00
Agriculture -	34.00	13.00	20.50	68.50
Commercial -	18.50	8.50	122.00	149.00
Diversified Occupations	2.00	7.50	13.50	23.00
English - - -	10.25	119.00	96.00	225.25
History - - -	8.50	98.50	96.00	203.00
Home Economics -	6.75	84.00	146.00	236.75
Industrial Arts - - -	5.50	25.50	185.00	216.00
Mathematics -	4.00	8.75	36.00	48.75
Music - - - -	10.50	187.50	52.50	250.50
Physical Education -	5.50	83.00	102.00	190.50
Physical Science - -	8.75	9.75	160.00	178.50
Total	123.75	649.00	1058.00	1830.75

Industrial Arts costs at \$185.00 ran highest in room supplies. Diversified Occupations room supply cost of \$13.50 were lowest. Home Economics, with a cost of \$236.75, ranked highest in total supply cost, while Diversified Occupations ranked lowest at a cost of only \$23.00. The total of all supply costs is \$1830.75.

Table 4.--PER PUPIL HOUR COST OF INSTRUCTION

Subject or department	Computed salary and supply cost	Pupil hours	Per pupil hour cost
Art - - - - -	\$ 313.00	2520	\$0.1202
Agriculture -	1109.00	10800	0.1027
Commercial -	1019.50	10800	0.0944
Diversified Occupations	2062.50	21600	0.0913
English - - -	1564.00	21600	0.0718
History - - -	1542.00	21600	0.0701
Home Economics -	1295.75	10800	0.1191
Industrial Arts - - -	762.00	5400	0.1407
Mathematics -	509.25	7200	0.0707
Music - - - -	2084.50	20050	0.1307
Physical Education -	1194.00	16200	0.0739
Physical Science - -	1209.50	14940	0.0802
Average	1285.14	13542	0.0949

The total per pupil hour cost of instruction is tabulated in Table 4. History was given for the lowest cost at \$0.0701 per pupil hour. Industrial Arts, at \$0.1407, ranked highest. The average per pupil hour cost of all subjects was \$0.0949. These costs are summarized graphically in Figure 1 on the following page. It is interesting to notice how Diversified Occupations, the

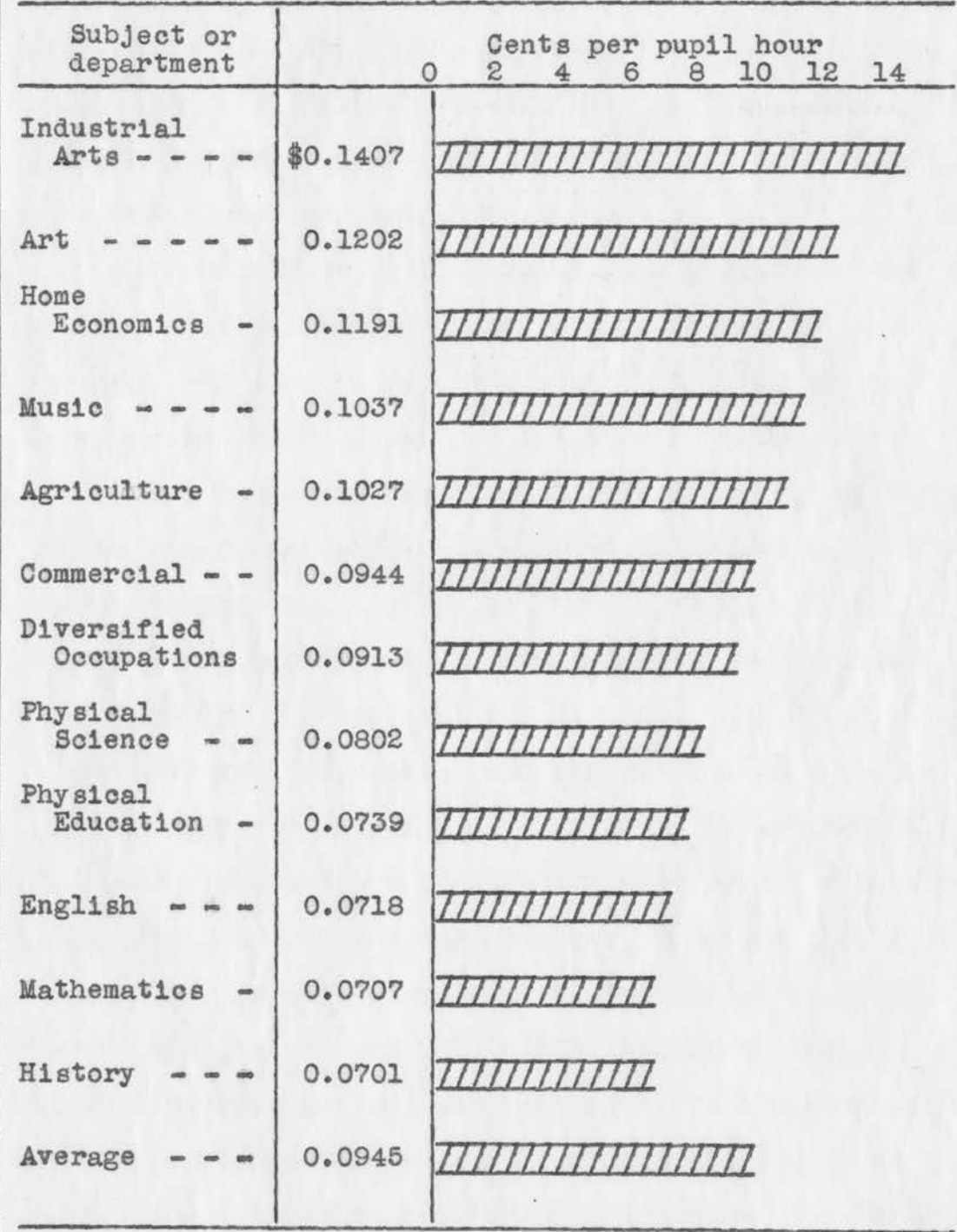


Figure 1.--Comparative and average per pupil hour cost

subject under question in this study, compares with the average per pupil hour cost of instruction. The per pupil hour cost of vocational subjects was higher, and comparable only with Art and Music. In this group, which was offered at the higher per pupil hour cost, Diversified Occupations ranked lowest.

Table 5 on the following page shows the distribution of all instructional costs for each subject offered. In case of the vocational subjects, instructional costs to the local community were exceedingly low. The instructional costs of Diversified Occupations to the local community were only \$0.0113 per pupil hour, and Industrial Arts, which had the highest per pupil cost, was only \$0.0703. The average cost to the local community for all subjects was \$0.0389.

State and federal aid was received by all departments for teacher salary purposes. In addition to this, all vocational subjects received special reimbursement of funds from the same source. Vocational Agriculture and Vocational Home Economics were both reimbursed for 66 2/3 per cent of all teacher salaries, while Diversified Occupations was reimbursed for 75 per cent of the coordinator's salary. The average amount received from the state and federal government in the form of state aid and reimbursable monies was \$0.0559 per pupil hour offered. Home Economics received a total of

Table 5.--DISTRIBUTION OF INSTRUCTIONAL COSTS

Subject or department	Cost to local school	Federal and state costs	Total per pupil hour cost
Art - - - - -	\$0.0601	\$0.0601	\$0.1202
Agriculture -	0.0172	0.0855	0.1027
Commercial -	0.0472	0.0472	0.0944
Diversified Occupations	0.0113	0.0800	0.0913
English - - -	0.0356	0.0356	0.0718
History - - -	0.0350	0.0350	0.0701
Home Economics -	0.0298	0.0894	0.1191
Industrial Arts - - -	0.0703	0.0703	0.1407
Mathematics -	0.0353	0.0353	0.0707
Music - - - -	0.0518	0.0518	0.1037
Physical Education -	0.0269	0.0269	0.0739
Physical Science - -	0.0401	0.0401	0.0802
Average	0.0389	0.0559	0.0949

\$0.0894 per pupil hour of instruction. Vocational Agriculture received \$0.0855 per pupil hour of instruction from state and federal funds, while Diversified Occupations received \$0.0800 per pupil hour of instruction from the same source.

The comparative costs of instruction are graphically represented in Figure 2. The average per

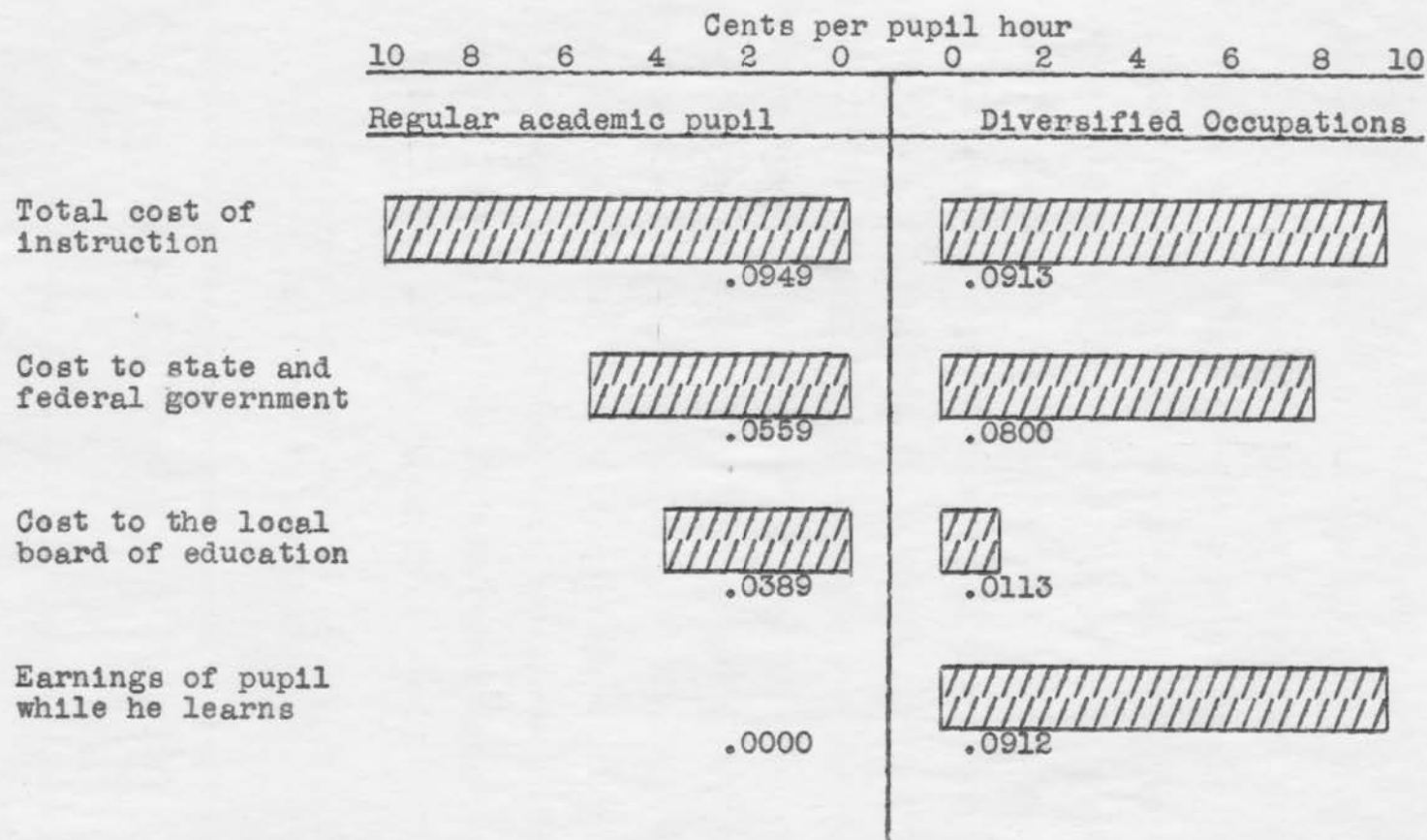


Figure 2.--Comparative costs of instruction

pupil hour costs for the Diversified Occupations pupil is shown on the right. This comparison shows the total cost of instruction, the cost to state and federal government, the cost to the local school, the net cost to the community, and pupil earnings. The average per pupil hour cost of instruction for a regular academic pupil was \$0.0949. The average per pupil hour cost of instruction for a Diversified Occupations pupil was \$0.0913. The cost to the state and federal government for a Diversified Occupations pupil was \$0.0800. The cost to the local school for a regular academic pupil was \$0.0389, while the same cost for the Diversified Occupations pupil was \$0.0113. The net cost to the community, as shown in the graph, was \$0.0949 for the academic pupil, and only \$0.0001 for the Diversified Occupations pupil. Thus, the earnings of the Diversified Occupations pupil has been considered. Table 6 shows the earnings of the Diversified Occupations pupil and the net cost to the community.

Table 6.--EARNINGS OF DIVERSIFIED OCCUPATIONS PUPIL AND NET COST TO COMMUNITY

Average per pupil hour cost of instruction	Average earnings per pupil hour of instruction	Net cost to local community and the public
\$0.0913	\$0.0912	\$0.0001

The actual average hourly earnings of the Diversified Occupations pupil while on his job was \$0.1824. He was not paid for two of the four hours during which he was receiving instruction. Therefore, his average earnings, while he learned, were \$0.0912. It is apparent that the net per pupil hour cost of instruction in the Diversified Occupations Program is only \$0.0001 to the public.

A discussion of these findings follows in Chapter V.

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and supervisor for equating all instructional costs. Ryan (1), in a similar case, reported that out of every \$100.00 spent for schools in New York, \$17.00 was spent for other than salaries of teachers and supervisors. These costs were included in this research, and appear as pro-rated instructional supply costs. The actual supply cost data secured from the local school office is accurate and complete, as the Monett Board of Education maintains a very complete and elaborate system of accounting.

One phase of this investigation is to examine the data to see if it is possible to make this program more effective at the same investment. A careful analysis of the data in Tables 2, 3, and 4, Chapter IV, reveals specific factors which affect equated costs. The most outstanding of these factors are the number of pupils enrolled in each class, the length of the school day, the number of school days in the year, and the pupil load of the teacher.

One means of making the educational program more effective is to increase the number of pupils enrolled in a given subject. Increasing the class size would have great influence in affecting an immediate lowering of per pupil hour costs. Increasing the teacher load in classes where enrollment is low will afford the same training to a larger group without in-

creasing the instructional costs of that class. Table 4, Chapter IV, shows that \$0.0913 were paid for per pupil hour of instruction in Diversified Occupations where 21,600 hours of instruction were given for the year. The lowest cost for Physical Science, a similar subject, was \$0.0802 per pupil hour. This comparison indicates that \$0.011 more were being paid for Diversified Occupations than Physical Science. If the number of pupils enrolled in Diversified Occupations is increased so that the per pupil hour of instruction given is equal to that of Physical Science, a considerable saving will be made. Instead of offering Diversified Occupations to 30 pupils, as is now being done, an additional four pupils to this class could be taught during the same time without increasing the instructional costs.

The number of school periods per day taught by the teacher also affects pro-rated costs of instruction. The Monett High School has seven periods per day. Several teachers conduct classes for six periods a day, while others conduct only five classes a day. The average teacher assignment hours, including homeroom activities, are 6.75 per school day. Makepeace (9:25) found that the teacher assignment hours in the Los Angeles High School, including all activities, were 7.69 average. If the Monett High School could lengthen

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the school day teacher assignment hours to seven, there would be a gain of 15 minutes per teacher per day. Thus, each school year of 180 days for 25 teachers would free 1125 teacher hours for additional instruction.

When the teacher hour load suggested for the Monett High School is compared with that in operation in the Los Angeles schools, it will be found that the latter is requiring .69 teacher hour load more than that suggested for Monett. When the teacher hour assignment is lengthened there is opportunity for additional course offerings. These offerings may be merely extensions of present classes or new courses may be organized. For example, no course in Guidance is offered as such, in this school. A very worthwhile course in Group Guidance would be an asset to the present program. This time could be utilized by several teachers who are not now working under full load, in offering a period in such courses as Personal Improvement or Personality.

The length of the school year has been mentioned as a third factor having bearing on equated instructional cost. All first class high schools in the state of Missouri are required by law to hold school for 180 days each year. Nothing could be improved here, unless the practice of having Saturday

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classes is approved. It is hardly reasonable to expect a full-load teacher to teach on Saturday without extra pay. If the teacher were paid, this would, of course, defeat the purpose of affecting the gain or instructional cost saving pursued in this study.

Other factors having bearing on equated costs are the pro-rated salaries of instructors and supervisors. An analysis of pro-rated instructional cost data (Tables 2, 3, and 4) reveal that some costs are higher when considered in the light of student hours of instruction. For example, 1425 hours of instruction were offered in History for each \$100.00 spent, while only 710 hours of instruction were offered in Industrial Arts at the same cost. The ratio here is two to one. This condition is wholly uncalled for and should not exist. The schedule of teacher load should be shifted so that the pupil hours of instruction will equal the average for the school. Something should be done, when cost of instruction of any subject rises above the average, to reduce the cost without influencing a salary decrease on the personnel.

One way of decreasing the per pupil cost of instruction for such classes is to increase the enrollment, by adjusting the school schedule so as to alternate such classes by semesters or years. Other classes could be offered by the teacher whose time is released

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as a result of schedule adjustment. This would extend the educational opportunities to meet the demands of other students. For example, Art could be given only one semester per year because the equated cost of instruction is \$0.1202 per pupil hour, while the average instructional cost of per pupil hour is only \$0.0949 for the entire school. This pro-rated salary is not excessive, but the subject is offered for the full year and with too few pupils enrolled in the course. Had this course been offered for only one semester, part of the teacher's time would have been free to offer such additional courses as are in demand by other students and which are so badly needed in the present curriculum.

In a study of the principal as a supervisor in Texas high schools, Pryor (16:17-18) suggests that principals should organize their work so that one-half of their time could be used doing supervisory activities. In the Monett High School, there are six members of the faculty doing supervisory duties. By interviews with these people, it was learned that they spent on the average, one-half of their time in supervision. The per cent of supervisory time spent by these six people in doing supervisory duties is in keeping with that recommended by Pryor. It was found possible to pro-rate the salaries of these supervisors very

accurately in computing the instructional costs tabulated.

It is necessary that the coordinator devotes one-half or more of his time in the field of Trade and Industry. The work of the coordinator is described in Bulletin I, Vocational Education Series (17:59) and is given in specific terms in the Missouri State Plan for Vocational Education. (10) Coordination includes such duties as contacting industries for the purpose of securing information regarding training needs, occupational and technological changes, plant safety, and production methods. The work of the coordinator in the community requires that he meet and work with groups interested in helping pupils in one way or another. Much of the direction that classes receive is through advisory committees which the coordinator must call together for conferences. Any information that is received by the coordinator should be used by the school in re-arranging or re-organizing the course content of specific subjects so that the training received in the school will meet the specifications required by industry. Not more than 10 per cent of his time may be devoted to keeping of records or doing administrative or supervision work. It is evident that the more students a school has the more teachers it will need to care for the enrollees. The more students and

teachers a school has the more places in the community the coordinator will have to contact to secure information and to place students in jobs.

As an example of extending new educational opportunities, the school could offer to its students a course in Occupational Adjustment and Group Guidance. It is shown by the National Occupational Conference Interim Report (12) that guidance and placement programs are relatively undeveloped in comparison with other training programs throughout the nation. Myers (11:60-80) reports that according to the United States census, there are nearly two and one-half million youth each year near the age of 18, and approximately this number between the ages of 16 and 25, drop out of full-time school to enter, or seek to enter, unprepared, some kind of occupation. He reveals the answers given by pupils to his questions concerning their vocational future, that

large numbers of boys and girls, on the point of leaving school, either have no vocational plans or have plans which are quite out of line with their own demonstrated abilities and with the opportunities for employment.

Because of the conditions existing in secondary schools, as pointed out, it is evident that Monett is offering some course content on a high level, but that the Counseling and Guidance Program falls far short of that desired. Additional personnel would be necessary to conduct a Counseling and Guidance Program if

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this weakness is to be strengthened. Table 1, Chapter IV, appears to show that the coordinator per pupil load is low. Indeed, this is not true. However, by investigation of actual practice, it was learned that the coordinator of Diversified Occupations uses two periods of instruction for his trainees. This was necessary in order to simplify class schedule and offerings. If the coordinator's classes were combined, he would have one period open for other services. The type of work done by the coordinator brings him very close to the activities of both school and community. It becomes necessary that he know the occupational trends of the community and be aware of occupational and technological changes.

As a result of these contacts and the immediate occupational information available to him, the coordinator could assume the responsibilities of organizing and conducting a Vocational Guidance Program in the local school. The time available would not be sufficient for him to counsel all the students in the school, but he could contact all of the juniors and seniors desiring his immediate occupational advice. The assistance of other teachers could be secured through staff cooperation, whereby the coordinator could direct an adequate Occupational Adjustment Service offered to the entire student body.

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Another way of extending new educational opportunities to the Diversified Occupations students would be to have the coordinator offer a course in Human Relations. This subject matter would be as valuable to the young worker as the Related Content which is now offered. It has been said that more people lose their jobs because of inability to understand and get along with their employer and other workers, than do from lack of skill and technical knowledge. Therefore, a period in Employer-Employee Relations, How to Land a Job and Get Ahead, and Legislation Affecting the Worker would be a desirable addition to the program.

A summary of comparative cost results is given in Table 4, and is graphically represented in Figure 1, Chapter IV. There is an opportunity to make the program of Diversified Occupations more effective without increasing the present cost of instruction.

Chapter VI

SUMMARY

Public demand for vocational training in the smaller communities has been met by offering a program of part-time cooperative training in Diversified Occupations. The addition of this department increased the instructional cost of such schools. The supply costs are nominal, due to the practice of using agencies of the community for training stations.

The problem arose in the Monett High School when administrators and teachers of academic subjects questioned the wisdom of offering a program in which the cost of instruction is apparently high. It was important that any changes or savings made be based on accurate cost information. To secure accurate cost data, it was decided to study the comparative cost of instruction in all subjects offered to all juniors and seniors in this school. This limited the extent of the study.

The investigation received its direction by an analysis of the following problem:

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What is the per pupil cost of instruction in the Diversified Occupations Program as compared to that of the academic pupil in Monett, Missouri?

- A. What are the instructional cost factors?
- B. What method can be used in determining per pupil costs?
- C. What is the amount of state and federal reimbursement the local community receives?
- D. What is the net per pupil cost of instruction for a Diversified Occupations pupil?
- E. What is the net per pupil cost of instruction for an academic pupil?
- F. How much does the Diversified Occupations pupil earn while he learns?
- G. What are the comparative results of these cost findings?
- H. How can this program be made more effective at the same investment?

Permission was secured from the superintendent and the Monett Board of Education to search the school records for instructional cost data in all subjects taken by juniors and seniors. The three instructional cost factors are salary of teacher, salary of supervisor, and cost of educational supplies as given by Englehardt and Englehardt (6:742-52).

The information first tabulated included supply costs, salaries of teachers and supervisors, the number of hours each subject was given per day, the number of days in the school year, and the number of juniors and seniors enrolled in each subject.

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These data were substituted in the following formula:

$$\frac{\text{Pro-rated salaries and supply costs}}{\text{Number of pupils enrolled in class} \times \text{Number of class hours per year}} = \text{Per pupil hour cost per subject}$$

This formula for equating instructional costs was used in the study of Arundel (2), Clark (4), and Hull (8). It was found that the general subjects had the lowest per pupil hour cost, (Table 4, Chapter IV) while Art, Industrial Arts, and vocational subjects were the most expensive.

Table 5, Chapter IV, shows the amount that the local board of education is reimbursed in each department, and the net instructional cost to the local district. While the total per pupil costs of the vocational subjects appear higher, the net cost to the local board was very much lower.

It was found, as shown in Table 6, Chapter IV, that when the earnings of the Diversified Occupations student is considered, the cost of this department to the local community is negligible.

The factor that had the greatest influence on equated cost was the number of pupils enrolled. When the number of pupils enrolled in a certain subject is increased the per pupil hour cost is immediately lowered. It will be noted that Table 4 shows History

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with an enrollment of 120 pupils costs only \$0.0701 per pupil hour, while Industrial Arts with an enrollment of 30 costs \$0.1407 per pupil hour. Britton (3:28-30) found that mathematics could be offered at an average of \$0.0349 per pupil hour (supply cost not included) in nine Wisconsin schools. It was concluded that Monett could offer the same subjects at comparable per pupil cost and that effective instruction could be given to more pupils at the same cost without impairing the progress of the pupil or lowering the standard of teaching.

The second factor considered was the number of school periods per day taught by the teacher. It was found that the average teacher assignment hours, including homeroom activities, were 6.75. Makepeace (9:25) also found that the teacher assignment hours in the Los Angeles High School, including all activities, were 7.69 average. Monett could gain 15 minutes per teacher per day by lengthening the school day teacher assignment hours to seven. This would free a total of 1125 teacher hours per school year.

A third factor having bearing on equated cost is the length of the school year. It was decided that nothing could be gained here, as the school year is set by law at 180 days and this practice is being followed.

The last factor affecting equated instructional costs is that of pro-rating the salaries of

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teachers and supervisors. It was found that these costs were very high when compared to the student hours taught. As a remedy for this condition, it was suggested that the school day be lengthened, enrollment be increased, or that the school schedule be so arranged that alternate classes could be given. The time freed by this procedure could be utilized to extend educational opportunities without increasing instructional costs. Pryor (16:17-28) suggests that principals organize their work so that at least one-half of their time could be devoted to supervisory activities. It was learned that the six members of the Monett faculty engaged in supervisory activities were following the practice recommended by Pryor.

It is shown by the National Occupational Conference Interim Report (12:1-40) that Guidance and Placement Programs are relatively undeveloped in comparison with other training programs throughout the nation. Myers (11:60-81) reports the United States census as showing nearly two and one-half million youth between the ages of 16 and 25 drop out of full-time school to enter, or seek to enter, unprepared, some kind of occupation.

Because of existing traditions in secondary schools, and even though Monett is offering some course content on a high level, the Counseling and Guidance

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Program falls far short of that desired. If the coordinator's classes were combined, he would have one period open for this service. The type of work done by the coordinator makes him particularly suited to serve as a Counseling and Vocational Guidance officer. As a result of his contacts and the immediate occupational information available to him, the coordinator should assume the responsibility of organizing and conducting a Counseling and Guidance Program. The time available would not be sufficient for him to counsel all the students in the school, but he could contact all of those desiring his immediate advice.

The answers to questions D to H have revealed that the school schedule and budget could be so arranged that educational opportunities could be extended without additional expenditure of funds. There is opportunity to give instruction to more students in present classes and to offer additional courses, or to extend the present services without increasing the total cost of instruction.

There is a lack of information regarding the following related subjects:

1. A comprehensive Counseling and Guidance Program for small schools.
2. The effectiveness of a Diversified Occupations training program.
3. Maximum teacher, supervisor, and coordinator load.

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Please give the proportionate total salaries as indicated below. Include only that portion of the salary which is pro-rated to the department listed.

Department or subject	Superin- tendent salary	Prin- cipal salary	Teacher salary	No. Junior and Senior hrs.

Form 3

ALLOCATION OF FUNDS QUESTIONNAIRE

Please enter under the proper heading the
per cent of funds allocated or furnished your school.

Department or subject	Purpose	Local	State and federal aid	Reimburs- able funds

Form 4

STUDENT EARNINGS QUESTIONNAIRE

Please list the earnings of your Diversified Occupations students as indicated.

Number of trainees	Total hours on job per week	Total hours in school per week	Total earnings per week

Form 5

TEACHER-PUPIL RECITATION QUESTIONNAIRE

Please give the teacher and pupil average weekly load by subject or department.

Department or subject	Number of Juniors & Seniors	Number of teacher periods wk.	Number of pupil periods per week

Form 6

TOTAL INSTRUCTIONAL COST PER PUPIL REPORT

Instructional costs represent total expenditures of local, state, and federal funds.

Department or subject	Instruc- tional costs	Number of pupil hours	Unit per pupil cost

Form 7

NET INSTRUCTIONAL COST PER PUPIL REPORT

Instructional costs represent net expenditure of the community.

Department or subject	Instruc- tional costs	Number of pupil hours	Unit per pupil cost

HULL'S METHOD OF EQUATING COST DATA

Hull's method of equating cost data is given in the following formula:

$$\frac{(\text{Average salary of teacher}) \times (\text{Number of class periods carried weekly by the average pupil})}{(\text{Average class size}) \times (\text{Number of class periods carried weekly by the average teacher})}$$

In order to analyze the influence of any component part of per pupil cost, the four elements of the formula were used.

The steps for working out the formula for any given case and the example are as follows:

- a. Compute the average teacher's salary - \$1400
- b. Compute the average size class - 25
- c. Compute the average class periods per week for average teacher - 25
- d. Compute the average class periods per week for average pupil - 22
- e. Substitute values in formula

$$\frac{1400 \times 22}{25 \times 25} = \$49.29 \text{ per pupil cost}$$

Thus the average per pupil cost of \$49.29 becomes a hypothetical norm that can be used in making comparisons with the actual cost per pupil.

Table 7.--COMPARATIVE CURRENT EXPENDITURES OF A FEW MEDIUM SIZED SCHOOL SYSTEMS

=From study of Englehardt and Englehardt (6)=

City	Total per pupil costs	Current Expenditures				
		General control	Instruc- tional	Operation	Main- tenance	Auxiliary
Topeka	\$ 85.44	\$2.96	\$66.84	\$11.16	\$2.24	\$.24
St. Joseph	89.92	3.48	69.16	10.97	5.01	1.31
Tulsa	106.07	3.13	81.23	10.75	10.78	.19
Springfield	72.55	1.89	54.54	10.39	5.30	.43
Peoria	100.00	5.00	75.55	12.88	6.35	1.29
Rockford	102.87	2.92	75.14	14.60	6.09	4.05
Average	95.16	3.60	72.27	12.07	6.08	1.83

Table 8.--COST OF SUBJECTS PER PUPIL-HOUR OF INSTRUCTION

From study of Britton (3)=

Subject	Average	Lowest	Highest
English - - - - -	\$.0334	\$.0058	\$.0811
Mathematics - - - - -	.0349	.0077	.0754
Cooperatives - - - - -	.0576	.0444	.0707
Social science - - - - -	.0231	.0081	.0503
Related science - - - - -	.0499	.0163	.0930
Foods - - - - -	.0701	.0341	.1362
Clothing - - - - -	.0533	.0118	.1358
Hygiene - - - - -	.0606	.0330	.1137
Art in the Home - - - - -	.0961	.0351	.3540
Consumer information	.0714	.0214	.1664
Auto mechanics - - - - -	.1383	.0382	.2403
Drafting - - - - -	.1337	.0566	.3553
Sheet Metal - - - - -	.1573	.0647	.2161
Machine shop - - - - -	.1143	.0472	.1520
Electricity - - - - -	.1329	.0435	.3325
Printing - - - - -	.1755	.0607	.2503
Woodwork - - - - -	.1305	.0921	.2967

Table 9.--INSTRUCTIONAL COST OF AVERAGE ENROLLMENT AND
PER PUPIL COST OF VOCATIONAL CLASSES IN LOS ANGELES
HIGH SCHOOLS

=From study of Frank F. Makepeace (9)=

Subject	Total cost	Average en- rollment	Per pupil cost per period
Mechanical drawing	\$55,533	22.9	\$ 7.37
Auto shop - - - -	37,027	19.7	8.27
Printing - - - -	33,929	16.2	11.19
Wood shop - - - -	28,058	18.7	10.36
Electricity - - -	24,292	19.9	8.50
Agriculture - - -	23,055	20.8	8.83
Foundry - - - - -	12,052	18.7	10.16
Machine shop - -	11,060	21.0	8.57
General shop - -	8,254	18.9	8.64
Cabinet shop - -	7,627	25.4	8.38
Sheet metal - - -	6,443	21.0	8.05
Aviation - - - -	1,298	*00.0	9.34
Total - - - - -	249,265		

*Average not given.

Table 10.--THE RANGE IN INSTRUCTIONAL COST PER PUPIL
PER PERIOD IN THE LOS ANGELES HIGH SCHOOLS

=From study of Frank F. Makepeace (9)=

Subject	Range		
Agriculture - - - - -	\$5.21	to	\$17.45
General shop - - - - -	6.96	to	21.22
Mechanical drawing - - - -	4.44	to	13.51
Auto shop - - - - -	5.81	to	14.22
Cabinet shop - - - - -	5.98	to	15.06
Wood shop - - - - -	5.02	to	17.40
Foundry - - - - -	6.97	to	12.58
Printing - - - - -	6.18	to	23.58
Sheet metal - - - - -	6.56	to	10.27
Machine shop - - - - -	5.76	to	16.36
Electricity - - - - -	5.13	to	14.00

Table 11.--AVERAGE ENROLLMENT, COST PER 1000 HOURS OF INSTRUCTION, AND CLASSROOM HOUR COST FOR SUBJECTS GIVEN IN 16 KANSAS HIGH SCHOOLS

=From study of Byron M. Clark (4)=

Subject	Average enrollment	Cost per 1000 hours of inst.	Classroom hour cost
Algebra II	11.1	\$146.00	\$.17
Woodwork II	14.9	141.00	.19
Cooking	15.1	121.00	.21
Cooking II	13.8	118.00	.20
Typing I	16.4	109.00	.11
Shorthand	15.2	107.00	.15
Typing II	15.0	106.00	.16
Agriculture	21.6	102.00	.15
Sewing II	12.0	99.00	.07
Sewing I	17.0	96.00	.11
Bookkeeping	20.9	84.00	.18
Commercial arithmetic	21.5	75.00	.15
General science	29.3	70.00	.12
English	25.3	69.00	.11
Algebra I	31.5	68.00	.11

Table 12.--COST PER PUPIL IN AVERAGE DAILY ATTENDANCE
IN 319 CITY SCHOOL SYSTEMS

=From study of L. M. Comstock (5)=

Item	Group I 69 cities	Group II 80 cities	Group III 85 cities	Group IV 85 cities
Lowest cost	\$ 50.50	\$ 42.66	\$ 30.12	\$ 33.58
First quartile	83.54	76.67	60.52	63.25
Median	104.18	91.54	80.83	78.37
Third quartile	118.13	110.00	93.96	88.75
Highest cost	164.40	213.13	147.59	173.78
Average cost	120.87	98.91	90.53	77.86

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