

A Study of Pupil Station and Room Utilization of
Class Rooms of Fourteen High Schools Located
in Lyon and Wabaunsee Counties

by

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TABLE OF CONTENTS

	<u>Page</u>
Chapter I.....Statement of Problem.....	1
Chapter II....Method of Procedure.....	5
Chapter III...Presentation of Data.....	14
Chapter IV....Factors Likely to Affect Utilization.....	77
Chapter V.....Summary and Conclusions.....	87
Bibliography.....	96

CHAPTER I

Statement of Problem

The tremendous increase in high school enrollment and the increase in cost of education forces us to a study of the utilization of the various types of class rooms. High school enrollment increased 140.6 per cent between the years 1915 and 1926.¹* "School costs were 3.65 times as great in 1926 as in 1914."² The construction of urgently needed buildings, postponed during the war, represents a heavy increase in school expenditures.

Reduction in cost is not always economy. The attitude, that the only way to exercise economy is to cut expenditures, may at times be classed as "Penny wise and pound foolish". Even greater expenditures may at times be considered economy. The expenditure of public money for any purpose should be justified upon the basis of return to the public sufficient to justify the outlay.

Expenditures for school buildings should be justified upon the basis of need. A careful survey of existing conditions should precede any additional outlay for buildings. One of the factors to be considered in any building program is the utilization of the present facilities.

The subsequent sections of this report are a consideration of the utilization of the high school class rooms in fourteen school buildings located in Lyon and Wabaunsee counties. Included in this report are certain physical characteristics (amount of black board space, number

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*See bibliography for references in order given.

of light outlets, ratio of glass to floor area, location of the rooms in the building, and type of heating facilities) that indirectly have a bearing on class room utilization.

In the hope that some contribution may be made to education and that a keener interest may be stimulated in this problem this study proposes to:

1. Determine the percentage of utilization of the existing pupil stations for the full number of periods per week the rooms may be used.
2. Determine the percentage of utilization of the existing pupil stations for the actual number of periods per week the rooms are used.
3. Determine the percentage of utilization of the potential capacity of the rooms for the full number of periods per week the rooms may be used.
4. Determine the percentage of utilization of the potential capacity of the rooms for the actual number of periods the rooms are used.
5. Determine the percentage of room utilization in the buildings studied.
6. Determine some factors that may affect room and pupil station utilization.

This study resolves itself into one of the survey type.

It deals with the utilization of class rooms during regular hours, and

with regularly scheduled classes. Before school, after school, and night activities are not included in this study. Gymnasiums, auditoriums, store rooms, offices, and locker rooms are omitted.

Utilization will be discussed chiefly as room utilization and pupil station utilization. Room utilization is not concerned with the number of pupils in the room, but whether or not the room is actually used for class purposes.

A pupil station is any seat, machine, space at a table, or proportion of space on a floor to which a pupil may be assigned for any period or part of a period.

Pupil station utilization is concerned with the relation of the number of pupils to the number of seats in the room.

Potential capacity refers to the maximum equipment for any room or type of room. The standards as set up by Strayer and Engelhardt are used in determining potential capacity.

Certain aspects of the problem of room utilization and pupil station utilization have been studied. S.A. Challman³ in a study of the new buildings at Pipestone, Minnesota, reports a utilization of about 80 per cent of the capacity of the building. C.O. Davis⁴ made a study of classes and teaching loads in the North Central Association. He reaches among others the following conclusions:

1. "There is no necessary connection between size of class and efficiency of instruction as measured by pupils' grades."
2. The North Central Association is not justified in demanding that for all teachers, in all types of work, the maximum

size of class shall be no greater than 30 pupils, or that the maximum number of pupil-hours per day shall not exceed 150."

Morphet⁵ computed the percentage of room and pupil-station utilization for each of 58 secondary schools to be only 75.4 per cent of the rooms and 41.1 per cent of the pupil stations in the average building.

Wallace A. Guthridge⁶ made a study of the Measurement and Interpretation of School Building Utilization in twelve first and second class cities in Kansas. Parker's⁷ study has called attention to some factors affecting utilization in secondary schools and has contributed data concerning utilization during class periods in a few congested buildings. He finds a need for more effective planning than now exists. "Every effort should be made to reduce the loss of non-interchangeability of use by planning for the largest maximum combination use possible."

CHAPTER II

Method of Procedure

That the data in this study might be accurate, actual visits to the schools were made and the data ^{collected} tabulated. The data from every school concerning type of rooms, number and type of pupil stations, lighting facilities, location of the rooms, size of rooms, and amount of black board space were secured by personal investigation and recorded on blanks (Form I) prepared for that purpose.

The subjects taught in each room and the number of pupils in each class were secured by letter from the principal or superintendent. A personal letter accompanied this form requesting the information desired and the reason for the request. All of the men are personally known to the writer and this type of letter seemed better than a formally prepared letter. In all cases except one the forms were returned without further correspondence.

The high schools of Wabaunsee and Lyon counties with the exception of Emporia were used in this study. These schools are located in the following towns: Alta Vista, Maple Hill, Paxico, Eskridge, Harveyville, and Alma in Wabaunsee county, and Bushong, Allen, Admire, Miller, Americus, Neosho Rapids, Reading, and Hartford in Lyon county. These towns were easily accessible for study and are about equal in size.

The directory for the year 1928-1929 lists the enrollment, number of teachers, and class of the fourteen schools as follows:

<u>Name of school</u>	<u>Enrollment</u>	<u>Teachers</u>	<u>Class</u>
Alta Vista	108	6	A
Maple Hill	50	3	C
Paxico	48	3	B
Eskridge	128	8	A
Harveyville	78	6	B
Alma	128	7	A
Bushong	58	3	B
Allen		3	B
Admire	51	4	B
Miller	50	3	C
Americus	90	5	B
Neosho Rapids	38	3	C
Reading		5	B
Hartford	115	6	A

In a study of class room and pupil station utilization the information must be secured in a uniform manner. Form I was prepared for this purpose.

Form I

<u>School</u>	<u>City</u>						
1. Room number	1	2	3	4	5	6	7
2. Dimensions							
Length							
Width							
3. Floor area							
4. Present pupil stations							
5. Potential capacity							
6. Equipment							
7. Black boards							
Length							
Width							
Height from floor							
8. Windows							
Area							
Per cent of floor area							
Location							
9. Light outlets							
10. Floor location							
11. Type of heating facilities							
12. Type of room							

1. Room number--This item refers to some method of identifying the various rooms.
2. Dimensions--The length and width of the rooms. Dimensions were secured to the nearest quarter-foot.
3. Floor area--The product of the width by the length as given in item number 2 is computed to the nearest square foot.
4. Present pupil stations--The number of seats or stations of any sort provided for pupils in each of the rooms. This term has previously been defined.
5. Potential capacity--This is obtained by dividing the floor area by the minimum acceptable number of square feet per pupil station for the type of room being studied.
6. Equipment--These rooms were equipped with various types of equipment as: chairs, tables, desks, benches, and combinations of the above.
7. Black boards--In each room the length, width, and height from floor of the black boards was measured. The height from floor is up to the top of the tray.
8. Windows
 - Area--The actual glass area in every room was measured and does not include any of the frame work. The per cent of floor area is found by dividing the window area by the floor area. The windows are located in two ways:
 - a. The direction of the source of light
 - b. Right, left, or back in relation to the way the pupil would face when seated.
9. Light outlets--the number of electric outlets in the room

and not the number of bulbs.

10. Floor location--The location of the room in the building whether basement, first floor, or second floor.

11. Type of heating facilities--steam, hot air, oil stove, or coal stove.

12. Type of room--Rooms should be classified on the basis of construction and type of equipment rather on the basis of use. For the purposes of this study the following types were used and in the order given.

- 1. Class rooms
- 2. Commerce rooms
- 3. Science rooms
- 4. Laboratories
- 5. Music rooms
- 6. Sewing rooms
- 7. Cooking rooms
- 8. Wood shops

The time schedules, number of periods, and classes for each room were secured by mailing Form II to each of the principals or superintendents.

Form II

	Room	Number		Number in Class
Periods	Length of period	Class		
1				
2				
3				
4				
5				
6				
7				
8				

The principal or superintendent was asked to fill in the information giving number of periods, length of period, class and number in class for each period of the day. This information was given for each room.

This study may be divided into two main sections which are in many respects quite closely related. The first, a study of pupil station utilization is concerned with the relation of the number of pupils in the room to the number of seats in the room. Form III was prepared to aid in the computation of pupil station utilization.

Form III

Room Number			Minutes per week			
Per- iod	Length of Per.	Present Schedule	Pupil	Pupil	Potential	Potential
			stations 8 periods	stations actual	capacity 8 Periods	capacity actual
1						
2						
3						
4						
5						
6						
7						
8						
Total						
Minutes						
Per cent						
of utilization						

"Minutes per week" is a more satisfactory basis for determining pupil station utilization than either periods or days. Some of the rooms are not used every day of the week, and there is some variation in the length of the periods.

The length of the period is an arbitrary division of time on the part of the school for recitation purposes. It may vary from

the minimum prescribed by the State Department of Education to any maximum the school may desire. In twelve of the schools studied the length of a period was forty minutes. One school used a sixty minute period and one school varied from a forty minute period to an eighty minute period. The length of the period multiplied by five gives the number of minutes per week for any given pupil station for one period a day. The minutes per week for ten pupil stations is ten times the amount for one pupil station. Reducing this to a formula for computation of minutes per week we have:

Length of period x five x number of pupil stations.

Adding together the number of minutes for each period per week we have the total number of minutes per week.

Five headings are found under minutes per week. Referring to the data collected in Form II we find the number in class for each period of the day. Placing this in our formula and adding the totals we get the number of minutes per week in the present schedule.

The present pupil stations for each room as determined by actual count is listed under item four in Form I. The number of minutes per week is found for the present pupil stations for the number of periods in the day the room may be used. It is also found for the number of periods the room is in actual use. These two totals are for the number of pupil stations in the room rather than the number that are used. The potential capacity of the room as defined in the early part of this chapter is listed under item five in Form I. Total minutes

per week for potential capacity of the room for all periods and for the periods in actual use is found in the same way as for the present pupil stations.

Per cent of utilization shows the relation of the total number of minutes per week it is possible to use it, for either all the periods or for the periods the room is actually used. This is determined for both the present pupil stations and for potential capacity of the room.

The second part of this study, a study of room utilization, is concerned with the relation of the number of rooms used to the total number of rooms. For the purpose of this study the rooms were divided into types on the basis of construction and type of equipment. The per cent of room utilization is found for types of rooms rather than for individual rooms. For the purpose of computing room utilization Form IV was prepared.

Form IV

Type of Room	Number per wk.	1.	2.	3.	4.	5.	6.	7.	8.	No. Occu.	Per cent
Class room											
Commerce											
Science											
Laboratory											
Music											
Sewing											
Cooking											
Wood shops											
Total											

All of the schools studied do not have all the types shown in Form IV. The form is then shortened leaving out the types not needed. The number of rooms in any one type times five gives us the number of rooms available for that type for one period per week. The number of rooms of any one type used for a week in any one period is

found by multiplying the number used during that period by the number of days used. All of the rooms occupied (which is found by adding the rooms in all the periods together) divided by the total number of rooms (the number of rooms multiplied by the number of periods per day) is the per cent of room utilization for that type of room. The total number of rooms occupied for all types divided by the total number of rooms for all types is the per cent of utilization for all the rooms in the building.

Chapter III

Presentation of Data

By the methods explained in Chapter II the percentages of pupil station utilization have been computed for each room of the fourteen schools studied. These percentages are presented in this chapter. The percentage of utilization for each room is given on the basis of (1) the percentage of utilization for each room is given on the basis of (1) the present number of pupil stations for all periods, (2) the present number of pupil stations for periods being used in the present schedule, (3) the potential capacity of the room for all periods, and (4) the potential capacity of the room for periods being used in the present schedule.

Percentage of utilization for each room is a more reliable indication of conditions within the building than building utilization. Building utilization tells nothing of what rooms or types of rooms are being used beyond their capacity or are not being used at all.

The schools in this study have been coded as Building A, B, C, etc. and will be presented under their respective letters.

As a further study of the utilization of the class rooms of the buildings studied, room utilization has been computed and put in tables. Room utilization has also been shown for each type of room in the form of a bar graph. The full length of the bar represents 10%. The percentage of utilization is shown by the dotted line above the bar and also by a division of the bar. The part of the bar marked by the broken lines represent the utilization of the room.

Building A.

Building A has seven rooms which are being used for instructional purposes. The rooms belong to the following types:

Room 1--Commerce

Rooms 2 and 4--Class rooms

Room 3--Sewing

Room 5--Laboratory

Room 6--Wood shop

Room 7--Cooking

Building A uses an eight-period schedule and sixty minutes to the period.

Pupil station utilization for eight periods. The lowest percentage of utilization is 25% and the highest is 70.12%. The percentage of utilization for all the rooms is 44.74%. Only two rooms exceed a utilization of 50%. Room one is used four periods a day, and rooms six and seven two periods a day. Room three is poorly lighted, with windows on the short side and accomodates only small classes and then very poorly. Room five is a laboratory that is being used for other classes.

Pupil station utilization for periods room is used. The lowest percentage of utilization is 51.9% and the highest is 125%. The percentage of utilization for all the rooms is 72.88%. Room seven is being utilized beyond the capacity of its present pupil stations. Room two is a large room and has thirty-five pupil stations.

TABLE I

A Summary of Pupil Station Utilization by Buildings of Existing Pupil Stations and of Potential Capacity for all Periods of the Day and for Periods Actually Used

Room	Present Schedule	Pupil stations 8 periods	Pupil stations actual	Potential capacity 8 periods	Potential capacity actual
1-Minutes per week	13400	32000	16000	59200	29600
Per cent of utilization		41.88%	83.75%	22.64%	45.28%
2-Minutes per week	21800	56000	42000	75200	56400
Per cent of utilization		38.92%	61.9%	28.99%	38.65%
3-Minutes per week	8400	24000	15000	35200	22000
Per cent of utilization		35%	56%	23.8%	38.1%
4-Minutes per week	21400	40000	30000	38400	28800
Per cent of utilization		53.5%	71.33%	55.73%	74.31%
5-Minutes per week	22440	32000	21600	22400	15120
Per cent of utilization		70.12%	103.88%	100.18%	148.41%
6-Minutes per week	3200	12800	3200	19200	4800
Per cent of utilization		25%	100%	16.66%	66.66%
7-Minutes per week	6000	19200	4800	20800	5200
Per cent of utilization		31.25%	125%	28.8%	115.68%
Total min. of rooms	96640	216000	132600	270400	151920
Per cent of utilization		44.74%	72.88%	35.74%	59.68%

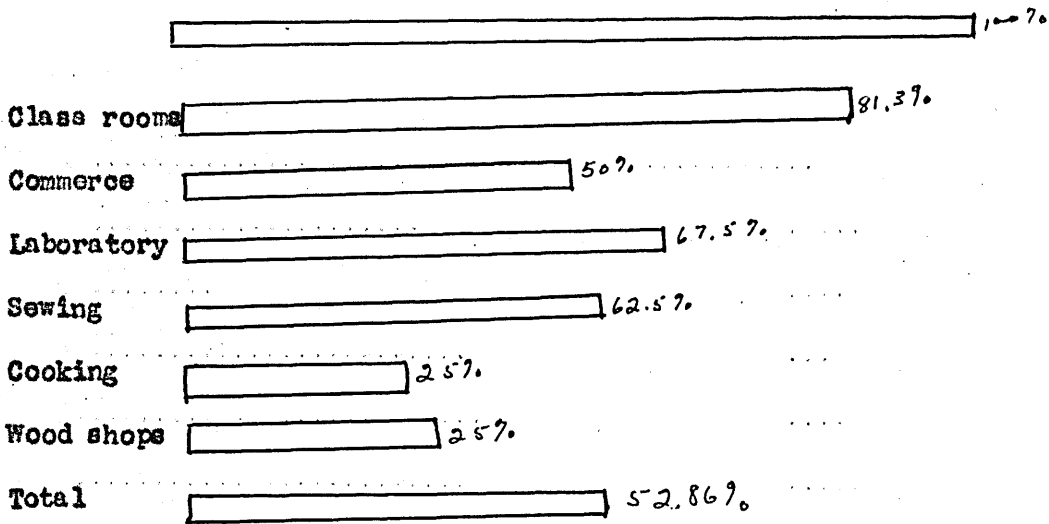
Table II

Percentage of Room Utilization for Each Type of Room, Building A

Rooms	Number per wk.	1	2	3	4	5	6	7	8	No.	Occu.	Per cent
Class rooms	10	10	10	5	10	10	5	10	5	80	65	81.3
Com- merce	5	5		5	5	5				40	20	50
Labor- atory	5	5	5	5	2		5	5		40	27	67.5
Sewing	5	5	5			5	5	5		40	25	62.5
Cook- ing	5			5	5					40	10	25
Wood shops	5					5	5			40	10	25
Total	35	25	20	20	22	25	20	20	5	280	157	52.86

No.--number of rooms per week
Occu.--Rooms occupied per week

A Graphic Presentation of Utilization for Each Type of Room



Potential capacity utilization for eight periods.

The lowest percentage of utilization is 16.66% and the highest is 100.18%. The percentage of utilization for all rooms is 35.74%. Rooms four and five are the only rooms utilized above fifty per cent. Room six is used only two periods a day and below its potential capacity. Room seven is used two periods a day. Rooms six and seven are standing idle three-fourths of the time.

Potential capacity utilization for periods used.

The lowest percentage of utilization is 38.1% and the highest is 148.41%. The percentage of utilization for all the rooms is 59.68%. Room five is being used much beyond its potential capacity. It is a laboratory room and is being used for classes other than laboratory classes. Room seven, with a potential capacity of twelve, is being used by fifteen students. Room two, a large room, is being used by some small classes.

The utilization of the potential capacity of these rooms is 35.74%. The utilization of the present pupil station capacity is 44.74%.

Room utilization for building A.

The lowest percentage of utilization is 25% and the highest is 81%. The percentage of utilization for all the rooms is 52.86%. Class rooms are utilized most. Cooking rooms and wood shop rooms are utilized least.

Building B

Building B has five rooms which are being used for instructional purposes. The rooms belong to the following types:

Room 1--Class room

Room 2--Wood shop

Room 3--Commerce

Room 4--Cooking

Room 5--Laboratory

Building B uses an eight period schedule and forty minutes to the period.

Pupil station utilization for eight periods.

The lowest percentage of utilization is 19.375% and the highest is 109.4%. The percentage of utilization for all the rooms is 42.73%. Room one is used 50% of the time but the classes are small compared with the pupil stations in the room. The classes in room three are small as compared with the number of pupil stations in the room. Room two, a wood shop, is being used by other than manual training classes.

Pupil station utilization for eight periods.

Room one is used four periods per day as a study hall and has been computed on a four period basis. It is used two periods a day by classes smaller than its number of pupil stations. Room two, a wood shop, is used by other classes much beyond the capacity of its present pupil stations.

Potential capacity utilization for an eight period day.

The lowest percentage of utilization is 13.6% and the highest is 76.25%. The percentage of utilization for all periods is 27.77%. Room three has a potential capacity of thirty-four seats while the largest class in the room is eleven. It is vacant three periods a day. Room one is used by classes much below its potential capacity and only 50% of the time. Room four is idle four periods of the day. Two of the classes are below its potential capacity.

Potential capacity utilization for periods used.

The lowest percentage of utilization is 21.76% and the highest is 138.63%. The percentage of utilization for all the rooms is 46.24%. Room three is being utilized by classes much smaller than the potential capacity of the room. Room one is being utilized only 50% of the time. Room five is being utilized by classes of twelve while the potential capacity of the room is eight. There is one class of eight in room five.

The utilization of the potential capacity of all the rooms is 27.77% which is very low and means that the rooms are either standing idle part of the time or being used by small classes. The percentage of utilization of the present pupil station is 42.73%. The utilization of the present seating capacity is low.

Percentage of room utilization.

The lowest percentage of utilization is 50% and the highest is 75%. The percentage of utilization for all the rooms is 59.4%. The wood

shop has the highest percentage of utilization. Class rooms and cooking rooms have the lowest. The woodshop is being used for four other classes.

Table III

A Summary of Pupil Station Utilization by Buildings of Existing Pupil Stations and of Potential Capacity for all Periods of the Day and for Periods Actually Used

Room	Present Schedule	Pupil Stations 8 Periods	Pupil Stations Actual	Potential Capacity 8 Periods	Potential Capacity Actual
1-Minutes per week	6200	32000	16000	39200	19600
Per Cent of utilization		19.375%	38.75%	15.8%	31.63
2-Minutes per week	14000	12800	9600	33600	25200
Per cent of utilization		109.4%	145.8%	41.7%	55.6%
3-Minutes per week	7400	22400	14000	54400	34000
Per cent of utilization		33.04%	52.86%	13.6%	21.76%
4-Minutes per week	6400	16000	8000	17600	8800
Per cent of utilization		40%	80%	36.36%	72.72%
5-Minutes per week	9760	19200	10560	12800	7040
Per cent of utilization		50.83%	92.42%	76.25%	138.63%
Total min. of rooms	43760	102400	58160	157600	94640
Per cent of utilization		42.73%	75.24%	27.77%	46.24%

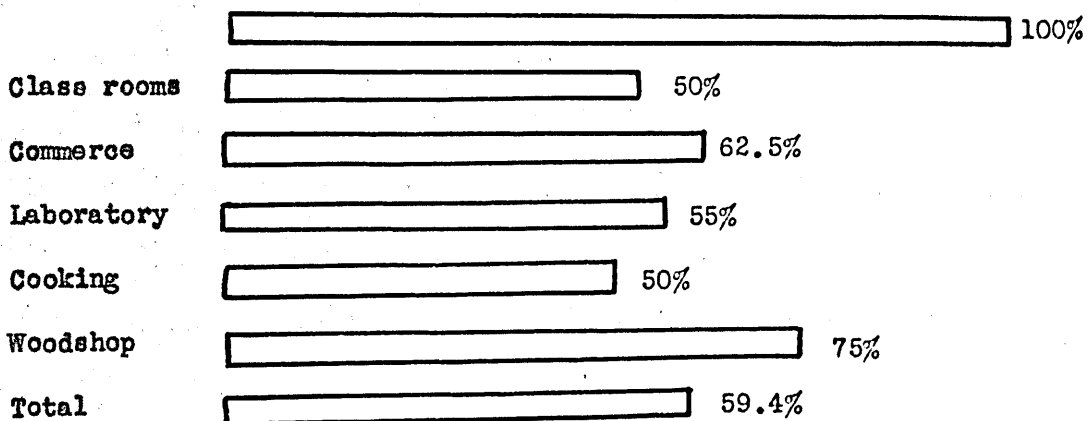
Table IV

Percentage of Room Utilization for Each Type of Room, Building B.

Rooms	Number per wk.									Total		Per Cent
		1	2	3	4	5	6	7	8	No.	Occu.	
Class rooms	5	5			5					20	10	50
Com- merce	5		5	5	5	5	5			40	25	62.5
Labor- atory	5	5				5	2	5	5	40	22	55
Cook- ing	5	5	5					5	5	40	20	50
Wood- shop	5	5		5		5	5	5	5	40	30	75
Total	25	20	10	10	10	15	12	15	15	180	107	59.4

No.-number of rooms per week
Occu.-rooms occupied per week

A Graphic Presentation of Utilization for each Type of Room



Building C

Building C has eleven rooms ten of which are being used for instructional purposes. The rooms belong to the following types:

Room 1, 5, 6, and 7--Class rooms

Room 2-----Sewing room

Room 3-----Cooking

Room 4-----Wood shop

Room 8-----Commerce

Room 9-----Music

Room 10-----Laboratory

Room 11-----Science

Building C uses an eight period schedule and forty minutes to the period.

Pupil station utilization for eight periods.

Room number eight is not used at all. Rooms number two, and nine are used two periods per day, room number ten is used two periods per week, and rooms number three, four and eleven, are used four periods per day, standing idle the rest of the time. All of the rooms are idle at least two periods per day. The lowest percent of utilization is 0% and the highest is 46.7%. The percent of utilization for all the rooms is 28.42%.

Pupil station utilization for periods used.

The lowest percent of utilization is 0% and the highest is 100%.

Rooms one and nine are the only rooms with a per cent of utilization

below 50%. The classes in room number one are small compared with the number of pupil stations in the room. Room number nine has 30 pupil stations and is utilized by one class of twelve and another of ten. The percentage of utilization for all the rooms is 58.65%.

Potential capacity of the building for eight periods.

The lowest percentage of utilization is 0% and the highest is 41.2%. The percentage of utilization for all the rooms is 24.98%. The utilization of potential capacity for any room in this building does not reach 50%. Several of the rooms are idle a good share of the time and many of the classes are small in comparison with the size of the room.

Potential capacity of the room for periods used.

The lowest percentage of utilization is 28.8% and the highest is 116.7%. The percentage of utilization for all the rooms in this building is 49.4%. Room two has a potential capacity of 12 pupil stations and is used by a sewing class of fourteen students. All classes held in room one are far below the potential capacity of the room. Room nine has a potential capacity of thirty three and is used by one class of twelve and another of ten.

The utilization of the potential capacity of the rooms in building C is 24.98%. The utilization of the present pupil stations is 28.42%. Both of the percentages are very low and can be accounted for by small classes and idle rooms.

Percentage of room utilization

The lowest percentage of utilization is 0% and the highest is 65.6%.

The utilization of all the rooms is 42.5%. The percentage of utilization is low for all the rooms and one room is not used at all.

Table V

A Summary of Pupil Station Utilization by Buildings of Existing Pupil Stations and of Potential Capacity for all Periods of the Day and for Periods Actually Used

Room	Present Schedule	Pupil Stations 8 Periods	Pupil Stations Actual	Potential Capacity 8 Periods	Potential Capacity Actual
1-Minutes per week	11400	48000	36000	52800	39600
Per cent of utilization		23.8%	31.7%	21.6%	28.8%
2-Minutes per week	5600	22400	5600	19200	4800
Per cent of utilization		25%	100%	29.1%	116.7%
3-Minutes per week	10800	25600	12800	27200	13600
Per cent of utilization		42.2%	84.4%	39.7%	79.4%
4-Minutes per week	11200	24000	12000	27200	13600
Per cent of utilization		46.7%	93.3%	41.2%	82.4%
5-Minutes per week	14000	40000	25000	48000	30000
Per cent of utilization		35%	56%	29.2%	46.7%
6-Minutes per week	19200	48000	36000	64000	48000
Per cent of utilization		40%	53.3%	30%	40%
7-Minutes per week	20600	48000	30000	64000	40000
Per cent of utilization		42.9%	68.6%	32.2%	51.5%
8-Minutes per week	0	24000	0	20800	0
Per cent of utilization		0%	0%	0%	0%
9-Minutes per week	4400	48000	12000	52800	13200
Per cent of utilization		9.2%	36.7%	8.3%	33.3%
10-Minutes per week	1120	25600	1280	27200	1360
Per cent of utilization		4.4%	87.5%	4.1%	82.4%

Table V (Cont.)

Room	Present Schedule	Pupil Stations 8 Periods	Pupil Stations Actual	Potential Capacity 8 Periods	Potential Capacity Actual
11-Minutes per week	14000	41600	20800	46400	23200
Per cent of utilization		33.7%	67.3%	30.2%	60.3%
Total min. of rooms	112320	395200	191280	449600	227360
Per cent of utilization		28.42%	58.65%	24.98%	49.40%

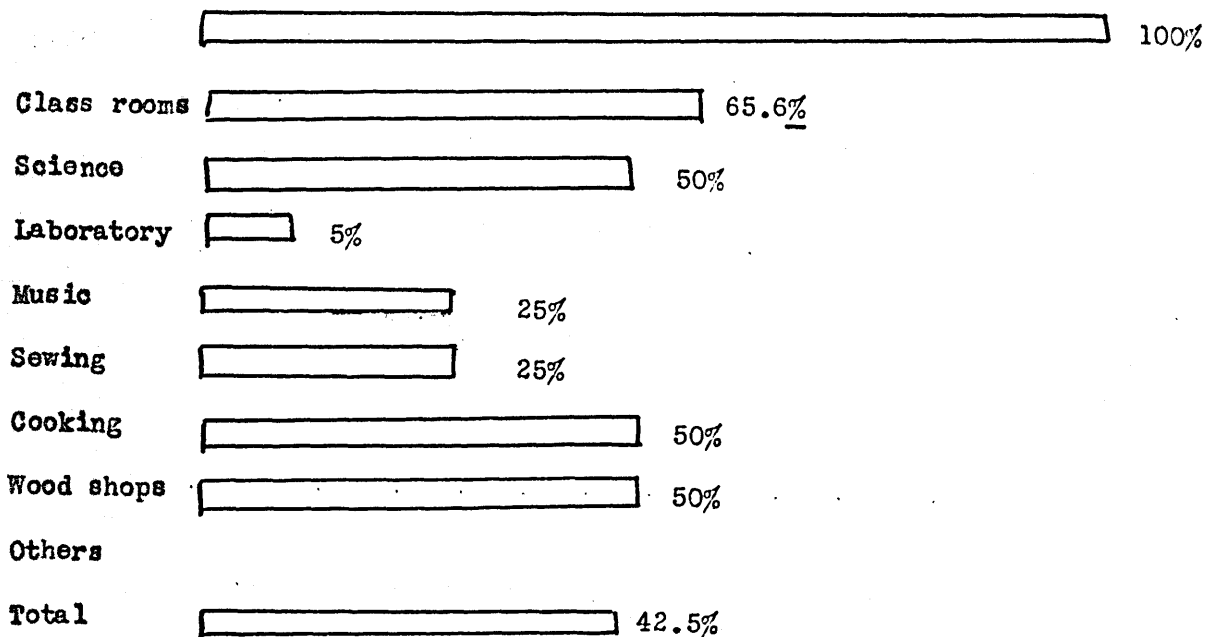
Table VI

Percentage of Room Utilization for Each Type of Room, Building C

Rooms	Number per wk.									Total		Per cent
		1	2	3	4	5	6	7	8	No.	Occu.	
Class rooms	20	20	20	15	15	15	10	10		160	105	65.6
Sci- ence	5	5		5		5		5		40	20	50
Labor- atory	5							2		40	2	5
Music	5		5					5		40	10	25
Sew- ing	5	5	5							40	10	25
Cook- ing	5					5	5	5	5	40	20	50
Wood- shops	5	5	5			5	5			40	20	50
Others	5									40	0	0
Total	55	35	35	20	15	30	20	27	5	440	187	42.5

No.-number of rooms per week
Occu.-rooms occupied per week

A Graphic Presentation of Utilization for Each Type of Room



Building D

Building D has six rooms which are being used for instructional purposes. The rooms belong to the following types:

Rooms 1 and 3--Class rooms

Room 2-----Sewing

Room 4-----Commerce

Room 5-----Cooking

Room 6-----Laboratory

Building D uses an eight period schedule and forty minutes to the period.

Pupil station utilization for eight periods.

The lowest percentage of utilization is 17.31% and the highest is 51.15%. The percentage of utilization for all the rooms is 32.13%. Only one room is used too exceeding 50%. Rooms three and four are used for three periods a day and room number five is used two periods a day. Rooms number one and two are used more periods per day but the classes are small.

Pupil station utilization for periods used.

The lowest percentage of utilization is 46.15% and the highest is 79.17%. The percentage of utilization for all the rooms is 57.28%. Room five has a pupil station capacity of ten and is used by a double period class of six people. Room three has a pupil station capacity of twenty six. The largest class in the room is fifteen. The size of the class in nearly every case is less than the present number of pupil

stations.

Potential capacity utilization for eight periods.

The lowest percentage of utilization is 9.5% and the highest is 55.41%. The percentage of utilization for all the rooms is 31.34%. Room four has a potential capacity of twenty-five pupil stations while the largest class in the room is seven. Rooms three, four, and five are used not to exceed three periods a day.

Potential capacity utilization of periods used.

The lowest percentage of utilization is 25.33% and the highest is 83.33%. The percentage of utilization for all the rooms is 58.12%. The classes in room four are very small in comparison to the potential capacity of the room. Room four is the only room with a utilization below 50%. Room one has two small classes and room three has one small class. None of the classes in these two rooms are equal to the potential capacity of the room.

The potential capacity of utilization for all the rooms is 31.34% and the percentage of utilization of the present pupil stations is 32.13%. There is very little difference between the potential capacity utilization on the present pupil station utilization. Both are very low and can be accounted for by small classes and idle periods.

Percentage of room utilization.

The lowest percentage of utilization is 25% and the highest is 80%. The percentage of utilization for all the rooms is 50.8%. The cooking room

is the lowest and the laboratory is the highest. The laboratory is being used by other classes than laboratory classes. With the exception of the laboratory the utilization of rooms is low.

Table VII

A Summary of Pupil Station Utilization by Buildings of Existing Pupil Stations and of Potential Capacity for all Periods of the Day and for Periods Actually Used

Room	Present Schedule	Pupil Stations 8 Periods	Pupil Stations Actual	Potential Capacity 8 Periods	Potential Capacity Actual
1-Minutes per week	17000	5400	34000	51200	32000
Per cent of utilization		31.25%	50%	33.2%	53.125%
2-Minutes per week	10000	25600	16000	19200	12000
Per cent of utilization		49.06%	62.5%	52.08%	83.33%
3-Minutes per week	7200	41600	15600	35200	13200
Per cent of utilization		17.31%	46.15%	20.45%	64.54%
4-Minutes per week	3800	12800	4800	40000	15000
Per cent of utilization		29.69%	79.17%	9.5%	25.33%
5-Minutes per week	2400	16000	4000	12800	3200
Per cent of utilization		15%	60%	18.75%	75%
6-Minutes per week	21280	41600	33280	38400	30720
Per cent of utilization		51.15%	63.94%	55.41%	69.27%
Total min. of rooms	61680	192000	107680	196800	106120
Per cent of utilization		32.13%	57.28%	31.34%	58.12%

Table VIII

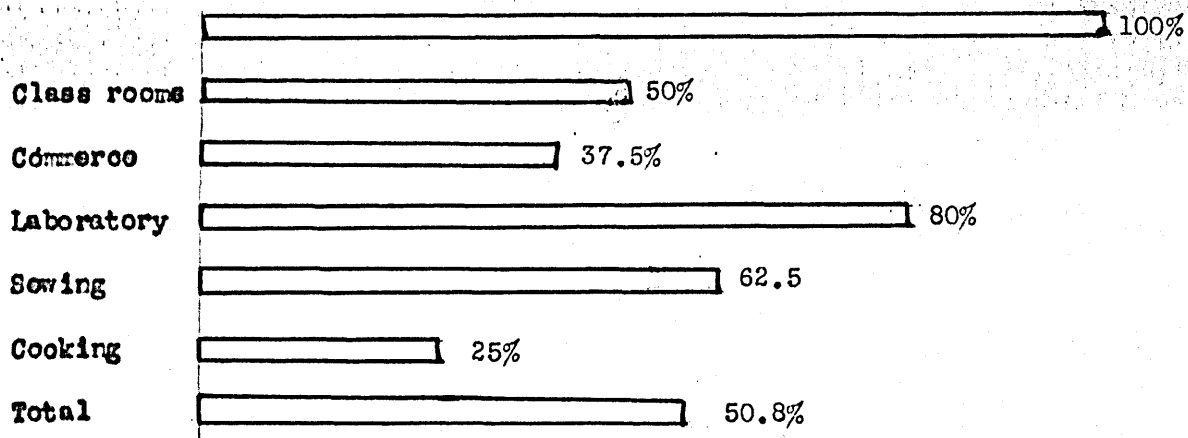
Percentage of Room Utilization for Each Type of Room, Building D

Rooms	Number per wk.									Total		Per cent
		1	2	3	4	5	6	7	8	No.	Occu.	
Class rooms	10	5	10	5	5	5		10		80	40	50
Com- merce	5			5		5	5			40	15	37.5
Labor- atory	5	5	5	2		5	5	5	5	40	32	80
Sewing	5	5			5	5	5	5		40	25	62.5
Cook- ing	5			5	5					40	10	25
Total	30	15	16	17	15	20	15	20	5	240	122	50.8

No.-number of rooms per week

Occu.-rooms occupied per week

A Graphic Presentation of Utilization for Each Type of Room



Building E

Building E has five rooms which are being used for instructional purposes. The rooms belong to the following types:

Room 3 and 4----Class rooms

Room 1-----Wood shop

Room 2-----Sewing

Room 5-----Commerce

Building E uses an eight period schedule and a forty minute period.

Pupil station utilization for eight periods.

The lowest percentage of utilization is 25% and the highest is 54.17%.

The percentage of utilization for all the rooms is 33.04%. Room one is used two periods per day. Room two is used six periods per day but the classes are small. Room four is used seven periods a day as a study hall. The percentage of utilization is computed on the basis of one period rather than eight. The number in the class is eight while the present pupil stations capacity is seventeen.

Pupil station utilization for periods used.

The lowest percentage of utilization is 34.43% and the highest is 100%. The percentage of utilization for all the rooms is 43.52%.

Potential capacity utilization for eight periods.

The lowest percentage of utilization is 12.5% and the highest is 40.63%.

The percentage of utilization for all the rooms is 29.65%. Room four has a potential capacity of forty-two pupil stations and is used by a class of eight. Room one has a potential capacity of sixteen and is used by a class of eight. It is also idle for six periods of the day. Room five does not have any black board space and is very small and ill shaped.

Potential capacity utilization for periods used.

The lowest percentage of utilization is 19.05% and the highest is 65%. The percentage of utilization for all the rooms is 41.96%. This is explained largely by small classes.

The percentage of utilization for potential capacity for all rooms is 29.65%. The percentage of utilization of present pupil station is 43.52%. Both are very low. This school has an enrollment of thirty eight and is located within about five miles of an A class school. There is a hard surfaced road between the two schools.

Percentage of room utilization.

The lowest percentage of utilization is 25% and the highest is 88.9%. The utilization for all the rooms is 66.7%. The wood shop is very low. The rooms of this building with the exception of the wood shop are being used a larger part of the time. The foods classes are being held in the sewing room. Two other classes are also being held in the sewing room.

Table IX

A Summary of Pupil Station Utilization by Buildings of Existing Pupil Stations and of Potential Capacity for all Periods of the Day and for Periods Actually Used

Room	Present Schedule	Pupil Stations 8 Periods	Pupil Stations Actual	Potential Capacity 8 Periods	Potential Capacity Actual
1-Minutes per week	3200	12800	3200	25600	6400
Percent of utilization		25%	100%	12.5%	50%
2-Minutes per week	8800	25600	19200	25600	19200
Per cent of utilization		34.38%	45.83%	34.38%	45.83%
3-Minutes per week	18800	62400	54600	54400	47600
Per cent of utilization		30.13%	34.43%	34.56%	39.5%
4-Minutes per week	1600	3400	3400	8400	8400
Per cent of utilization		38.24%	38.24%	19.05%	19.05%
5-Minutes per week	5200	9600	6000	12800	8000
Per cent of utilization		54.17%	86.67%	40.63%	65%
Total min. of rooms	37600	113800	86400	126800	89600
Per cent of utilization		33.04%	43.52%	29.65%	41.96%

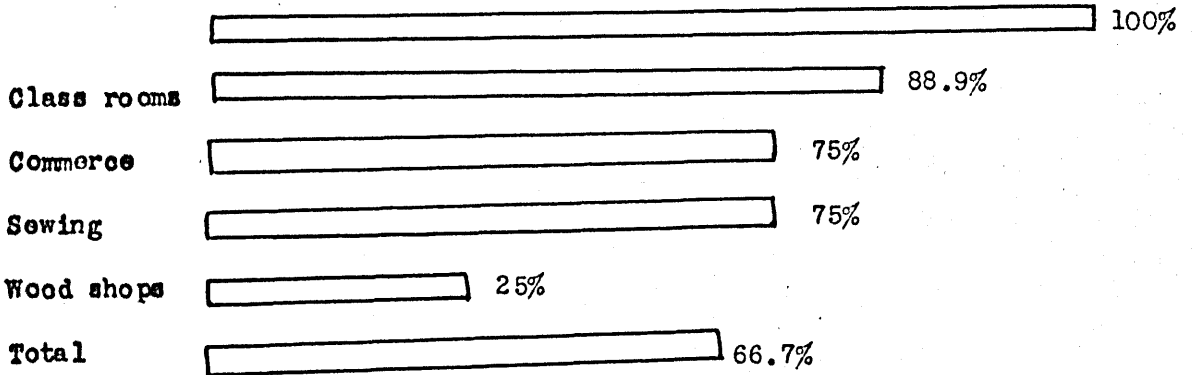
Table X

Percentage of Room Utilization for Each Type of Room, Building E

Room Class	Number per wk.	Number of rooms per week								Total		Per cent
		1	2	3	4	5	6	7	8	No.	Occu.	
Class rooms	5-5/8	5	5	5	5	10	5	5		45	40	88.9
Com-merce	5	5	5			5	5	5	5	40	30	75
Sew-ing	5	5	5		5	5		5	5	40	30	75
Wood shops	5							5	5	40	10	25
Total	20-5/8	15	15	5	10	20	10	20	15	165	110	66.7

No.-number of rooms per week
 Occu.-rooms occupied per week

A Graphic Presentation of Utilization for Each Type of Room



Building F

Building F has five rooms which are being used for instructional purposes. The rooms belong to the following types:

Room 1 and 2-----Class rooms

Room 3-----Laboratory

Room 4-----Class room

Room 5-----Cooking

Building F has an eight period schedule and forty minutes to the period.

Pupil station utilization for eight periods.

The lowest percentage of utilization is 47.92% and the highest is 78.12%. The percentage of utilization for all the rooms is 61.08%.

Room five is used four periods a day. Room three is used five periods a day for two days a week and four periods a day for three days a week.

The sewing and cooking classes are both held in one room.

Pupil station utilization for periods used.

The lowest percentage of utilization is 59.34% and the highest is 125%. The percentage of utilization for all the rooms is 76.24%.

Room three has a seating capacity of twelve and if being used by classes much larger than that. It is a laboratory room and other classes are being held in that room. Room two has twenty six pupil stations. The classes held in this room are all smaller than the number of pupil stations in this room. Room two is not very well lighted. The windows are on the short side of the room and the room

is almost twice as long as it is wide.

Potential utilization for eight periods.

The lowest percentage of utilization is 22.57% and the highest is 104.16%. The percentage of utilization for all the rooms is 44.79%. Room four has a potential capacity of thirty six. The largest class held in this room is twelve. It is used six periods a day. Room five is used only four periods a day. Room two is not used up to its potential capacity by any class in that room. Room three is not used for all the periods per day but every class exceeds the potential capacity of the room.

Potential capacity utilization for periods used.

The lowest percentage of utilization is 30.1% and the highest is 166.66%. The percentage of utilization for all the rooms is 55.84%. Room four is used much below its potential capacity. Room three is a laboratory and is being used by classes much beyond its potential capacity.

The percentage of utilization of the potential capacity of the room is 44.79% and the percentage of utilization of the present pupil stations is 61.08%. The rooms in building F are being used a large percentage of the time. Some of the classes are small and for this reason the percentage of utilization is below the capacity of the rooms. The rooms in building F are being used to a larger extent than in some of the other buildings of this study. The lighting in rooms four and five is poor.

Percentage of room utilization.

The lowest percentage of utilization is 50% and the highest is 87.5%. The percentage of utilization for all the rooms is 73.5%. All of the rooms are being utilized 50% or more of the time. Sewing and cooking are being held in one room. The laboratory room is being used for other classes.

Table XI

A Summary of Pupil Station Utilization by Buildings of Existing Pupil Stations and of Potential Capacity for all Periods of the Day and for Periods Actually Used

Room	Present schedule	Pupil stations 8 period	Pupil stations actual	Potential capacity 8 periods	Potential capacity actual
1-Minutes per week	27200	36800	36800	46400	46400
Per cent of utilization		73.91%	73.91%	58.62%	58.62%
2-Minutes per week	21600	41600	36400	49600	43400
Per cent of utilization		51.92%	59.34%	43.55%	49.77%
3-Minutes per week	15000	19200	12000	14400	9000
Per cent of utilization		78.12%	125%	104.16%	166.66%
4-Minutes per week	13000	24000	18000	57600	43200
Per cent of utilization		54.17%	72.2%	22.57%	30.1%
5-Minutes per week	9200	19200	9600	24000	12000
Per cent of utilization		47.92%	95.83%	38.33%	76.66%
Total min. of rooms	86000	140800	112800	192000	154000
Per cent of utilization		61.08%	76.24%	44.79%	55.84%

Table XII

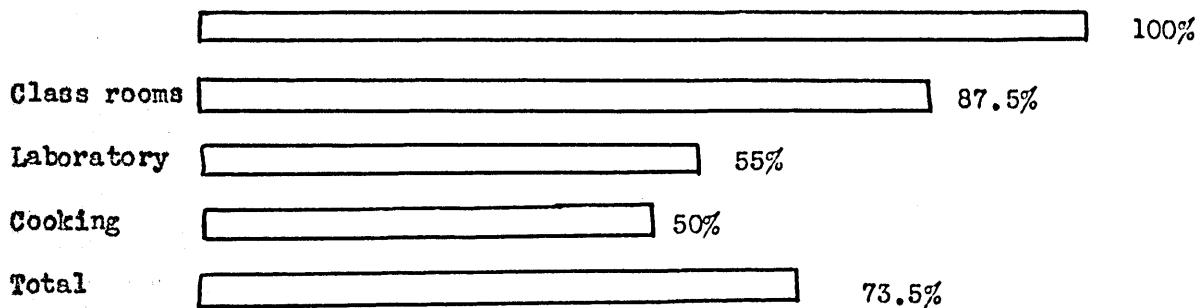
Percentage of Room Utilization for Each Type of Room, Building F

Rooms	Number per week									Total		Per cent
		1	2	3	4	5	6	7	8	No.	Occu.	
Class rooms	15	15	15	15	15	15	15	15	5	120	105	87.5
Labor- atory	5	2		5	5	5	5	5		40	22	55
Cook- ing	5	5	5	5	5	5				40	20	50
Total	25	20	22	20	25	20	20	15	5	200	147	73.5

No.-number of rooms per week

Occu.-rooms occupied per week

A Graphic Presentation of Utilization for Each Type of Room



Building G

Building G has seven rooms which are being used for instructional purposes. The rooms belong to the following types:

Room 3-----Cooking

Room 1-----Commerce

Room 2-----Sewing

Room 4-----Laboratory

Rooms 5, 6, and 7--Class rooms

Building G uses an eight period schedule and forty minutes to the period.

Pupil station utilization for eight periods.

The lowest percentage of utilization is 25% and the highest is 79.76%.

The percentage of utilization for all the rooms is 54.17%. Room three is only used two periods a day. Rooms one and two are used four periods a day. Room four is used seven periods a day but the size of the classes are below the present number of pupil stations. The rooms has more pupil stations than the potential capacity permits as will be seen under the discussion of potential utilization.

Pupil station utilization for periods used.

The lowest percentage of utilization is 59.69% and the highest is 100%.

The percentage of utilization for all the rooms is 73.81%.

Potential capacity utilization for eight periods.

The lowest percentage of utilization is 21.875% and the highest is 90.38%. The percentage of utilization for all the rooms is 44.86%.

Room three is used only two periods a day. Rooms one and two are used four periods a day. Room four has twenty four pupil stations in the room while the potential capacity of the room is only thirteen. Four of the classes held in this room exceeds its potential capacity. Room four is a laboratory in the basement. The lighting of the rooms is very poor as is the equipment. It is heated by a coal stove. Room one is on a stair landing closed in by a temporary partition and heated by an oil stove. Rooms two and three are really in one. They are in the attic of the building and are very poorly lighted and odd shaped.

Potential capacity of utilization for periods used.

The lowest percentage of utilization is 42.86% and the highest is 118.74%. The percentage of utilization for all the rooms is 57.45%. Two of the rooms are used beyond their potential capacity.

The percentage of utilization of the potential capacity of the rooms in building G is 44.86% and the percentage of utilization of the present pupil stations is 73.81%. This is high for the type of building. It is very old, out of date and poorly equipped.

Percentage of room utilization.

The lowest percentage of utilization is 25% and the highest is 91.7%. The percentage of utilization for all rooms is 68.6%. The cooking room is used two periods a day for cooking only. The percentage of room utilization for this building would be very high if classes were held only in rooms fitted for class work.

Table XIII

A Summary of Pupil Station Utilization by Buildings of Existing Pupil Stations and of Potential Capacity for all Periods of the Day and for Periods Actually Used

Room	Present schedule	Pupil stations 8 Periods	Pupil stations actual	Potential capacity 8 Periods	Potential capacity actual
1-Minutes per week	4000	8000	4000	9600	4800
Per cent of utilization		50%	100%	41.66%	83.33%
2-Minutes per week	15200	38400	19200	25600	12800
Per cent of utilization		39.58%	79.16%	59.37%	118.74%
3-Minutes per week	5600	22400	5600	25600	6400
Per cent of Utilization		25%	100%	21.875%	87.5%
4-Minutes per week	18800	38400	30720	20800	16640
Per cent of utilization		48.95%	61.2%	90.38%	112.98%
5-Minutes per week	26800	33600	29400	67200	58800
Per cent of utilization		79.76%	91.15%	39.88%	45.58%
6-Minutes per week	23400	44800	39200	62400	54600
Per cent of utilization		52.23%	59.69%	37.5%	42.86%
7-Minutes per week	23200	30400	30400	49600	49600
Per cent of utilization		76.34%	76.34%	46.77%	46.77%
Total min. of rooms	117000	216000	158520	260800	203640
Per cent of utilization		54.17%	72.81%	44.86%	57.45%

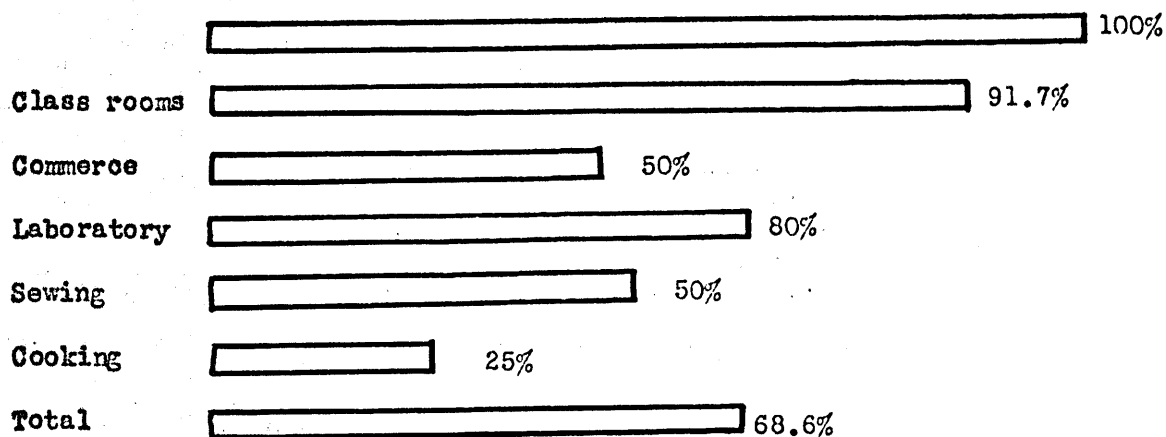
Table XIV

Percentage of Room Utilization for Each Type of Room, Building G

Rooms	Number per wk.									Total		Per cent
		1	2	3	4	5	6	7	8	No.	Occu.	
Class rooms	15	15	10	15	15	15	15	15	10	120	110	91.7
Com- merce	5	5	5	5	5					40	20	50
Labor- atory	5	5	5	2	5	5	5	5		40	32	80
Sew- ing	5	5	5					5	5	40	20	50
Cook- ing	5			5	5					40	10	25
Total	35	30	25	27	30	20	20	25	15	280	192	68.6

No.-number of rooms per week
Occu.-rooms occupied per week

A Graphic Presentation of Utilization for Each Type of Room



Building H

Building H has six rooms which are being used for instructional purposes. The rooms belong to the following types:

Room 1-----Sewing

Room 2-----Cooking

Room 3

Room 4-----Class Room

Room 5-----Wood shop

Room 6-----Commerce

Building H uses an eight period schedule with forty minutes to the period.

Pupil station utilization for eight periods.

The lowest percentage of utilization is 16.7% and the highest is 50%. Four of the rooms have a percentage of utilization between 40% and 50%. Room two and five are used only two periods a day. The percentage of utilization for all the rooms is 40.45%. This may be raised by having larger classes and using the room more periods per day.

Pupil station utilization for the periods room is used.

The lowest percentage of utilization is 63.25% and the highest is 104.82%. All of the rooms have a percentage of utilization above 60%. Rooms four and five are used to the full capacity of their present pupil stations. The percentage of utilization for all the rooms is 72.54%.

Potential capacity utilization for eight periods.

The lowest percentage of utilization is 16.66% and the highest percentage

of utilization is 49.79%. The percentage of utilization for all the rooms is 30.43%. The utilization of potential capacity is very low, all of the rooms falling below 50%. The present number of pupil stations in rooms three, five, and six are much below the potential capacity of the rooms. Rooms two and five are used only two periods a day. Rooms cannot have high potential capacity utilization unless they are seated to capacity and then used. Anything less is a waste of room.

Potential capacity utilization for periods rooms are used. The lowest percentage of utilization is 32.23% and the highest is 104.82%. The percentage of utilization for all the rooms is 52.2%. Room four is being used beyond its capacity for the time the room is used. Room six is used the lowest for the reason that it is seating only one-half of its potential capacity.

The percentage of utilization of the potential capacity of the rooms in building H is 30.43%. The percentage of utilization of the present pupil stations is 40.45%.

Per centage of room utilization.

The lowest percentage of utilization is 25% and the highest is 75%. The cooking and wood shop rooms are utilized only two periods per day. The laboratory is being utilized by two other classes. The percentage of utilization for all the rooms is 51.7% which is just a little more than half of the time. The sewing room is being used for other classes.

Table XV

A Summary of Pupil Station Utilization by Buildings of Existing Pupil Stations and of Potential Capacity for all Periods of the Day and for Periods Actually Used

Room	Present schedule	Pupil stations 8 periods	Pupil stations actual	Potential capacity 8 periods	Potential capacity actual
1-Minutes per week	9200	20800	13000	22400	14000
Per cent of utilization		44.23%	70.77%	41.07%	65.71%
2-Minutes per week	3200	19200	4800	17600	4400
Per cent of utilization		16.7%	66.66%	18.18%	72.72%
3-Minutes per week	18200	38400	28800	49600	37200
Per cent of utilization		47.4%	63.2%	36.7%	48.92%
4-Minutes per week	9560	19200	9120	19200	9120
Per cent of utilization		49.79%	104.82%	49.79%	104.82%
5-Minutes per week	4800	19200	4800	28800	7200
Per cent of utilization		25%	100%	16.66%	66.66%
6-Minutes per week	12000	24000	18000	49600	37200
Per cent of utilization		50%	66.66%	24.2%	32.26%
Total min. of rooms	56960	140800	78520	187200	109120
Per cent of utilization		40.45%	72.54%	30.43%	52.2%

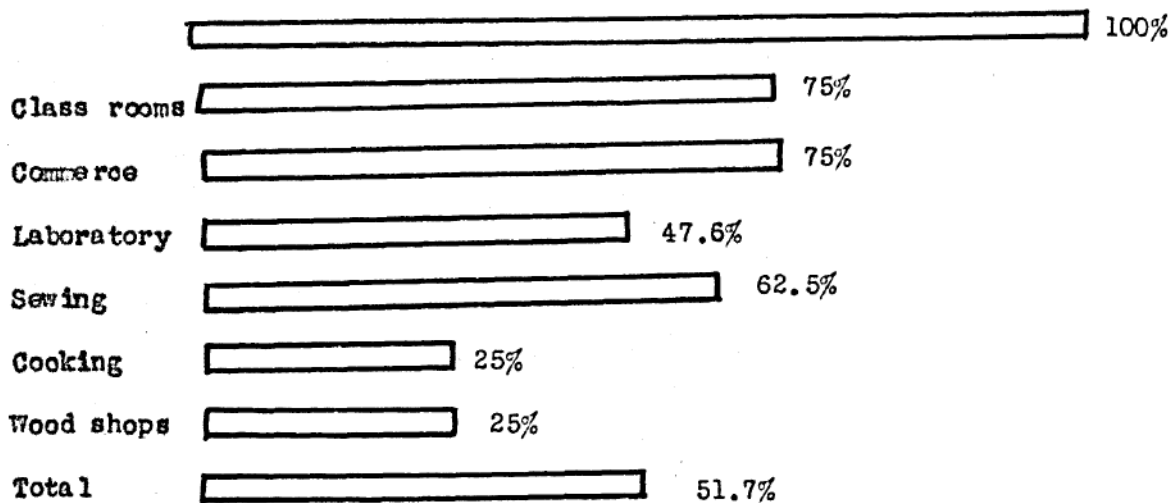
Table XVI

Percentage of Room Utilization for Each Type of Room, Building II.

Rooms	Number per week									Total		Por Cent
		1 .	2 .	3 .	4 .	5 .	6 .	7 .	8 .	No.	Occu.	
Class rooms	5	5	5		5	5	5	5		40	30	75
Com- merce	5	5	5	5	5	5	5	5		40	30	75
Labor- atory	5		5	5	4	5				40	19	47.6
Sew- ing	5		5	5	5	5	5			40	25	62.5
Cook- ing	5			5	5					40	10	25
Wood- shops	5					5	5			40	10	25
Total	30	15	20	19	25	20	20	5		240	124	51.7

No.-number of rooms per week
Occu.-rooms occupied per week

A Graphic Presentation of Utilization for Each Type of Room



Building I

Building I has six rooms which are being used for instructional purposes. The rooms belong to the following types:

Room 1-----Laboratory

Room 2-----Cooking

Room 3, 4, and 5--Class rooms

Room 6-----Wood shop

Building I uses a six period schedule with sixty minutes to the period.

Pupil station utilization for six periods.

The lowest percentage of utilization is 18.11% and the highest is 66.66%. The percentage of utilization for all the rooms is 38.42%. Rooms number three and six are used only two periods a day. Each room is standing idle four of the six periods per day. Rooms one and two are standing idle half of the day.

Pupil station utilization for the periods room is used.

The lowest per cent of utilization is 43.33% and the highest is 105.55%. The percent of utilization for all the rooms is 70.65%. Four of the rooms have a utilization above 90%. The utilization of room five is low because the classes in this room are small.

Potential capacity utilization--six periods.

The lowest per cent of utilization is 13.44% and the highest is 91.66%. The percent of utilization for all the rooms is 38.02%.

Room three is not seated to capacity and is used only two periods a day. The same is true for room six. Rooms one and two are the only rooms utilized above 50%.

Potential capacity utilization-for periods used.

The lowest per cent of utilization is 40.32% and the highest is 183.33%. The per cent of utilization for all the rooms is 73.49%. Rooms one and two are used far beyond their potential capacity. Room one is seated 50% beyond its capacity and room exceeds its capacity by 100%. Larger rooms should have been provided. Room five is seated 20% beyond its capacity but the classes in this room are small keeping down the percentage of utilization.

The percentage of utilization of the potential capacity of the rooms in building I is 38.02. The percentage of utilization of potential capacity is due largely to leaving rooms stand idle a large part of the day.

Percentage of room utilization.

The lowest percentage of utilization is 33% and the highest is 61.1%. The percentage of utilization for all the rooms is 50%. The wood shop is used two periods a day and one of the class rooms is used two periods.

Table XVII

A Summary of Pupil Station Utilization by Buildings of Existing Pupil Stations and of Potential Capacity for all Periods of the Day and for Periods Actually Used

Room	Present schedule	Pupil stations 6 periods	Pupil stations actual	Potential capacity 6 periods	Potential capacity actual
1-Minutes per week	11400	21600	10800	14400	7200
Per cent of utilization		52.78%	105.55%	79.16%	158.33%
2-Minutes per week	13200	28800	14400	14400	7200
Per cent of utilization		45.83%	91.66%	91.66%	183.33%
3-Minutes per week	7500	41400	13800	55800	18600
Per cent of utilization		18.11%	54.35%	13.44%	40.32%
4-Minutes per week	12000	18000	12000	32400	21600
Per cent of utilization		66.66%	100%	37.04%	55.55%
5-Minutes per week	15600	43200	36000	32400	27000
Per cent of utilization		36.11%	43.33%	48.15%	57.77%
6-Minutes per week	6000	18000	6000	23400	7800
Per cent of utilization		33.33%	100%	25.64%	76.92%
Total min. of rooms	65700	171000	93000	172800	89400
Per cent of utilization		38.42%	70.65%	38.02%	73.49%

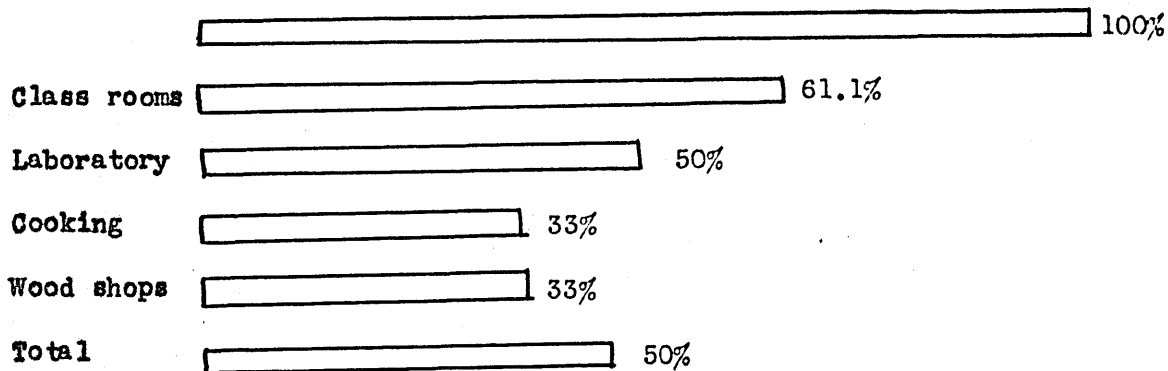
Table XVIII

Percentage of Room Utilization for Each Type of Room, Building I

Rooms	Number per wk.							Total		Per cent
		1	2	3	4	5	6	No.	Occu.	
Class rooms	15	10	15	10	10	10		90	55	61.1
Labor- atory	5	5	5		5			30	15	50
Cooking	5			5	5			30	10	33
Wood- shops	5			5	5			30	10	33
Total	30	15	20	20	25	10		180	90	50

No.-number of rooms per week
Occu.-rooms occupied per week

A Graphic Presentation of Utilization for Each Type of Room



Building J

Building J has ten rooms which are being used for instructional purposes. The rooms belong to the following types:

Room 1-----Science

Room 3-----Sewing

Rooms 2, 5, and 8--Class rooms

Room 4-----Cooking

Rooms 6 and 7----Commerce

Room 9-----Wood shop

Room 10-----Laboratory

Building J uses an eight period schedule with forty minutes to the period.

Pupil station utilization for eight periods.

The lowest percentage of utilization is 6.25% and the highest is 46.9%.

The percentage of utilization for all the rooms is 23.25%. All of the rooms fall below a utilization of 50%. Room three is utilized very little.

Rooms one, three, four, seven, and ten are used only two periods a day.

Room one is used three days a week and room ten is used four days per week. The schedule for building J looks almost like a room for each class.

Pupil station utilization for periods room is used.

The lowest percentage of utilization is 25% and the highest is 89.4%.

The percentage of utilization for all the rooms is 57.48%. The class

in room three is small, the number being ten while there are twenty

seats in the room. The present pupil stations for this building are

not being utilized, largely because there are too many rooms.

Potential capacity utilization for eight periods.

The lowest per cent of utilization is 7.2% and the highest is 30.6%. The percentage of utilization for all the rooms is 20.43%. The utilization of potential capacity is very low for each room all of them falling below 30.6%. There are too many rooms for the number of classes that are being taught.

Potential capacity utilization for periods used.

The lowest per cent of utilization is 33.3% and the highest is 133.3%. The percentage of utilization for all the rooms is 47.91%. Room ten has a potential capacity of nine and is being used by one class of ten and another of fourteen. This makes the percentage very high. Room four is being utilized very nearly to capacity. Seven of the rooms are utilized below 50% of their capacity.

Building J was built about three or four years ago. The enrollment at that time was larger than it is now and it was expected that it would grow larger. It has actually grown smaller and as a result the very low per cent of utilization.

Percentage of room utilization.

The lowest percentage of utilization is 15% and the highest is 56.3%. The percentage of utilization for all rooms is 41%. The percentage of utilization for all the rooms is very low. The outstanding thing about these rooms is the fact that they are not used.

Table XIX

A Summary of Pupil Station Utilization by Buildings of Existing Pupil Stations and of Potential Capacity for all Periods of the Day and for Periods Actually Used.

Room	Present schedule	Pupil station 8 periods	Pupil station actual	Potential capacity 8 periods	Potential capacity actual
1-Minutes					
per week	2880	36800	5520	40000	60000
Per cent of utilization		7.82%	52.17%	7.2%	48%
2-Minutes					
per week	11200	38400	24000	44800	28000
Per cent of utilization		29.2%	46.6%	25%	40%
3-Minutes					
per week	2000	32000	8000	24000	6000
Per cent of utilization		6.25%	25%	8.3%	33.3%
4-Minutes					
per week	4000	19200	4800	18200	4800
Per cent of utilization		20.8%	83.3%	20.8%	83.3%
5-Minutes					
per week	11800	35200	13200	49600	18600
Per cent of utilization		33.5%	89.4%	23.8%	63.4%
6-Minutes					
per week	6000	12800	11200	20800	18200
Per cent of utilization		46.9%	53.6%	28.8%	32.96%
7-Minutes					
per week	3400	19200	4800	30400	7600
Per cent of utilization		17.8%	70.8%	11/18%	44.7%
8-Minutes					
per week	15200	43200	27000	49600	31000
Per cent of utilization		35.2%	56.3%	30.6%	49%
9-Minutes					
per week	4400	19200	9600	24000	12000
Per cent of utilization		22.9%	25.8%	18.33%	36.67%
10-Minutes					
per week	3840	22400	4480	14400	2880
Per cent of utilization		17.1%	85.7%	26.6%	133.3%
Total min. of rooms	64720	278400	112600	316800	135080
Per cent of utilization		23.25%	57.48%	20.43%	47.91%

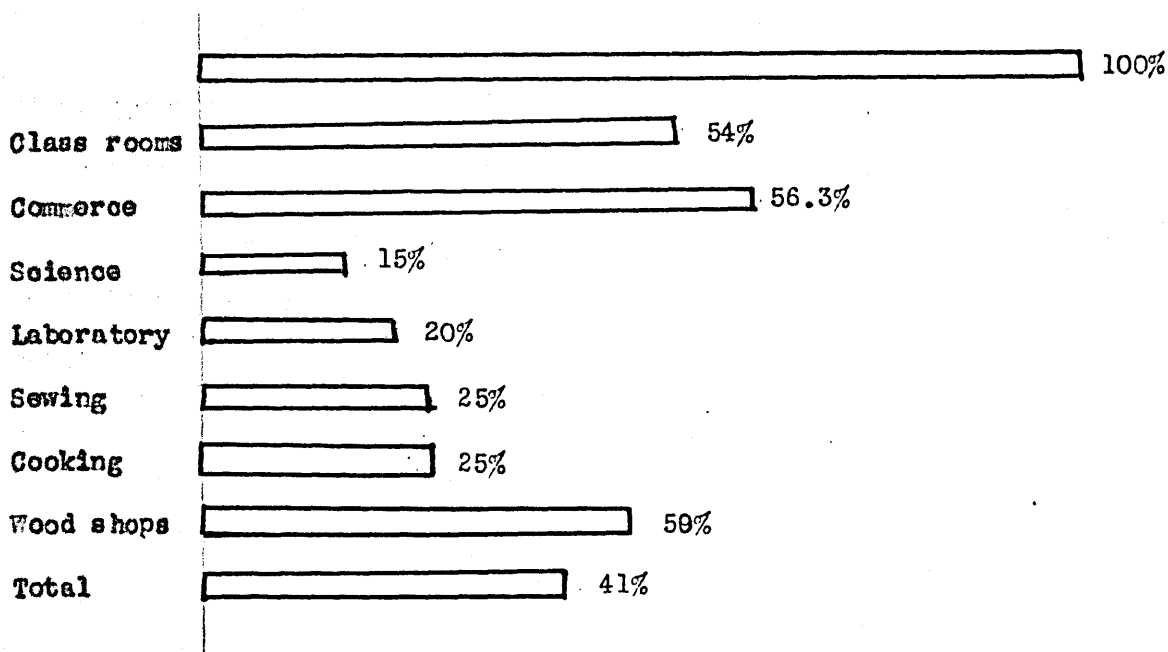
Table XX

Percentage of Room Utilization for Each Type of Room, Building J

Rooms	Number per wk.									Total		Per cent
		1	2	3	4	5	6	7	8	No.	Occu.	
Class rooms	15	15		5	15	10	15	15		120	65	54
Com- merce	10	5	5	5	10	5	5	5	5	80	45	56.3
Science	5	3	3							40	6	15
Labor- atory	5	4	4							40	8	20
Sew- ing	5					5	5			40	10	25
Cook- ing	5			5	5					40	10	25
Wood- shops	5	5	5	5	5					40	20	50
Total	50	32	17	20	25	20	25	20	5	400	164	41

No.-number of rooms per week
Occu.-rooms occupied per week

A Graphic Presentation of Utilization for Each Type of Room



Building K

Building J has six rooms which are being used for instructional purposes. The rooms belong to the following types:

Rooms 1, 3, and 4-----Class rooms

Room 2-----Sewing

Room 5-----Cooking

Room 6-----Laboratory

Building K uses an eight period schedule and a forty minute period.

Pupil station utilization for eight periods.

The lowest percentage of utilization is 25.57% and the highest is 50%. The percentage of utilization for all rooms is 34.61%. All of the rooms in this building fall below 50%. There are many vacant periods, room number four being the only room that is used as much as five periods a day and that for only three days a week.

Pupil station utilization for periods rooms is used.

The lowest percentage of utilization is 25.57% and the highest is 100%. The percentage of utilization for all rooms is 65.35%. The percentage for room number two is small because the number in class for the classes held in that room is small. There are nine in each class for room two while there are twenty two seats. Part of the classes in room four are small. The classes in room five are small in comparison to the number of seats in that room. Three of the rooms are high in percentage of utilization of pupil stations for the periods used. Low percentage can be raised by having larger classes.

Potential capacity utilization for each period.

The lowest per cent of utilization is 20.59% and the highest is 40.18%. The percentage of utilization for all the rooms is 27.42%. The explanation for these small percentages is small classes and vacant periods. Room one is used four periods per day, room two is used five periods per day, room three is used four periods per day, room five is used four periods per day, and room six is used four periods per day for two days and two periods per day for five days per week.

Potential capacity utilization for periods used.

The lowest percentage of utilization is 41.18% and the highest is 72.62%. The percentage of utilization for all the rooms is 52.23%. Room one is seated less than 50% of its potential capacity. The potential capacity is thirty four and the present seating is fourteen. The classes in room four are small all of them falling below the potential capacity of the room.

Building K is utilized 27.42% of its potential capacity and 34.61% of its present pupil station capacity. The explanation is small classes and many vacant periods. This school has an enrollment of 48 and is located close to another with an enrollment of fifty. This may offer some explanation of the low percentage of utilization.

Percentage of room utilization.

The lowest percentage of room utilization is 35% and the highest is 62.5%. The percentage of utilization for all the rooms is 50.8%. The school has a small enrollment and is close to two other high schools.

Table XXI

A Summary of Pupil Station Utilization by Buildings of Existing Pupil Stations and of Potential Capacity for all Periods of the Day and for Periods Actually Used.

Room	Present schedule	Pupil stations 8 periods	Pupil stations actual	Potential capacity 8 periods	Potential capacity actual
1-Minutes per week	11200	22400	11200	54400	27200
Per cent of utilization		50%	100%	20.59%	41.18%
2-Minutes per week	9000	35200	22000	22400	14000
Per cent of utilization		25.57%	40.9%	40.18%	64.28%
3-Minutes per week	13400	27200	13600	46400	33200
Per cent of utilization		49.26%	98.53%	28.88%	57.76%
4-Minutes per week	11360	38400	22080	43200	24840
Per cent of utilization		29.58%	51.45%	26.3%	45.73%
5-Minutes per week	7200	25600	12800	22400	11200
Per cent of utilization		28.12%	56.24%	32.14%	64.28%
6-Minutes per week	4880	16000	5600	19200	6720
Per cent of utilization		30.5%	87.14%	25.41%	72.62%
Total min. of rooms	57040	164800	87280	208000	107160
Per cent of utilization		34.61%	65.35%	27.42%	53.23%

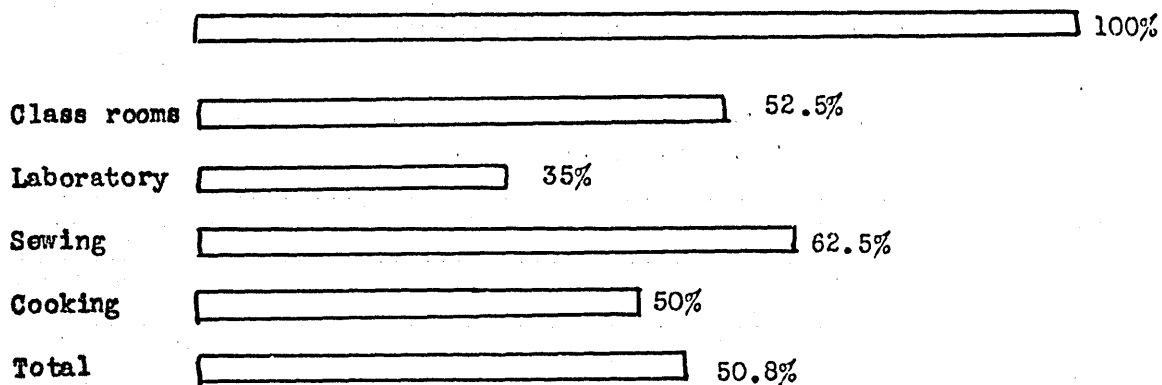
Table XXII

Percentage of Room Utilization for Each Type of Room, Building E

Rooms	Number per wk.									Total		Per cent
		1	2	3	4	5	6	7	8	No.	Occu.	
Class rooms	15	5	5	8	5	10	10	10	10	120	63	52.5
Labor- atory	5	5	5	2	2					40	14	35
Sew- ing	5	5	5	5	5	5				40	25	62.5
Cook- ing	5	5	5	5	5					40	20	50
Total	30	20	20	20	17	15	10	10	10	240	122	50.8

No.-Number of rooms per week
Occu.-rooms occupied per week

A Graphic Presentation of Utilization for Each Type of Room



Building L

Building L has seven rooms which are being used for instructional purposes. The rooms belong to the following types:

- Room 1-----Sewing
- Room 2, 4, and 5-----Class rooms
- Room 3-----Cooking
- Room 6-----Laboratory
- Room 7-----Wood shop

Building L uses an eight period schedule and a forty minutes period.

Pupil station utilization for eight periods.

The lowest percentage of utilization is 15% and the highest is 43.13%. The percentage of utilization for all the rooms is 28.55%. All of the rooms fall below a utilization of 50%. Rooms one, three, and seven are each used two periods per day. Room six is used three periods for two days a week.

Pupil station utilization for periods used.

The lowest percentage of utilization is 46% and the highest is 154.16%. The percentage of utilization for all the rooms is 65.3%. Rooms one, three, and six are used up to or beyond their capacity. Room six has a very high percentage because the size of the classes exceed the number of pupil stations. Room four is the only room that falls below 50% in utilization.

Potential capacity utilization for eight periods.

The lowest per cent of utilization is 12.5% and the highest is 60%.

The percentage of utilization for all the rooms is 20.23%. Room four has a potential capacity of forty five with a present pupil capacity of twenty. It is also used only five periods a day and by classes below its present seating capacity. Room five is seated much below its potential capacity and in turn is used only four periods a day and by classes smaller than its seating capacity. Room seven is used only two periods a day.

Potential capacity utilization for periods used.

The lowest percentage of utilization is 20.44% and the highest is 240%. The percentage of utilization for all rooms is 40.81%. Two rooms are used far beyond their potential capacity. Room one has a double period class of twelve with a potential capacity of five. The classes in room six are much larger than the potential capacity of the room.

Percentage of room utilization.

The lowest percentage of room utilization is 15% and the highest is 57.5%. Only two of the rooms in this school are used more than 50% of the time. The percentage of utilization for all the rooms is 37.5%.

Table XXIII

A Summary of Pupil Station Utilization by Buildings of Existing Pupil Stations and of Potential Capacity for all Periods of the Day and for Periods Actually Used

Room	Present schedule	Pupil stations 8 periods	Pupil stations actual	Potential capacity 8 periods	Potential capacity actual
1-Minutes per week	4800	19200	4800	8000	2000
Per cent of utilization		25%	100%	60%	240%
2-Minutes per week	11040	25600	16640	36800	23920
Per cent of utilization		43.13%	66.35%	30%	46.15%
3-Minutes per week	4800	19200	4800	19200	4800
Per cent of utilization		25%	100%	25%	100%
4-Minutes per week	9200	32000	20000	72000	45000
Per cent of utilization		28.75%	46%	12.78%	20.44%
5-Minutes per week	11400	38400	19200	64000	32000
Per cent of utilization		29.7%	59.4%	17.81%	35.62%
6-Minutes per week	2960	12800	1920	11200	1680
Per cent of utilization		23.13%	154.16%	26.43%	176.19%
7-Minutes per week	2400	16000	4000	19200	4800
Per cent of utilization		15%	60%	12.5%	50%
Total for all rooms	46600	163200	71360	230400	114200
Per cent of utilization		28.55%	65.3%	20.23%	40.81%

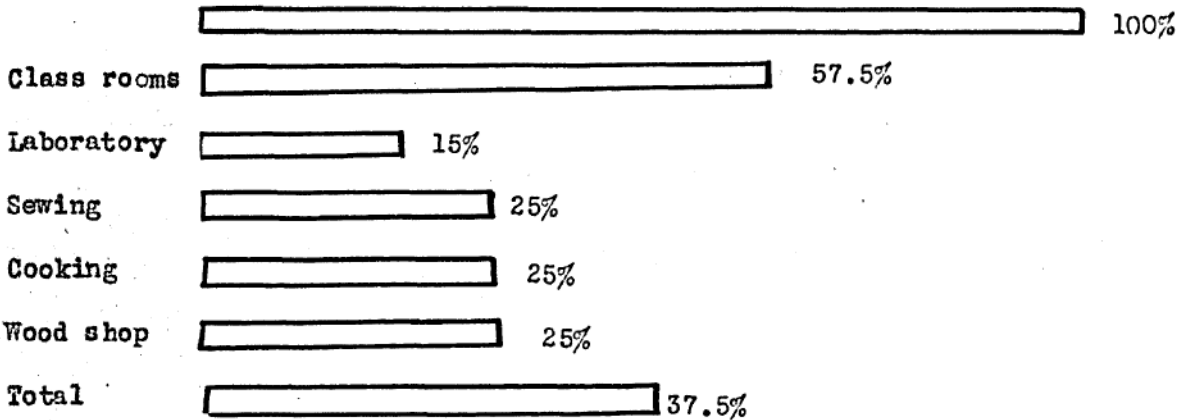
Table XXIV

Percentage of Room Utilization for Each Type of Room, Building L

Rooms	Number per wk.									Total		Per Cent
		1	2	3	4	5	6	7	8	No.	Occu.	
Class rooms	15	11	13	5	15	10	5	10	10	120	69	57.5
Labor- atory	5	2	2	2						40	6	15
Sew- ing	5					5	5			40	10	25
Cook- ing	5			5	5					40	10	25
Wood - shop	5			5	5					40	10	25
Total	35	13	15	17	15	10	10	10	10	280	105	37.5

No.-number of rooms per week
Occu.-rooms occupied per week

A Graphic Presentation of Utilization for Each Type of Room



Building M

Building M has nine rooms which are being used for instructional purposes. The rooms belong to the following types:

Room 1-----Commerce
 Rooms 2, 3, and 7-----Class rooms
 Room 4-----Laboratory
 Room 5-----Music
 Room 6-----Sewing
 Room 8-----Cooking
 Room 9-----Wood shop

Building M uses a seven period schedule with periods as follows:

1st period-----60 minutes
 2nd period-----60 minutes
 3rd period-----80 minutes
 4th period-----40 minutes
 5th, 6th, and 7th periods each 40 minutes.

Pupil station utilization for seven periods.

The lowest percentage of utilization is 15.79% and the highest is 62.2%. The percentage of utilization for all the rooms is 42.31%. Room eight has one eighty minute class a day. Room seven has two sixty minute classes a day. Room nine has two forty minute classes a day. The explanation for the low percentage is that the rooms are not used for all the periods of the day.

Pupil station utilization for periods used.

The lowest percent of utilization is 56.04% and the highest is 116.66%. The percentage of utilization for all the rooms is 77.26% which is fairly high. All of the rooms are used pretty well up to and in some cases above their capacity except rooms three and five. Room three has two small classes and room five has four small classes.

Potential capacity utilization for seven periods.

The lowest per cent of utilization is 18.95% and the highest is 71.43%. The percentage of utilization for all the rooms is 30.34%. Room one is seated far below its potential capacity. It is used up to its present seating capacity for the periods it is used. Room five is also seated far below its potential capacity. The same is true of room seven. Not only are some of these rooms seated below their potential capacity but rooms seven, eight, and nine are used for less than half the time.

Potential capacity utilization for periods used.

The lowest per cent of utilization is 19.75% and the highest is 104.4%. Room four is both seated and used beyond its potential capacity. The per cent of utilization for all the rooms is 54.41%. Room five has a very low utilization because of its small classes.

Building M has an enrollment of more than 100. It yet has the potential capacity to take care of more students. Some of the rooms are used only a small part of the day and some of the classes

are below the capacity of the room. The percentage of utilization of the potential capacity of the rooms in this building is 30.34% and the utilization of the present pupil stations is 42.31%. These are both low and mean a great waste of space.

Percentage of room utilization.

The lowest percentage of utilization is 14.3% and the highest is 100%. The percentage of utilization for all the rooms is 50.8% . The cooking room is used a very small part of the time. The same is true of the wood shop.

Table XXV

A Summary of Pupil Station Utilization by Buildings of Existing Pupil Stations and of Potential Capacity for all Periods of the Day and for Periods Actually Used

Room	Present schedule	Pupil stations 7 periods	Pupil stations actual	Potential capacity 7 periods	Potential capacity actual
1-Minutes per week	12600	26600	12600	66500	31500
Per cent of utilization		47.37%	100%	18.95%	40%
2-Minutes per week	30200	57000	39000	45600	31200
Per cent of utilization		52.98%	77.44%	66.23%	96.79%
3-Minutes per week	21600	60800	35200	55100	31900
Per cent of utilization		35.53%	61.36%	39.2%	67.71%
4-Minutes per week	28500	45600	31200	39900	27300
Per cent of utilization		62.2%	91.35%	71.43%	104.4%
5-Minutes per week	18100	32300	32300	91200	91200
Per cent of utilization		56.04%	56.04%	19.75%	19.75%
6-Minutes per week	8600	22800	12000	34200	18000
Per cent of utilization		37.72%	71.67%	25.15%	47.78%
7-Minutes per week	14700	43700	13800	89300	28200
Per cent of utilization		33.64%	106.52%	16.46%	52.13%
8-Minutes per week	5600	22800	4800	26600	5600
Per cent of utilization		24.56%	116.66%	21.05%	100%
9-Minutes per week	4800	30400	6400	28500	6000
Per cent of utilization		15.79%	75%	16.48%	80%
Total for all rooms	144700	342000	187300	476900	270900
Per cent of utilization		42.31%	77.26%	30.34%	53.41%

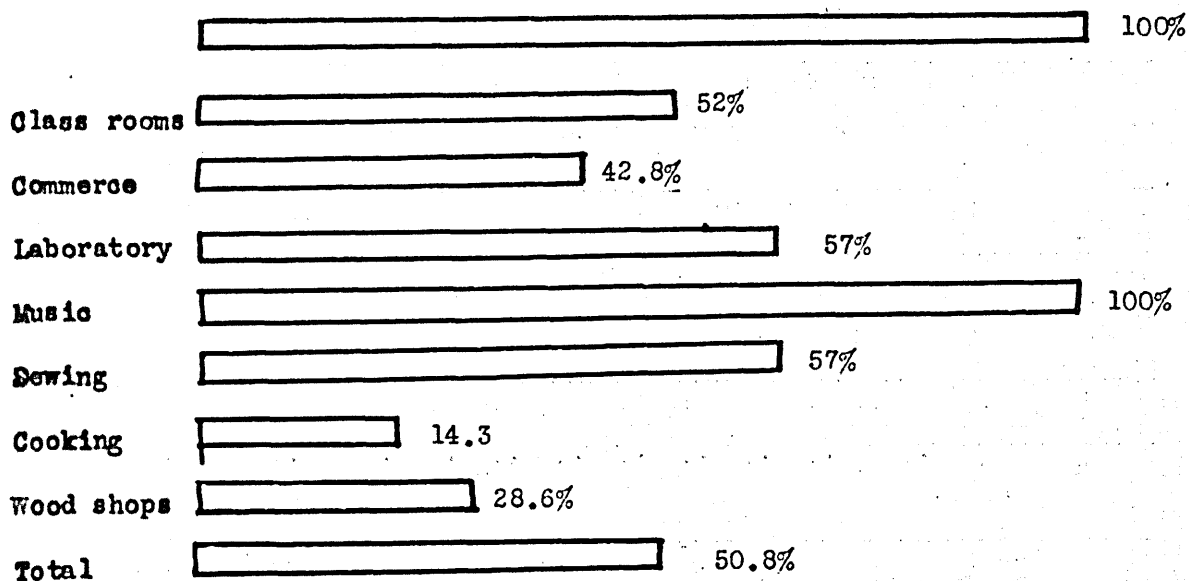
Table XXVI

Percentage of Room Utilization for Each Type of Room, Building M

Rooms Class	Number per wk.								Total No.	Total Occu.	Per cent
		1	2	3	4	5	6	7			
rooms	15	15	10		15	10	5		105	55	52
Com- merce	5		5	5		5			35	15	42.8
Labor- atory	5	5	5	5	5				35	20	57
Mus- ic	5	5	5	5	5	5	5		35	35	100
Sew- ing	5		5		5	5	5		35	20	57
Cook- ing	5		5						35	5	14.3
Wood- shops	5					5	5		35	10	28.6
Total	45	25	30	20	30	30	20	5	315	160	50.8

No.-number of rooms per week
Occu.-rooms occupied per week

A Graphic Presentation of Utilization for Each Type of Rooms



Building N

Building N has four rooms that are being used for instructional purposes. The rooms belong to the following types:

Room 1-----Science

Room 2-----Cooking

Room 3, and 4-----Class rooms

Building N uses an eight period schedule and forty minutes to the period.

Pupil station utilization for eight periods.

The lowest percentage of utilization is 37.5% and the highest is 63.7%.

The percentage of utilization for all the rooms is 46.72%. Room number three is used only four periods a day. The same is also true of rooms number one and four. The classes in room number two are small as compared with the number of pupil stations in the room.

Pupil station utilization for periods used.

The lowest percentage of utilization is 66.6% and the highest is

127.5%. The percentage of utilization for all the rooms is 84.76%.

Room number one is being used by classes larger than its pupil station capacity.

Potential capacity utilization for eight periods.

The lowest percentage of utilization is 25% and the highest is 44.4%.

The percentage of utilization for all the rooms is 31.91%. The present

pupil stations in rooms one, two, and three are all below the potential capacity of the rooms. Rooms one, three, and four are being used only four periods a day. Potential utilization is low where the present pupil stations in the room are not equal to its potential capacity and the rooms are not used. Three of these rooms are standing idle 50% of the time.

Potential capacity utilization for periods used.

The lowest percentage of utilization is 42.1% and the highest is 88.8%. The percentage of utilization for all the rooms is 57.41%. These rooms are not being used to their capacity.

The rooms in this building are standing idle very nearly 50% of the time. Room two is being used for other purposes than cooking thus helping to hold its percentage of utilization to a higher level. The percentage of utilization of the potential capacity of the rooms in this building is 31.91% and the utilization of the present pupil stations is 46.72%. These are both low and mean that the building is standing idle a good part of the time. A larger enrollment would increase the utilization of this building.

Percentage of room utilization.

The class rooms and laboratory have a utilization of 50% and the cooking room has a utilization of 75%. The cooking room is used for classes other than cooking and so has a higher percentage. The percentage of utilization for all rooms is 56.3%. The enrollment in this school is small and the school is located within six miles of another school.

Table XXVII

A Summary of Pupil Station Utilization by Buildings, of Existing Pupil Stations and of Potential Capacity for all Periods of the Day and for Periods Actually Used

Room	Present schedule	Pupil stations 8 periods	Pupil stations actual	Potential capacity 8 periods	Potential capacity actual
1-Minutes per week	10200	16000	8000	33600	16800
Per cent of utilization		63.7%	127.5%	30.36%	60.7%
2-Minutes per week	9600	19200	14400	30400	22800
Per cent of utilization		50%	66.6%	31.6%	42.1%
3-Minutes per week	10800	28800	14400	43200	21600
Per cent of utilization		37.5%	75%	25%	50%
4-Minutes per week	12800	28800	14400	28800	14400
Per cent of utilization		44.4%	88.8%	44.4%	88.8%
Total min. of rooms	43400	92800	51200	136000	75600
Per cent of utilization		46.72%	84.76%	31.91%	57.41%

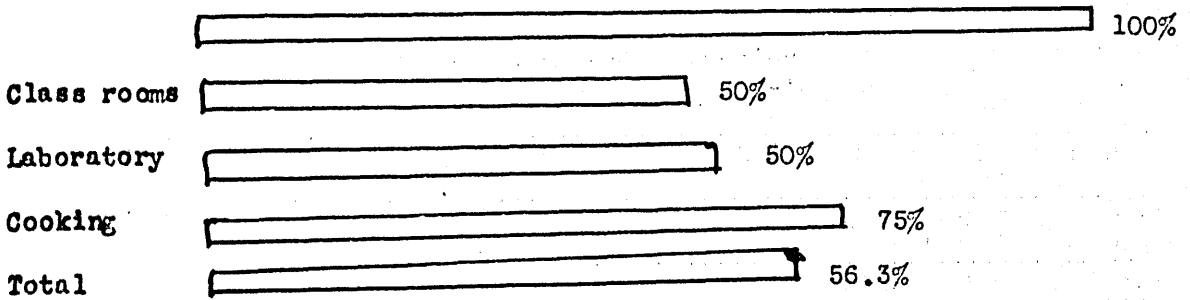
Table XXVIII

Percentage of Room Utilization for Each Type of Room, Building N

Rooms	Number per wk.									Total		Per cent
		1	2	3	4	5	6	7	8	No.	Occu.	
Class rooms	10	10	5	10		5	5	5		80	40	50
Labor- atory	5		5		5	5		5		40	20	50
Cook- ing	5	5	5	5	5	5	5			40	30	75
Total	20	15	15	15	10	15	10	10		160	90	56.3

No.-number of rooms per week
 Occu.-rooms occupied per week

A Graphic Presentation of Utilization for Each Type of Room



Chapter IV

Factors Likely to Affect Utilization

Size of room--Large rooms are as likely to be used as smaller rooms but are less likely to be used to capacity. Small rooms are less likely to be used, but when they are used will be used up to or beyond their capacity. Most of the rooms in this study are under used rather than over-used. There is very little uniformity in size among the rooms used in this study. Rooms vary from very small to very large. The rooms in this study may be grouped as follows:

Area in sq. ft.	number of rooms	area in sq. ft.	number of rooms
50-100	1	400-450	15
100-150	1	450-500	15
150-200	2	500-550	13
200-250	0	550-600	13
250-300	10	600-650	4
300-350	5	650-700	2
350-400	7	700-750	6

Types of rooms--The rooms in this study have been grouped into eight types on the basis of their equipment. Both room and pupil station utilization is affected by the uses to which the room may be put. The uses to which these rooms in this study are put are summarized below.

Table XXIX

Types of Classrooms in which Different Subjects Meet for Recitation,
for the Fourteen Schools of this Study

	Class rooms	Com- merce	Science	Labor- atory	Music	Sew- ing	Cook- ing	Wood shops	Others
Eng. I	14					1		1	
Eng. II	12							1	
Eng. III	13								
Eng. IV	3								
Journalism	1								
Pub. Speak.	1								
Amer. Hist.	9							1	
Eur. Hist.	10			2	1	1			
Citizenship	4								
Sociology	6						1		
Social Civics	3			2					
Prob. of Amer. Dem.				1					
Economics		1		2		2			
Physiology	2			1					
Physics	3		3	10					
Agriculture	3		2	3					
Biology	1		1	3					
Gen. Science	1		1	6			1		
Phys. Geog.	1			1					
Algebra	11		1	1				1	
Geometry	10		1	2					
Arithmetic	1	1		1					
Solid Geom.	1								
Spanish	3					1			
Latin I	4								
Latin II	3					1			
Accounting	3	3		1		3			
Bus. Arith.	3	1				1			
Com. Law	3		1						
Com. Geog.	1								
Shorthand	1	1				1			
Business Practice	1								
Typewriting		8							
Penmanship		1							
Methods	2					1			
Psychology	2								
Reviews	4					1			
Music	2			1	2				
Voc. Agr.	3			1					
Foods						1	13		
Clothing						9	4		
Home Living						1			
Manual Tr.									9
	145	16	10	38	3	24	19	13	

Table XXX

Number of Rooms by Types, Number of Subjects Taught in Each Room and Number of Classes in Each Type of Room for the fourteen Schools in This Study

Type of room	Number of rooms in each type	Number of subjects Taught in Each Type of room	Number of Classes in Each Type of room
Class rooms	35	35	145
Commerce	9	7	16
Science	3	7	10
Laboratories	12	16	38
Music	2	2	3
Sewing	10	13	24
Cooking	13	4	19
Wood shops	9	5	12

A large number of subjects are taught in class rooms.

Proportionately, more subjects are taught in laboratories than in class rooms. There is a tendency for the laboratories to be used beyond their capacity while in use because the classes other than strictly laboratory classes are beyond the capacity of the room. The cooking, wood-shop, and music rooms have the smallest number of classes proportionately. Cooking and wood shop rooms have a specialized type of equipment that do not lend themselves to other uses. Sewing rooms may be used for accounting rooms, class rooms, in addition to their uses as a sewing room.

Size of class--In the study of the utilization of both pupil stations and rooms it was noticed that many of the classes were small. This is due largely to small enrollment and a large number of offerings in the schedule.

Table XXXI

Size of the Classes Taught in the Rooms of Schools Included in this Study

Size of Class	Number in this size
33-36	1
30-33	7
27-30	3
24-27	13
21-24	19
18-21	35
15-18	54
12-15	77
9-12	72
6-9	67
3-6	35
1-3	1
Total number	384
Median size class	12.66

The median size class for all the classes held in the fourteen schools is 12.66.

In order that we may compare the size of class and the number of pupil stations for the rooms in this study the number of pupil stations in each room have been thrown into a frequency distribution.

Table XXXII

Pupil Stations	Number of rooms
39-42	2
36-39	0
33-36	2
30-33	6
27-30	2
24-27	14
21-24	7
18-21	7
15-18	16
12-15	23
9-12	7
6-9	7
3-6	1
1-3	0
Total	94
Median	16.31

The median number of pupil stations for all rooms is 16.31. The median size of class was 12.66. There are 15 pupil stations below 12. Step 12-15 contains 23 pupil stations, hence there are $23/3$ or $7 \frac{2}{3}$ pupil stations per scale unit. $7 \frac{2}{3} \times .66 = 5.06$. 15 plus 5.06 or 20.06 of the pupil stations fall below 12.66, the class median. $94 - 20.06 = 73.94$ accordingly, $\frac{73.94}{90}$ or 82 plus the percent of the pupil stations reach or exceed the median score of the size of class.

Comparing in the same way the size of class and the potential capacity of all the rooms, the computed number of pupil stations for the potential capacity of each room is as follows:

Table XXXIII

Distribution of Potential Capacity Stations for 94 rooms in this study

Potential Capacity	Number of rooms
48-51	94
45-48	2
42-45	3
39-42	4
36-39	2
33-36	6
30-33	9
27-30	7
24-27	5
21-24	6
18-21	7
15-18	11
12-15	18
9-12	4
6-9	7
3-6	1
1-3	0
Total	94
Median	20.57

The median number of pupil stations for the potential capacity of the rooms is 20.57. The median of the size of class is 12.66. There are 12 pupil stations below 12. Step 12-15 contains

The lowest per cent glass area is of floor area is less than 5% and the highest is over 30%. The median per cent is 14.27 per cent of floor area. Seventy-two or nearly 77 per cent of the rooms are below a minimum standard of 20 to 25 percent.

Table XXXV

Location of windows in 94 Classrooms of this Study

Location of windows	Class rooms	Com-merce	Sci-ence	Labor-atory	Music	Sew-ing	Cook-ing	Wood-shops	Others
East	9	2	1	4		3	3	3	1
North	7	4				2	4	4	
South	14	2	1	7		6	7	5	
West	13	4	1	4	2	1	5	3	
Left	27	5	1	1					
Right	3		1		1				
Back	2	1							

Twenty six rooms have windows on the east, twenty-one on the north side, forty two on the south side, and thirty three on the west side.

Thirty-three of the rooms have the source of light on the left of the pupil, five on the right of the pupil, and three at the back of the pupil.

The type of equipment makes it impossible to locate the source of light in all the rooms.

Table XXXVI

Distribution of light Outlets for 94 Schoolrooms of this Study

Light outlets	Class rooms	Com-merce	Sci-ence	Labor-atory	Music	Sew-ing	Cook-ing	Wood-shops	Others
6	1							1	
5									
4	2	2		1			2	3	
3									
2	8	2		3	1	4	7	4	
1	24	5	3	8	1	6	4	1	1

Fifty-three rooms have one light outlet; twenty-nine have two; ten have four, and two have six.

Floor location.--Basement, attic, or other poorly constructed rooms are likely to have poor lighting or poor heating facilities or to be otherwise unattractive and used only because better rooms are not available.

Table XXXVII

Floor Location of 94 School Rooms of this Study

	Class rooms	Com-merce	Sci-ence	Labor-atory	Music	Sew-ing	Cook-ing	Wood-shops	Others
Basement	3	1		3		2	8	6	
1st floor	13		2	4	1	2	3	3	
2nd floor	18	7		4	1	4			1
3rd floor	1		1	1		1	1		
Attic						1	1		
Stair landing		1							

Type of heat--Eighty-two of the rooms are heated with steam,--Seven with hot air, five with coal stoves and one with an oil stove. Coal stoves and oil stoves are fire hazards and should not be tolerated in the modern school.

Table XXXIX (Cont.)

Width	Class rooms	Com- merce	Sci- ence	Labor- atory	Music	Sew- ing	Cook- ing	Wood shops	Others
50								1	
48				1					
47	2	1		1		1	1		
44	1								
42	7	2	2	2	1	3	2	2	1
40	10	3		2		4	4	3	
38	4			1					
36	10	2	1	4			5	2	
35	1				1	1	1		
30				1					
Height from floor									
44	1	1			1				
42	1			1					
40		1		1				1	
38	1					1		1	
37	3			1			1	1	
36	9	2	1	4		1	4	2	
35						2	1		
34	6		1	1	1	1	2	1	1
33	4	1							
32	6	2	1	2		3	2	1	
30	1	1		2		1	1	1	
28							1		
26	3						1		

Chapter V

Summary and Conclusions

In the preceding chapters, data on the room and pupil station utilization of fourteen school buildings of Kansas are presented and interpreted. Some space has been given to some factors that have a bearing on utilization of rooms and of pupil stations.

This chapter summarizes the findings of this study.

Percentage of utilization for:

1. Pupil stations utilization for all periods.
2. Pupil station utilization for periods rooms are used.
3. Potential capacity utilization for all periods.
4. Potential capacity utilization for periods rooms are used.

Building	I	II	III	IV
	Pupil stations all periods	Pupil stations actual	Potential capacity all periods	Potential capacity actual
A	44.74%	72.88%	36.74%	59.68%
B	42.73%	75.24%	27.77%	46.24%
C	28.42%	58.65%	24.98%	49.40%
D	32.13%	57.28%	31.34%	58.12%
E	33.04%	43.52%	29.65%	41.96%
F	61.08%	76.24%	44.79%	55.84%
G	54.17%	73.81%	44.86%	57.45%
H	40.45%	72.54%	30.43%	52.20%
I	38.42%	70.65%	38.02%	73.49%
J	23.25%	57.48%	20.43%	47.91%
K	34.61%	65.35%	27.42%	53.23%
L	28.55%	65.30%	20.23%	40.81%
M	42.31%	77.26%	30.34%	53.41%
N	46.72%	84.76%	31.91%	57.41%
Percentage of utilization for all buildings in this study	37.9%	67.64%	30.58%	53.33%

I. Pupil station utilization for all periods for all rooms by buildings. The lowest percentage of utilization is 23.25% and the highest is 61.08%. The percentage of utilization for all rooms is 37.19%.

II. Pupil station utilization for all rooms by buildings for periods used. The lowest percentage of utilization is 43.52% and the highest is 44.86%. The percentage of utilization for all rooms is 67.64%.

III. Potential capacity utilization for all rooms by buildings for all periods. The lowest percentage of utilization is 20.23% and the highest is 44.86%. The percentage of utilization for all rooms is 30.58%.

IV. Potential capacity utilization for all rooms by buildings for periods used. The lowest percentage of utilization is 40.81% and the highest is 73.49%. The percentage of utilization for all rooms is 53.33%.

A second summarization is given for the types of rooms. There is a variation between types of rooms.

Summary of Pupil Station Utilization

	Present schedule	P.S. all periods	P.S. actual	Potential all periods	Potential actual
Class rooms	543600	1345900	887120	1756600	1145060
% of util.		40.4%	61.27%	30.95%	37.47%
Commerce	67800	167400	91400	343300	185900
% of util.		40.5%	74.17%	19.78%	36.47%
Science	27080	94400	34320	120000	46000
% of util.		28.69%	78.9%	22.57%	58.87%
Laboratory	149540	313600	172560	254300	134780
% of util.		47.68%	86.66%	58.80%	110.95%
Music	22500	80300	44300	144000	104400
% of util.		28.02%	42.33%	15.63%	21.55%
Sewing	81600	266000	134800	235800	124800
% of util.		30.68%	60.53%	34.61%	65.38%
Cooking	88000	272400	105600	277800	110000
% of util.		32.31%	83.33%	31.68%	80%
Wood shops	54000	165200	58800	229500	87800
% of util.		32.69%	91.84%	23.53%	61.50%
Others	0	24000	0	20800	0
% of util.		0	0	0	0
Total	1034120	2729200	1528900	3382100	1938740
% of util.		37.9%	67.64%	30.58%	53.33%

Pupil station utilization for types of rooms for all periods. The lowest percentage of utilization is 28.02% for music rooms and the highest is 47.68% for laboratories. Science, sewing, cooking, and wood shop rooms are all very low.

Pupil station utilization for types of rooms for periods used. The lowest percentage of utilization is 42.33% for music rooms and the highest is 91.84%. Class rooms are third from the bottom while the special equipped rooms are at the top. These rooms are used very nearly to capacity while they are being used. Other classes held in these special rooms give them a higher percentage of utilization.

Potential utilization for types of rooms for all periods. The lowest is 15.63% for music rooms and the highest is 58.80% for laboratories.

Potential utilization for types of rooms for periods used. The lowest percentage of utilization is 21.55% for music rooms and the highest is 110.95% for laboratories. Music rooms are utilized the least while laboratories are the highest. Other classes are being held in laboratories which helps to give them a high percentage. Special types of rooms are utilized to higher degree or periods used but are low for all periods.

The variation in percentage of pupil station utilization may be seen below.

Per cent of utilization	Pupil stations all periods	Pupil stations actual	Potential capacity all periods	Potential capacity actual
230-240				1
220-230				
210-220				
200-210				
190-200				1
180-190				1
170-180				1
160-170				1
150-160		1		1
140-150		1		1
130-140				2
120-130		3		
110-120		1		4
100-110	1	16	2	4
90-100		7	2	1
80-90		10		8
70-80	5	12	4	8
60-70	3	13	2	11
50-60	14	16	5	12
40-50	17	7	11	20
30-40	21	5	18	11
20-30	19	1	26	3
10-20	9		18	3
0-10	5	1	6	1
Total	94	94	94	94
Median	36.66	73.3	28.85	57.33

Pupil station utilization for all periods vary from less than 10% to more than 100% with a median of 36.66%. Pupil station utilization for periods used varies from less than 10% to more than 150% with a median of 73.3%.

Potential capacity utilization for all periods varies from less than 10% to over 100%, with a median utilization of 28.85%. Potential capacity utilization for periods used varies from less than 10% to 240% with a median of 57.33%.

A second part of this study is the collection and interpretation of data for computing room utilization of the rooms studied. We cannot expect to utilize pupil stations to full capacity for the room must be large enough to take care of the largest class that will be held in that room. Idle rooms are wasted. The summary of room utilization for types of the rooms in this study is given below.

Summary of Room Utilization by Type

Type of Room	Number of rooms per week	Number of rooms occupied	Per cent occupied
Class rooms	1300	852	65.54
Commerce	355	200	56.34
Science	80	26	32.50
Laboratories	505	239	47.32
Music	75	45	60.
Sewing	395	182	46.08
Cooking	505	185	36.63
Wood shops	345	130	37.68
Others	40	0	0

The lowest percentage of utilization is 32.50% for science rooms and the highest is 65.54% for class rooms. One building has a room that is not used at all and is not considered in the statement made above. The percentage of utilization for all the rooms in this study is 52.13%. This means that the rooms of this study are idle very nearly 50% of the time.

As a means of comparison for the buildings used in this study the room utilization for buildings have been summarized.

Conclusions

1. The percentage of utilization of the existing pupil stations for the full number of periods per week for the rooms of this study is 37.9%.
2. The percentage of utilization of the existing pupil stations for the actual number of periods per week the rooms are used is 67.64%.
3. The percentage of utilization of the potential capacity of the room for the full numbers of periods per week the rooms of this study may be used is 30.58%.
4. The percentage of utilization of the potential capacity of the rooms for the actual number of periods the rooms are used is 53.33%.
5. The percentage of utilization of the rooms in the buildings studied is 52.13%.
6. Percentages of room utilization and pupil station utilization may be affected or greatly influenced by certain factors, chief among which are: degree to which the building is adjusted to the educational program, the physical desirability of the rooms, the type of equipment, whether rooms and equipment are used for other purposes than those for which they are primarily designed, size of

the class, lighting of the room, floor location, type of heat, location with reference to other schools, and the relation of the number of rooms to the enrollment of the school.

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