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ABSTRACT

The importance of long-term planning, and undesirable conditions resulting from failure to plan, are stressed. General procedures named as essential are--(1) the official approval of the Board of Education before the administration proceeds with long-range planning, (2) the design of the school plant around the educational program it is to serve, (3) determination of school enrollments, (4) determination of plant needs, (5) appraisal of existing facilities, (6) formulation of a master plan, including a list of present and projected buildings, a time schedule for all identified construction needs, a list of needed sites and site improvements, and cost estimates, (7) estimation of costs and appraisal of resources--the final step to avoid compromising the quality and adequacy of a projected program by over-concern for costs. The guide includes charts for making a population projection and for planning a program of school plant construction. (BD)

UTAH STATE BOARD OF EDUCATION

Research Report

PLANNING A PROGRAM OF SCHOOL PLANT CONSTRUCTION

School Plant Planning Series

PLANNING A PROGRAM OF SCHOOL PLANT CONSTRUCTION

Revised 1965

LEGISLATIVE MANDATE
Section 53-11-3(3) UCA 1953
as Amended

FOREWORD

An inherent part of any educational program is the provision of facilities. In order to assure the wise use of money in the provision of school facilities, it is necessary that a program of long-range planning take place before the construction of school facilities begins.

It must be understood that the physical facilities provided will have a lasting effect upon the educational program to be provided; therefore, it is necessary that consideration be given to the development of a program prior to the construction of any school facilities.

The legislature in the State of Utah has placed the responsibility upon the State Board of Education to establish rules and regulations covering the procedures to be used and data to be considered in determining school plant needs of the school districts within the state.

With these ideas in mind, this publication is presented as a partial fulfillment of these responsibilities. It must be recognized only as a guide to be used in development of programs meeting the local conditions. This should allow for the exercise of competent professional freedom on the local level.

One of the major responsibilities of a school district is the provision for physical facilities in which the educational program can be carried out. This responsibility for school plant administration is always present in the total task of school administration. The most desirable way to meet it is to view it as a continuing, organized program of scheduled activities and assigned responsibilities. This necessitates projecting a planned program over a period of years on a district-wide basis. The importance of this phase of the administration of a school district is emphasized by the following factors:

1. The effect that the school plant has upon the total educational program. It is widely accepted that the quality of the educational program is enhanced by adequate physical resources. An attractive up-to-date school plant contributes to greater efficiency and more success in attaining the educational objectives.
2. The investment in school plants is a substantial capital investment of public money. It is estimated that the annual investment in the United States is from three and one-half to four billion dollars.
3. The factor that school houses are substantially permanent buildings, with life expectancy of approximately fifty years, necessitates good planning to prevent obsolescence and educational hardships from developing before the normal life expectancy of the building is reached.

Failure to meet this responsibility by long-range planning of district-wide school plant programs generally leads to undesirable conditions such as: (1) maintenance of uneconomical school centers; (2) retardation of desirable organized attendance areas; (3) depriving children of well-rounded educational

opportunities equal to those enjoyed by children in better-organized programs; (4) development of community complications over partiality being shown to one area; (5) misunderstandings and community rivalry affecting the outcome of bond issues; (6) costly duplication of physical facilities; (7) division of available resources between projects so that the resultant physical facilities are inadequate.

In many cases these conditions are already present, having been developed over a period of years. In such circumstances, steps toward the solution must start with the existing conditions. This makes the immediate achievement of the ideal almost impossible. Sufficient long-range planning started at any point, however, and carried on consistently over a period of time can be counted on to eventually solve these problems.

Even when a planned program is developed, it should be considered only as a basis for continued evaluation and replanning. As mentioned before, a school plant planning program should be a continuous process calling for systematic evaluation and review from year to year.

It is inevitable that planned programs for different school districts will vary greatly, but the procedures followed and the steps taken in carrying out the procedures tend to be more uniform. At least six general procedures may be named as essential. These are: (1) approval for long-range planning; (2) identification and description of the educational program to be offered; (3) determination of the number of children according to residence in the various age-grade categories to be housed - current and projected; (4) determination of needed physical facilities and the location; (5) appraisal of existing school plants and their locations; (6) formulation of master plan for the program of

the school plant construction to meet the above needs; (7) estimation of costs and appraisal of resources.

Approval

Before the administration proceeds with long-range planning, they should have the official approval of the district board of education. It is the responsibility of the administration to bring this before the board, and to support the idea with sufficient data to give the board an understanding of the problem and the necessity for undertaking such a program. The types of data used to support such a program could include present enrollments, enrollment trends established by study of at least the past five years, the adequacy and limitations of existing school plants to house the educational program, the degree of obsolescence in existing school plants, and the utilization of available space.

All of these areas will receive intensive study as a long-range plan proceeds, but enough should be presented to make the board feel secure in the adoption of the program.

The administration should also outline at this time, the possible organization needed to carry out the planning program. There seems to be no preconceived or universally adopted organization for such an undertaking. The administration in recommending an organization should be sensitive to and understand the inter-community relationships as well as the role of various organizations and agencies, and in many cases, individual influential citizens.

One of the accepted ways of bringing community relationships and attitudes of organized groups into the program is the organization of a lay citizen

advisory committee. Some cautions need to be observed in the establishment of such a committee:

1. The caution should be emphasized that the group is merely advisory to the school board, and that they have no legal authority to take action on a program for the school district. They may, however, in their advisory capacity make recommendations to the school board. Care should be exercised, however, to let these groups feel that their role is needed and that they are important. Above all, they should not feel that they are being handed something that has been predetermined and adopted, and that their role is merely that of a figurehead. It would be better not to have such a committee than to have one under these circumstances.
2. The membership of the committee should be representative of a cross section of the geographical, economic, sociological and political structure of the school district.
3. The above may indicate a fairly large committee. If this is the case, it is usually advisable to have a small executive committee function to direct the activities of the committee as a whole. As an essential part of this committee and of the executive committee, the administration and leadership of the district should be represented. They should be careful, however, not to dominate the committee or unduly impose their thinking upon the committee.

As the committee begins to function, it may be desirable to call in persons from outside the school district to aid them in research, in understanding, and in discovering sources of information not readily available within the school district. Such resource people will generally come from other educational agencies

such as state departments, universities, or other school districts.

The administration in submitting data supporting approval of the planning program does not need to have complete details. They should outline the program and organization only in general terms. If the idea is approved, the details can be worked out according to the needs of the program. Other parts of the organization - such as staff involvement, professional consultants, the role of the school board, etc., should also be outlined in general terms for consideration in the adoption of a planning program.

THE EDUCATIONAL PROGRAM

Perhaps the cardinal principle of school plant planning should be that the school plant is designed around the educational program it is to serve. The first step in the development of an educational program is the formulation of a statement of educational philosophy. The philosophy should include the objectives which indicate the aims and purposes of the educational program of the district. This should also include a description of the educational program and how it is to be organized. The development of the philosophy, and the description of the educational program required to implement this philosophy and objectives is the basis for the development of the educational specifications for a given school plant.

It is not intended that the long-range planning group should enter into a comprehensive study of curriculum. Their aim is to formulate reference points for making decisions about school plant needs. They should do no more in their statement of philosophy and educational objectives than is necessary for the formulation of a long-range program of school plant needs.

Detailed decisions as to school organization, location of school plants, etc., can best be made after the first decisions have been reached as to what is to go into the educational program.

Determination of School Enrollments

With the development of an educational program, the next necessary steps would be the determination of the pupil population to be involved.

A partial answer to this question would be found in the present enrollments at each grade level and location of the individual residence. The second part of the answer could be found by use of annual census data of pre-school age children and their location of residence. Still a third part would be in anticipating future trends and enrollments. This is a complex and somewhat speculative endeavor. There are many factors that affect this picture.

The basic factor in any population picture is the birth rate - that is the number of children born each year per thousand population. It is equally important to understand the mortality rate for children from birth through the school age. Some other factors that should be considered are compulsory school attendance, the rate of school dropouts, per cent of students attending non-public schools, possibilities of annexation of additional geographic areas, economic and industrial expansion or retraction which affect the population and the migration trend to the type of community served by the school district. It is quite evident that in arriving at an anticipated school population with any degree of accuracy requires consideration of all these factors directly or indirectly. Many of them will of necessity have to be based on some subjunctive judgments; however, in most cases, if the planning group look for it, they can find reliable data that will indicate the effect that each of these factors

will have on school enrollment trends. Because of the speculative nature of such predictions, the error increases rapidly - generally beyond the first five years of such a project. Chamberland and Crawford[1] found that there is a definite relationship between the accuracy of the prediction and the time factor - the shorter the interval of time, the more accurate the prediction.

There are three major types of population projections - the mathematical, component, and symptomatic. Perhaps the most common in use is the mathematical approach. This assumes that what has happened in the past few years establishes a pattern for the future. It is usually easy to gather enrollment data for the past five years and then by mathematical means, compute the rate of growth and project this rate into the future. A sample of this type of projection is found on the following chart. It is computed by finding the per cent of change for each year of the five-year period. This average rate of change is then used to multiply the enrollment for the preceding year in projecting each year into the future up to a five-year period.

This method in itself does not take into account factors of sudden changes in economic conditions, industrial development or shutdowns or other such extraneous components that may have an affect on the school enrollments.

This brings us to the second type of projection based on various components. This system starts with the present enrollment data and the speculations on such things as birth and mortality rates, changes in industrial and economic conditions, the type of community and other sociological conditions

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[1]Chamberland, I. M. and Crawford, A. B., The Prediction of Population and School Enrollment in the School Survey. Bulletin of the Bureau of School Service; Lexington; College of Education, University of Kentucky, March 1952.

Form CSBP - 1

School District _____ Date _____

CONTINUING SCHOOL BUILDING PROGRAM
DISTRICT WIDE POPULATION PROJECTION

(1) Age or Grade	(2) No.	(3) No.	(4) No.	(5) No.	(6) No.	(7) Ave. %	(8) No.	(9) No.	(10) No.	(11) No.	(12) No.
0-1 year old											
1 year old											
2 year old											
3 year old											
4 year old											
5 year old											
Winter Kgn.											
1st grade											
2nd grade											
3rd grade											
4th grade											
5th grade											
6th grade											
7th grade											
8th grade											
9th grade											
10th grade											
11th grade											
12th grade											
TOTALS: 1-6											
7-9											
10-12											
TOTAL											

Note: Insert the figures denoting the respective school years in the column headings. The figures in Column 6 should be for the current year; in case the yearly ADM is not yet known, use the figures from the most recent report from schools in the district.

that may cause either an influx or an outgo of school population. It would seem that a combination of the mathematical approach, and the application of some major components would bring about the most accurate analysis of future school enrollments.

There are other approaches to enrollment projections based on symptomatic data - such as number of new telephones installed, rate of new homes being built, even increases in banking deposits are sometimes used as indicators of population growth.

Each of these techniques has some advantages and have produced some reliable predictions. It is safe to say that no one best way has been accepted. It is important that the enrollment predictions be made as accurate as possible, and that they be subject to constant review and adjustment.

When planning a building program, it may be advisable to make detailed enrollment-trend predictions in each school attendance area. Spot maps of the school population and pre-school children are very helpful in guiding a planning group. They are difficult to make and are subject to adjustments even while being developed, but they are necessary to show population spread and migration data. They are invaluable aids in predicting future enrollments.

DETERMINATION OF PLANT NEEDS

There comes a time when we must consider all the facts about numbers of students to be enrolled, everything known about the educational program, all that we know about children and how they learn, what we know about teachers and administrators and how they work. These factors must be merged into a clear concept and spelled out in terms of space and facilities.

This is a crucial period in the program. It is a time when all alternatives are considered and vital judgments made. This is the point of translation from theory to concrete practical ideas. From this point on, the ideas begin to take shape on the architect's drawing board. When the number of students to be enrolled have been merged with the educational program, it becomes a matter of mathematics to compute the spaces needed in terms of how many and what kind of instructional areas, general-use areas, and special-use areas that need to be provided. As we look at the work of teachers, administrators, etc., the number and type of administrative and professional preparation areas that must be provided can be determined. The identification of new plant needs will depend upon a careful appraisal of existing facilities together with a very careful study of population projections and population spot map analysis.

Three important things should be done at this time: (1) make a list of the total amount of instructional areas needed according to the school population projections and educational program; (2) make a similar list of all special-use and general-use rooms; (3) make a similar list for all administrative and staff needs.

In determining the total amount of instructional areas needed, the following criteria should be observed for each child to be housed at any one given time for instructional purposes. For kindergarten children - 40 to 50 square feet per child; for first-grade children - 35 to 40 square feet per child; for second-grade children - 30 to 35 square feet per child; and grades above the second grade - 25 to 30 square feet per child. The amount of space required for special-use and general-use rooms as well as administrative and staff needs will depend upon the local educational program, and hence, no specific square foot dimensions are prescribed; however, the following guides may be used as directions to be adapted to the local educational program.

Libraries - Instructional-Material Centers

The trend today is away from the traditional concept of libraries as such to an instructional-material center. This facility includes not only the reading room and stacks of books of the traditional concept, but also has control, storage and management of supplementary materials and aids of all kinds, and includes office space, workrooms and conference rooms in addition to the traditional library room. Its space organization, interior finish and furniture should be designed to produce a friendly, informal, and attractive climate. The library reading room should provide 25 to 30 square feet per student for 15 to 20 per cent of the students enrolled in the school. The other necessary facilities for storage, conference room, office and workrooms should be in addition to this. Flexibility should be the guide in the design of space and selection of furniture.

Auditorium

There seems to be a growing acceptance of the value of activities on the auditorium stage. From the educational point of view, the major emphasis should be placed on the stage area. This does not detract from the values of listening and viewing, but indicates the real values learned through the activity of performance and stage craft. The size of the auditorium will vary with the school philosophy. The trend is in one of two directions - either to seat the entire student enrollment or to seat one-half of the student enrollment. It is suggested that a school auditorium beyond a seating capacity of 1,500 is not desirable, and therefore, in schools with enrollments above this, recommendation would be to seat one-half the student body. The suggested space allotment for seating should be about eight square foot per seat if

seats are in straight rows, and one extra square foot per seat if curved rows. The auditorium stage should have at least a 30 foot front opening with a stage depth of 25 feet. The side wings of the auditorium stage should contain one and one-half times as much space as the stage itself. The auditorium should have dressing rooms and restroom facilities either as a part of the auditorium or adjacent to it so that easy access from the stage to these facilities is provided without having to pass through the auditorium itself.

Administrative and Faculty Areas

The administrative suite is the focal point of all that goes on in the plant. It should allow for:

1. General office (size to be determined by the number of employees to work in it, and by the equipment to be installed).
2. Waiting space
3. General office supply room
4. Record vault
5. Workroom for duplicating activities
6. Office for principal - offices for assistant principals
7. Storage room for school supplies
8. Storage room for books
9. Conference room
10. Space for console and public address control
11. Office and waiting space for attendance employees
12. Facilities for staff comfort and convenience

Teacher lunch and restroom facilities should be provided, and in addition, one or more teacher workrooms should be included in the plant.

A health center with examination, waiting and restroom facilities should be included.

A guidance facility should include the following items:

1. Reception and waiting space
2. Counseling offices
3. Conference room
4. Testing lab
5. Storage facilities

Custodial facilities should include a custodial workshop, storeroom for materials and equipment, an area for receiving and shipping, a custodial locker room and small-supplies closet at various points in the school equipped with a sink and running water.

Restroom facilities should provide one water closet for each 25 girls, one water closet for each 50 boys, one urinal for each 30 boys, one washbasin for each 50 pupils with tempered water in one faucet.

The school should provide one drinking fountain for each 75 pupils. Drinking fountains should not be attached to sink faucets nor located in restrooms.

If the school has a food-service program, adequate space for preparation for food, storage, dishwashing, staff dressing rooms and restrooms should be provided in addition to adequate space for actual lunchroom activities.

The amount of space involved in corridors and other service areas will be determined by the design of the building and educational specifications.

APPRAISAL OF EXISTING FACILITIES

As the needs have been established as outlined above, the district should proceed to serve existing plants and determine how adequate they are for meeting current and future needs. It is advisable to have some outside professional consultants help in the careful appraisal of existing facilities. Usually one of the many evaluating instruments such as McClery's guide for evaluating school buildings; O'Dell's standard for elementary and secondary schools; and the Holly Arnold School Building Evaluation sheet are used. These instruments are subjective in nature even though qualitative and quantitative descriptions guide the score of each item. They do give a fairly good idea of school status based normally on a total maximum-point score of 1,000 points with 850 or more being excellent; 700 to 849 above average; 550 to 699 average; 400 to 549 below average and below 400 points as unsatisfactory. After this appraisal has been made, the board, with the help of spot-population maps, should make decisions on the existing plants to be abandoned, plants to be retained, additions to be made, remodeling and rehabilitation work to be done. They should also show the grades to be housed and number of children to be enrolled in each plant.

The next task is to establish what new plants will be needed with grades to be housed and students enrolled.

FORMULATION OF THE MASTER PLAN

Formulation of the master plan for the program of school plant construction should not be too difficult if the three procedures discussed above have been

carried out fully and carefully. This procedure as here envisioned consists of the making of a master plan of the needed construction. This plan may be put into a format which allows it to be seen in one glance. Desirably this master chart should contain the following as a minimum:

a. A list of present schools showing any planned changes in grade organization; and any planned additions or modifications through remodeling or rehabilitation.

b. A list of new construction projects, indicating their definiteness and the urgency of their need.

c. A time schedule of all the identified construction needs (including additions, remodeling and rehabilitation, and new buildings).

d. A list of needed site acquisitions and site improvements.

e. Cost estimates of all identified needs.

As stated above it is a good idea to design a master chart so that the lists named above may be entered and viewed at a single glance. The form appearing below is offered as a suggestion for local adaptation. The content of this form is self-explanatory. It is recognized, of course, that it may not be possible to give all of the projects in a long-range program equally specific identity - identity as to size, type, location and time of need. Nevertheless, all projects should be listed.

ESTIMATION OF COSTS AND APPRAISAL OF RESOURCES

There are good reasons for naming as the final procedure in projecting a long-range program of school plant needs the estimation of costs and appraisal of resources. First, cost estimates cannot be made until needs have

MASTER PLAN FOR THE PROGRAM OF SCHOOL PLANT CONSTRUCTION

(1) PROJECTS (List Separately)	(2) Should Be Ready for Occupancy by:	(3) Reason for Proj.	(4) Grades to be Taught in This Project	(5) Nature of Projects & Estimated Cost (insert est.)	(6)	(7)
		Relieve Overcrowding				
		Provide for Enrollment Increase				
		Replace Obsolete Buildings				
		Make Exist. Facil. More Adequate				
				Complete New Plant Exclusive of Site $		
				New Building on Site Now Used as School Center $		
				Addition to Existing Building $		
				Remodeling or Rehabilitation of Old Building $		
				New Site; Addition to Site; Improvement of Site $		
					Total Estimated Cost of Project $	
						Number of Pupils Benefitted

been identified in some detail. And second, an over-anxious concern to keep the program within a predetermined cost level may compromise the quality and adequacy of the projected program. It is better to formulate the program on the basis of reasonable and defensible criteria, and then take stock of resources. If reductions in the program are found to be necessary, the reductions can be made more intelligently and with least loss to the long-time value and economy of the program.

Close estimates of costs can be made only after preliminary drawings and outline specifications have been prepared for a particular project. It is essential to recognize, then, in estimating the costs of a projected program that the required capital outlay can only be roughly approximated.

It is relatively much easier to determine the available capital outlay resources. Bonding capacity can be scheduled for the forecast period. The annual tax yield for capital outlay can also be forecast with reasonable reliability. Resources for capital outlay can be placed parallel with the construction schedule and gaps can readily be noted. Only then can firm decisions be made with respect to particular construction projects.