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An Assessment of the Utilization of Permanent and Temporary Classrooms as It Relates to Cost and Efficiency in Selected School Divisions

E. Carlton Bowyer
Old Dominion University

AN ASSESSMENT OF THE UTILIZATION OF PERMANENT AND TEMPORARY CLASSROOMS AS IT RELATES TO COST AND EFFICIENCY IN SELECTED SCHOOL DIVISIONS

by

E. Carlton Bowyer

A.B. 1960, Wofford College
M.S. 1967, Old Dominion University
C.A.S. 1971, Old Dominion University

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Approved by:

Franklin Ross Jones,
Dissertation Chair

Member

Concentration Area Graduate
Program Director

Member

Dean, College of Education

ABSTRACT

AN ASSESSMENT OF THE UTILIZATION OF PERMANENT AND TEMPORARY CLASSROOMS AS IT RELATES TO COST AND EFFICIENCY IN SELECTED SCHOOL DIVISIONS

E. Carlton Bowyer
Old Dominion University, 1990
Director: Dr. Franklin Ross Jones

In the mid-1900s there were over eighty thousand public school buildings in the United States housing approximately thirty-nine million pupils. Many were constructed thirty or forty years earlier and have approached the end of their useful life without requiring major retrofitting or replacement. Rising construction costs prompt school systems to investigate alternative means of housing rapidly growing student populations. This study traced the historical background of the school facility and the development of school construction relative to the function of education.

The focus of this study was to ascertain the current use of temporary and permanent housing in the fifty largest school systems in the United States. The protocol for this dissertation required the study of certain systems through the categories of: (1) demographics, (2) facilities, (3) finance, (4) rationale for decision making, and (5) curriculum and instruction.

An examination of the economy and efficiency relating to school construction formed the basis of the study along with the investigation of decision-making criteria. It was anticipated that policy might be established for public school systems dependent on the data derived from the study as it relates to temporary and permanent housing.

Parametric and non-parametric statistical measures were applied to the data via a t-test and the Wilcoxon Matched-Pairs instrument respectively where it is germane to the thesis. The confidence level for rejection was set at the .05 level. Data has been displayed by combination tables in tabular form and an analysis is presented.

Significant differences in construction costs between temporary and permanent facilities exist in the responding school divisions. The null hypothesis number one states there is no statistically significant difference between the cost efficient utilization of permanent and temporary classrooms. The number one null hypothesis was rejected at the .05 level of significance. The mean cost difference in square foot costs between permanent and temporary facilities was $37.70 per square foot.

Hypothesis number two states that there is no statistically significant difference between the curriculum utilization in permanent classroom housing and temporary housing. The Wilcoxon Test of Matched Pairs was employed with this hypothesis. The null was not rejected. The critical value for rejection at the .05 level of significance was

W(s)>183. The test statistic was W(s)=34. Therefore, the null was accepted.

In summary, it was determined that there is a statistically significant difference in square foot cost between permanent and temporary facilities in the responding school systems. It was further determined that there was no statistically significant difference between the curriculum utilization in permanent and temporary facilities in the responding school systems.

The use of temporary school facilities was especially pronounced in the sunbelt states of Florida, California, and Texas. Building codes are becoming more strict and in some states, such as California, seismic requirements must be met. Additionally, the State of California mandates that 30% of all state funds provided for school construction be spent on temporary facilities. Decision criteria for determining the use of permanent or temporary units include aesthetics, mandates, economy and land available. The upgrading of building codes, mandated funding, cost increases and efforts to reduce class size are factors that will probably play major roles in establishing policy that pertains to the use of temporary facilities.

ACKNOWLEDGEMENTS

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TABLE OF CONTENTS

APPENDIX

LIST OF FIGURES

LIST OF TABLES

CHAPTER I

INTRODUCTION

The increasing fiscal demands on localities to provide new school facilities has become a major educational problem. Decisions to retrofit or replace those facilities that have reached or are approaching forty years of age will involve major capital outlays. The impact of the financial burden that communities and states will experience by retrofitting or constructing new facilities will be significant. The specter of this financial burden has prompted a renewed interest in exploring alternative means of housing students. School districts that have a decided need to retrofit, replace, or construct additional new facilities will face this fiscal demand and will need to investigate alternatives.

School districts facing rising construction costs, reduced funding from the state, and little or no assistance in the form of federal funding sources for capital outlay must explore alternative means of housing student populations. Tax increases are not palatable and it is estimated that billions of dollars will be needed during the next decade to provide the classrooms necessary to house public school students. The need for funds which, in many instances, require voter approval of bond referendum

campaigns prompted this researcher to study the utilization of temporary classrooms in the fifty largest school districts in the United States.[1] Factors such as the economy, rate of growth during the past three years, number of temporary classrooms currently utilized, average number of years in use, cost and rationale for building type were assessed to determine if perhaps temporary classrooms were cost effective and efficient for curriculum delivery in housing student populations.

Background of the Study

Housing public school students in the United States has placed an increasing fiscal burden on local school districts. The problem confronting school boards is the difficulty of finding a means for funding additional classroom facilities at a time when construction costs have doubled over the last ten years. This phenomenon has jeopardized many local school boards' ability to provide adequate housing for many of the over thirty-nine million students now in our public school systems.[2]

Traditional construction costs have mushroomed over the past decade. Land is becoming increasingly scarce and expensive. Square foot costs for school construction currently range from approximately $88.00 to $86.00 for elementary and secondary schools, respectively, depending on the various construction regions. Capital outlays for school construction normally come from charter or referendum bonds

and city and school systems vie for available funds. This renders large outlays for new construction even less palatable when charter monies are limited through legislation. School districts experiencing growth usually carry on bond referendum campaigns in order to convince voters of the need for new facilities. This can be quite perplexing in communities with a large number of residents on fixed incomes. Additionally, most local governments prefer that school boards carry on political campaigns for funding, leaving other revenue sources available for city services which are not as readily saleable to the general public through referendum campaigns.

Such circumstances prompted the Virginia Beach City Public Schools to investigate the use of temporary housing as an alternative to permanent construction. The findings resulting from this study are significant.[3] The decision was made to determine if other selected school districts were utilizing temporary units and under which circumstances as identified in the research instrument. School districts experiencing enrollment declines or a need to retrofit older facilities may benefit by initiating new approaches to the housing of students.

Traditionally, declining enrollments do not necessarily eliminate the need to provide student classrooms. The age and condition of facilities as it pertains to curriculum delivery are also the determining factors in whether or not

to provide new facilities or retrofit older ones. Both are expensive propositions with new elementary, junior, and senior high schools costing $88.00, $86.00, and $86.00 per square foot respectively.[4] Retrofitting is extremely expensive because of the demolition, and the difficulty in various construction trades gaining access to the construction areas. Moreover, space is oftentimes no longer adequate to carry on specified instruction programs to enhance teaching. Code requirements for fire and the handicapped also are not grandfathered and some facilities are not conducive to retrofitting. The leasing and rental of temporary units are sometimes utilized, but usually only for the short term to meet the need temporarily. The significant cost differences between temporary housing and permanent construction is an attractive factor when decisions regarding the housing of students have to be made. High land costs have also made temporary classroom units more appealing. Additionally, when land is not available, the idea of adding cost effective classrooms adjacent to existing facilities without purchasing additional land is extremely attractive.

The placement of temporary units is a relatively simple task and this, coupled with speed of construction, can save considerable construction dollars. Contractors have documented that time is a major cost factor in the construction industry. School districts needing last minute housing capabilities may also seek relief through this

important time/speed factor. This research may provide alternatives for housing students in school systems where funding sources are limited and pupil populations are increasing or new construction is necessary.

Statement of the Problem

In the mid 1980's there were over eighty thousand public school buildings housing about thirty-nine million pupils.[5] Many of these school buildings were constructed thirty to forty years ago to accommodate the many children after World War II. These buildings have reached or soon will reach the end of their useful life. Replacement, refurbishment, additions and modernizing existing structures will become necessary.[6] At the same time, construction cost has increased, and allied with the local tax burdens in rapidly growing school systems, there is the possibility of sudden enrollment declines which prompts consideration for the most cost effective alternative in housing. The focus of school finance in the late eighties has been aimed at savings in construction cost and flexibility in the use of space.[7]

The focus of this investigation is to examine the utilization of permanent and temporary classrooms in providing school facilities in the fifty largest public school systems in the United States. Interfaced with the problem of ascertaining the status of building needs in America's largest school systems is that of assessing the funding practicality as it relates to cost and efficiency.

The study's focus is to examine: (1) the current cost of temporary and permanent classrooms in the fifty largest school systems in the United States, (2) the effect on the curriculum delivery in utilizing permanent and temporary school housing.

Additionally, the study will investigate, according to location and size of school system, the following: (1) economic aspects and rate of growth during the past three years; (2) the number of temporary and permanent buildings and the average number of years in use; (3) anticipated new facilities--temporary and permanent; and (4) the rationale for building type--permanent or temporary. Finally, a summary of the explanations and comments is provided as they relate to items presented above.

Beyond the facets of this study, there is the implication for policy. Public school systems may benefit from such policy. The implications relate to efficiency and economy as the yard stick for construction of school facilities. For instance, school systems that experience little population growth may face demand for reduced class size. Class size mandates create a need for temporary school housing which affords expeditious facilitation opportunity and one that is consonant with financial capability of most school divisions.

Definition of Terms

For the purpose of the study, the operational

definitions are:

1. Permanent Classrooms - Classrooms attached to a permanent facility or included in a school plan which has a basic infrastructure provided at the time of construction and cannot be relocated from one area to another.
2. Temporary Classrooms - Classrooms that may or may not have a basic infrastructure. They are adequate in size and configuration to meet appropriate mandates for curriculum delivery and housing, and can be relocated to another site.
3. Cost - The projected cost amount per square foot to provide equivalent classroom space for housing students, either permanent or temporary.
4. Efficiency - The ability to deliver standard curriculum/subject areas assigned to the existing temporary or permanent classroom units with little or no affect.
5. Infrastructure - All amenities, i.e., water, sewer, roads, walkways, etc., that are normally provided with new permanent construction.
6. Curriculum Delivery - The ability to deliver a standard core curriculum within the confines of a standard temporary or permanent classroom with approximate equivalent space.

Design of the Study

The principal instrument of data collection for this

study was the analytical survey. A self-report was obtained from the fifty largest school systems in the United States. A pilot study intended to obtain information on the adequacy of the survey was also utilized. Additionally, telephone interviews were conducted to clarify and quantify any data that were unclear in the survey. Data gathered from the survey will encompass demographics, facilities, finance, rationale for building type, and curriculum and instruction.

The study will focus on cost and efficiency. Cost will pertain to differences in square foot cost between temporary and permanent classroom construction. Efficiency is examined in the context of curriculum delivery within the temporary and permanent structures. The size of school system will be noted and the economic conditions and growth rates over the past three years recorded. The numbers of temporary and permanent buildings and the average number of years in use will be obtained. The reason for determining the type of building utilized will be examined. The factors involved are: demographics, facilities, finance, rationale for building type, and curriculum and instruction. The study is designed principally to ascertain an answer to the question of the practicality in efficiently delivering a variety of curricula and their specially related facilities.

Finally, the essential element of this research is organized to provide an answer to the question of whether temporary school housing is as economical as permanent school

housing. Research will also determine whether the curriculum can be efficiently delivered with the utilization of temporary school housing and in permanent school housing. The challenge to these questions is stated as a null hypothesis effected by the use of parametric and nonparametric statistics as analyzed through the t-test statistic and the Wilcoxon Matched-Pairs Test.

Limitations of the Study

This study sampled the fifty largest school districts in the United States at the time this project was presented and approved in 1989. The survey instrument was sent to the superintendents of the fifty largest school systems in the United States. Virginia Beach was included along with the other respondents. Data will be presented in Chapter IV of the study.

The study was restricted to the fifty largest urban school districts and, therefore, many relatively large school systems were not sampled. An additional problem of some concern is the fact that the survey instrument in some instances was completed by school facility planning personnel with varying degrees of educational background and knowledge of school facilities and finance. This could reflect differential responses to the survey and perhaps bias in some way the answers given.

The data collection was dependent upon the willingness of the school districts to respond to the survey and provide the

requested data. Approximately one in five school systems did not respond to the survey. One can only conjecture what the information would reveal concerning temporary and permanent school housing and those associated activities, i.e., finance, curriculum, use, etc., in the systems not responding. Considerable confidence exists in the ultimate meaning of the data due to the reception of seventy-eight percent completed returns. Telephone interviews were conducted with some school districts which provided information that appeared conflicting or incomplete.

Although a pilot survey revealed a general adequacy of the survey, some data from the respondents were incomplete, e.g., in some instances numbers of permanent buildings listed were not congruent with the student populations. Likewise, square foot costs in one instance appeared to be outrageous. Hawaii Public Schools, for instance, included all mandated infrastructure into the square foot building costs. One might infer that the instrument failed to elicit the requested information. In instances where data were unclear, telephone interviews were conducted in order to clarify the responses.

A final limitation, but not necessarily crucial, was the fact that no response was received from the New York City Public Schools, the largest school system in the United States. On the other hand, the second, third, and fourth sized school systems did participate in the survey. The

broad sample of thirty-nine of fifty school districts responding lends credence to the validity of the data.

Significance of the Study

School buildings are generally getting older. Most of the nation's fifty largest public school systems experienced growth ranging from 0.1 percent to 9.4 percent between the fall of 1986 to 1988. Educators must discover new and creative ways of providing economical classroom space which meets the needs of today's modern curriculum.[8] Educational construction in the United States rose to $12.46 billion in 1988, an increase of $1.5 billion over 1987. School districts accounted for $7.9 billion including $2.9 billion for new buildings, $2.7 billion for additions to existing structures, and $2.3 billion for upgrading existing structures. Of the $1.5 billion increase in total construction spending, school districts accounted for almost $1.3 billion.[9]

School boards and administrators will face heavy responsibilities and exciting challenges in the future. Since facilities are shaped by education, and in many ways shape education, school facility planners share in these challenges and responsibilities.[10] The capacity of cooperation for a common cause and for a common purpose has been a formidable power in the hands of the people in this country from the time of the early settlers' first settlements on the Atlantic seaboard to the recent Freedom

March in Alabama. Cooperation has been the source of social energy that created and shaped institutions, nurtured learning, and opened doors to new and greater opportunities for successive generations of people. Leadership which has proven to be instrumental in bringing this power of cooperation to bear in a constructive manner on the basic problems is the greatest and most enduring contribution to the well-being of the country.[11]

The people of this country are looking to the schools for a contribution in developing a reservoir of creative power. Cost effective schools must be one of the major priorities. Perfecting skills needed to meet and deal with the responsibility for challenges arising on the forefront of cultural change is a responsibility naturally and appropriately assumed.

In-depth studies that are dealing with alternative ways to provide cost effective and efficient means of housing students in classrooms must be effected. Such data must be available to school superintendents, facility planners, and school boards who have charges to provide cost effective and efficient housing for their school districts. This study should provide data to assist the professional educators in making informed decisions to meet and accomplish their charges.

Value of the Study

School districts are facing burgeoning costs for new

construction. Funding sources are limited and existing facilities are in need of replacement or retrofitting. The need to explore alternative methods for housing students is evident.

This study should serve as a basis for formulating policy that has ramifications for public school systems in providing housing for students in an efficient and economical way. The study explores the cost and efficiency of temporary classrooms as an alternative to permanent school construction. School boards and school administrators may be provided with data to assist them in being informed consumers, a basic charge for the positions they hold.

The data derived from this research should enable school districts to profit from the experiences of other districts. School district decision makers may discover the versatility of temporary housing and be encouraged to use it. At least it should prompt further investigation into the cost and efficiency of temporary versus permanent school housing.

Organization of the Dissertation

Chapter I of this study examines the background for this research project and introduces the problem of the study. The significance of the study and the limitations of the study are presented. Additionally, the definitions of terms are also presented in Chapter I.

Chapter II of the study provides a history of permanent school housing and its evolution. Covered also, are a brief

history of temporary housing and some legislative and legal aspects regarding temporary housing.

Chapter III presents the methodology of the study. A research survey was piloted to determine the validity of the questionnaire survey. The fifty largest school systems in the United States were then surveyed to determine the extent of the temporary classroom use. Additionally, telephone interviews were conducted with selected school systems congruent with the written survey to clarify specific data. The primary method of analysis is through descriptive tables used to exhibit the relative data configuration derived from the survey. Both parametric (t-test) and non-parametric (Wilcoxon Matched-Pairs Test) statistics were employed.

Chapter IV presents the data derived from the survey instrument and interviews. Information on demographics, facilities, finance, rationale for selection, and curriculum and instruction are presented in tabular form utilizing parametric and non-parametric statistics.

Chapter V presents the summary of the literature and findings and the conclusions which were drawn from an analysis of the data which were obtained from the survey. Finally, recommendations will be made as to further use of the data and the elements derived from the study which have universal application.

This chapter provides an overview of the study. Background of the study, statement of the problem, definitions of

terms, and design of the study are presented. The limitations of the study, significance of the study, and value of the study are also outlined.

The organization of the dissertation is to acquaint the reader with the organizational context of the dissertation. The study should provide school boards and school administrators with data sufficient to become informed consumers in providing cost effective and efficient classroom space for students.

ENDNOTES

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7. C. William Burbaker. Facilities Planning Outlooks. *American Schools and Universities 59 (1986)*: 30-31.

8. Education USA, (1988), 10.

9. *American School and University*, (May 1989): 32.

10. Report of the AASA Commission on School Buildings. *Schools for America.* (Washington, D.C.: American Association of School Administrators, 1987), 2.

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CHAPTER II

REVIEW OF THE LITERATURE

This chapter presents the review of the literature. Although many articles and publications exist on school facilities, there is a limited amount of research data available on the use of permanent versus temporary classroom space. The lack of data was good news to the researcher and adds to the significance of the study, since it is hoped that this research will be a possible basis for establishing policy in public schools investigating needed alternatives in the housing of students. A history of school buildings and their evolvement into more sophisticated facilities, the legal aspects of temporary classrooms and current status of temporary classrooms are included.

A Historical Perspective of School Buildings

Educators and architects presently envision the school building as a structural envelope that houses the desired educational program. The structural envelope concept is relatively new and gained national prominence immediately following World War II. Prior to this time, a school building was essentially a shelter in which pupils and teachers assembled. Books and lecture-discussion method were the

primary vehicles of learning in those days.[1]

A brief review of the history of school buildings is quite revealing. During the Hellenistic Era (500 B.C. - 200 B.C.), there were no school buildings as we know them today. Instruction was generally conducted in the open air, sometimes in the shadow of a temple or in an enclosure that would barely protect the students from the elements.[2] The meeting place of the students was incidental to the instructional process.

American school buildings, as we see them today, are relatively new on the educational scene. Seventeenth and eighteenth century American schoolhouses had progressed very little beyond the ancient Greek notion that they were basically shelters in which pupils and teachers came together. They did include some furniture, benches and tables for the pupils and a podium for the teacher.[3] Naturally, some exceptions existed and some school districts, such as Philadelphia, had quite sophisticated buildings in the early eighteenth century.

In 1787 Congress passed the famous Northwest Ordinance. This law provided that the sixteenth section of every township in the western lands was to be reserved for the maintenance of schools. The ordinance contained the following statement of purpose which has come to be regarded as a kind of charter for public education in the United States: "Religion, morality, and knowledge being necessary to good

government and the happiness of mankind, schools and the means of education shall be forever encouraged."[4]

When and why did the schoolhouse become important and significant in American education? Over 150 years ago, reformers began to claim that the schoolhouse was fundamental to the education of the young.[5] The schoolhouse was considered a temple of learning for every child by men like Horace Mann, and Jacob Riis.[6]

In public education the importance of school design became an article of faith and an educational imperative as soon as the need for a reliable system of mass education was realized. At first Americans turned to the British for architectural ideas. Organized according to the methods of the English school reformer Joseph Lancaster, public schools in New York and Philadelphia in the early nineteenth century contained schoolrooms large enough to accommodate more than 250 pupils. But such numbers soon proved to be unmanageable, and by the 1830s a search was underway for structural alternatives. In Prussia schoolhouses were subdivided into many separate classrooms, a characteristic noticed, no doubt, by such Americans who visited there as Horace Mann. No less subject to the nationalism of the Jacksonian era than others, educators sought to develop indigenous schoolhouse plans and ideas. The American Institute of Instruction published a discourse on "The Construction and Furnishing of School-rooms and School Apparatus" in 1830 and one year later awarded a

twenty-dollar prize to the reformer William A. Alcott for his entry in a contest to find the best essay on school architecture and classroom design. But it was Horace Mann and his colleague from Connecticut, Henry Barnard, who insisted that Americans build better schoolhouses, arguing that school buildings should be carefully planned and that educators should initiate such a trend. In a supplement to his first annual report as secretary of the Massachusetts Board of Education, Mann said that schoolhouse design was closely connected to study, proficiency, health, anatomical formation interests. First published as a series of articles between 1838 and 1840, *School Architecture* by Henry Barnard became a classic in the nineteenth century, popularizing the idea of a "close connection" between education and school design.

School authorities in Boston acted on the ideas of Mann and Barnard in the 1840s. As part of an overall drive for efficiency and competence, whose general shape David Tyack has described, they introduced graded instruction at the Quincy grammar school in the fall of 1847 and facilitated its implementation by means of an architectural innovation. Unlike other schools, which contained one or two large study halls with a seat for every pupil, the Quincy schoolhouse was divided into a dozen separate, self-contained classrooms. Such a layout made possible the closer supervision of students and greater specialization of instruction. The Boston School Committee adopted standard specifications for

grammar schoolhouses based on the Quincy plan, and by 1855 every grammar school in the city was subdivided into self-contained classrooms. Primary schools received similar treatment five years later. At the request of the Committee on Public Instruction of the Boston City Council a uniform plan was approved, featuring classrooms twenty-eight feet square with desks for fifty-six pupils.

Following Boston's example, many urban school districts reorganized their instructional space in the mid-nineteenth century. Schoolhouses with several separate classrooms for students alike in age and achievement appeared in Philadelphia as early as 1848, while in St. Louis there were nine such buildings by the end of the 1850s. The Chicago Board of Education adopted the Quincy plan in 1866, and according to Henry Barnard's *American Journal of Education*, it was the model for many schools built in San Francisco, New Orleans, New Haven, Louisville, and Cincinnati. Among major cities only New York continued to erect schoolhouses with large study halls and complementary recitation rooms. The presence of a large heterogeneous student body persuaded many urban educators to adopt the new design, and it, in turn, encouraged the view that a well-planned environment contributed to a better education.

Outside urban areas the Quincy plan was not as popular in the nineteenth century. As late as 1920 there were still about two hundred thousand one-room schoolhouses in the

United States. But even in rural American a well-built schoolhouse could enhance the learning process, or so T. H. Burrowes, Charles P. Dwyer, and Samuel Eleveth assumed when they published rural school pattern books between 1855 and 1870. In an influential volume entitled *Country School-Houses*, which appeared in 1859, James Johonnot advocated age-graded instruction and the architectural planning needed to make it work.

Support for better schoolhouses arose in part from the depressing even unhealthful, condition of many public schools. It was unpleasant to work in buildings without adequate light, heat, air, space, or sanitation, but in such counterproductive surroundings many educators felt a special distress because they understood themselves to be community leaders charged with protecting nothing less than the future of American society. Beginning with the common school reformers, one generation of educators after another complained about the many faults of rural schoolhouse location, construction, and maintenance. City schools were no better. Reiterating what by then had become a familiar theme, the specialist in school hygiene, Fletcher B. Dresslar, observed in 1910 that urban schools were "housed in buildings situated on small lots, hemmed in by other buildings, and immersed in foul air, much dust, and the din of the hurrying multitude." Horace Mann first said that more than anything else such conditions served "to retard the progress of public

education," and for decades most of his professional descendants would not have disagreed. Improving the physical condition of American schools required more than merely an awareness of the problem. Educational leaders said it depended on their being given more control over school planning and construction. In the nineteenth century local boards of education unilaterally decided when, where, and how to erect schools. Staffed by laymen and subject to powerful political pressures, these boards often allowed corruption and incompetence to affect their architectural decisions. Although able to understand and respond to neighborhood conditions, grassroots decision makers were an anachronism in an age increasingly committed to centralized management and expertise. Of course, politics and favoritism resisted reform, especially in the field of school architecture. In the siting of new schools and the assignment of construction contracts too much was at stake to exempt the school building process from assaults on its integrity. But to educators striving for recognition and respect, the practice of school design seemed well suited to centralization and professional control. The real cost of the schoolhouse and its apparent relevance to learning made it a natural candidate for expert planning and oversight, and after 1900 a corps of specialists in school architecture began to emerge.[7]

The earliest school buildings were often makeshift outbuildings, unused barns, chicken coops and wagon sheds.

One abandoned Cape Cod windmill, with its inner machinery removed, served as a schoolhouse for several decades. One school was held in a room over a stone well house at the John Chad Homestead in Chadd's Ford, Pennsylvania, where it still stands as a monument.[8]

Most old county maps indicate all the houses with the names of the owners, and one might be surprised at the number of schoolhouses (usually marked as "S.H.") in any one area. The early one-room schoolhouses were so scattered that students seldom walked more than a mile. An 1850 map of Warren, Connecticut, shows seven schoolhouses within an area of over fifteen miles.[9] Evidence shows that a great number of one-room school buildings were not only adequate but because of their small nature were most efficient.

The idea of a school being within sight of the village was popular in the 1700's for safety reasons. Bears and wolves were common in Pennsylvania and New England, and they frequently roamed the streets during winter. One group of school children in New Hampshire in 1820 were returning from a late school party when they were attacked by a large bear. Six of the children managed to climb a tree only to watch the seventh, a small girl, be devoured by the beast. When Indians attacked Deerfield, Massachusetts, Mrs. Hannah Beaman, the schoolmistress, and her flock were stationed in a remodeled stable, and with the Bible under her arm, she led her class quickly, and just in time, to the fort.[10]

In 1647 the original Massachusetts Colony passed a law, The Old Deluder Satan Act, requiring all parents to teach their children to read; five years later the law was changed requiring each township of fifty families to support a simple reading school, and each township of a hundred families to support a grammar school for college preparation. Additionally, each locality was required to provide a location which, in many instances, were churches, town meeting halls, one-room school houses or other available buildings which some times the communities had to construct.[11] College in those Puritan days, however, was primarily for those contemplating the ministry.

It is true that America's earliest schools were established for religious reasons, mainly so that children could read the Bible and quote from it. And there are those who now violently condemn this idea and criticize the early schools for having been over-religious. Yet without the available church buildings and the abandoned meeting houses, the ministers who doubled as schoolmasters and the only available book which happened to be the Bible, there would have been a whole century in America without any schools at all.[12]

The first southern schoolhouses were log shacks erected in abandoned fields too full of rocks or too over-cultivated for farm use and therefore not taxed. Such property was called an "old field." George Washington attended an old-

field school presided over by an old-field minister from an old-field church. Even in those days, it appears, avoiding taxes was an important trick, and the term "old field" was the popular tax-exempt phrase of the day.[13]

New England schoolhouses were more centrally located, but like the southern old-field buildings, they were often constructed of logs. Instead of separate desks, sticks were driven between the logs in the wall at about a height of four feet and planks were then laid on top, like slanted shelves. Rough planks placed alongside, served as seats. School desks as we know them became standard in the 1800's. The first American school desks were made of wood and were placed upon platforms to separate them from the tamped dirt floor to keep students feet warmer during winter.[14]

The master's desk was on a raised platform, too, at first with its bench attached. One such master's desk was found with a place for resting a birch-rod pointer and there were burned marks beneath the desk proving that the teacher had, at one time, used a coal foot warmer. Many lessons of this period "were heard" around the pot-bellied stove in the winter months.

Heating the classroom was always a major problem. Sometimes with two fireplaces to feed, ten or twelve cords of wood would not last the winter, and the woodshed was frequently as large or even bigger than the schoolhouse itself. The woodshed was often a lean-to attached to the

schoolhouse, but the most accepted arrangement was to place it between the schoolhouse and the privy, with a fence separating the boys' entrance from the girls'. The ancient designation of privy doors was to saw into them a sun (for boys' toilet) and a moon (for girls' toilet). Lack of transportation meant some boys had to walk four or five miles to school.

The students' parents were responsible for heating the old-time classroom, and the student who brought in the least wood usually sat farthest from the fire. It was a rule of the mid-1700's for each scholar to bring in one "load" (half a cord) of good wood for the winter term. As late as 1825 in Hartford, Connecticut areas, the "out country" schools voted that:

> Each scholar shall furnish ten feet of seasoned hardwood, or green walnut or white ash, to be inspected by the master. This wood to be delivered at commencement time, or a penalty of forty cents in money shall thereby be subjected.

Each week a different boy, designated "fire-monitor," opened the schoolhouse, cleared out the spent ashes and started a new fire.[15]

There was little change in the design of school buildings for several decades after the Civil War. While the structures were consciously planned as schools, there is little evidence indicating that any effort was made to relate the design of the structure to the educational function intended for it. By the turn of the twentieth century,

however, a distinctive trend in the design of school building was developing in the more affluent school districts.[16] According to Roth, schools were either castles or palaces and their architectural style either Gothic, Renaissance, or Baroque, or a combination of styles. Whatever their shape or form, they in no way resembled a school in the functional sense. The child's own small size was not taken into consideration, either practically or emotionally. Out-sized entrances, corridors, stairways, seemed to be particularly selected by the architect for his "artistic" effects with the well-meant aim of contributing to the child's education in art.

The influence of classical European architecture was pronounced in the design of a few schools built prior to World War II, but the majority of them were still structures without architectural character. Many looked like large boxes enclosed by red brick walls and covered by a steep slate roof. The large boxes were subdivided into four or eight smaller, uniform cubicles called classrooms. Many times, the attic space under the steep slated roof was finished and used as an assembly hall. At that time, these nondescript schoolhouses undoubtedly represented the best architectural answer to the school housing problem, but again, as Roth points out, neither architects nor educators had a clear understanding of the tasks to be accomplished.[17] Structural alternatives to the spartan construction of the

1800's and 1900's were manifest in New York and Philadelphia. The H-shaped schoolhouse found in New York City around 1891 was equipped with electric lighting, telephones, and, large innovative kindergarten rooms complete with movable furniture.[18]

After 1830, several sophisticated schools were erected in Philadelphia. One facility known as the Samuel B. Morse School was erected in 1867 at a cost of $14,375. The school was compact and frugal, yet it was functional in design.[19] A windfall of surplus reserve distributed in 1837 enabled Philadelphia to construct its new Central High School at a cost of $72,000. Most school buildings were constructed for a third of that amount. The school had an astronomical observatory with telescope. The observatory with telescope was the fourth one ever erected in the United States and perhaps the first ever for use in a high school. Philadelphia Central High School at that time was considered without rival.[20] The school became the model for high schools in the nation when funding could be secured to construct such a building.

The functional school buildings appearing in the 1950's gradually matured and became more refined. Closed-circuit television was either provided at the time when the building was constructed, or conduits were installed so the wiring and equipment could be added later. Study carrels became a standard feature of the well-planned learning resources

center, formerly called the library. Teacher offices or work stations were introduced into many of the middle and high school buildings of advanced design. Carpeting was used more extensively in all school buildings. Lighting standards were almost doubled over a period of twenty-five years. Air conditioning was installed to encourage year-round use of school buildings and to promote learning effectiveness during hot weather. Sound attenuation was given more attention. The hearing environment was improved within the spaces for learning by the wide use of acoustical materials on interior wall surfaces and by designing partitions between classrooms to prevent unwanted sound from entering the learning space.[21]

During the 1960's, there was a great deal of emphasis on windowless schools. The impetus for this feature stemmed from two sources. The first was related to the increased use of air conditioning equipment. Windows produce a significant amount of heat gain due to direct sunlight. Thus, if the amount of glass area could be reduced, the load on air conditioning equipment could be lowered. A few architects designed schools without any windows, while other provided only small vision strips. The second reason for reducing the number of windows was to keep damage due to vandalism in the core cities at a minimum.[22]

In the United States, schooling was thoroughly identified with the special place in which formal teaching

and learning occur. So intimate is the link between schooling and the schoolhouse that in the 1960's "schools without walls" where pupils learn while associating with adults in every day environments, were originally noted as revolutionary.[23] However, the concept was controversial. Opponents of the plan postulated that savings due to the elimination of partitions would be more than offset by the necessity of constructing supplementary audio-visual rooms. They also pointed out that the expected flexibility rarely occurred, once the visual barriers were set in place.

The seventies marked a generation of teaching aids and was considered the period for the beginning of the widespread use of supplementary instructional devices. The development of high-intensity light bulbs inaugurated a new era in projection techniques. The arc lantern was soon replaced by the slide projector, and the movie projector became a common piece of educational equipment. Most schools owned at least one movie projector, which was shared by several teachers in a school building. During this same period, scientists invented the vacuum tube, which made it possible to produce a powerful distortion-free record player suitable for classroom use. Educators exploited these relatively simple educational tools to the maximum.

The responsibility for providing school buildings has historically rested with local districts throughout the United States. A measure of authority in recent years

regarding the planning and construction of school facilities, however, has been exercised by State Departments of Education by the utilization of various regulatory and school plan approval procedures.[24] A wide range of recommended criteria for schoolhouse planning along with the existence of a lack of standardization, with regard to the preparation of education specifications is evident from an examination of literature.[25]

In 1975, George Spera of Rutgers University, surveyed forty-five state guides of public school facilities with the emphasis on planning criteria. Although these guidelines indicated a wide range of criteria, flexibility and community utilizations were also emphasized. After an analysis of these proposed guidelines, Spera developed and submitted eleven planning guidelines, which were recommended as State guidelines, to a jury of nine planning authorities for their assessment. The guidelines classified under flexibility stated the following: (1) flexibility should be incorporated into the design of schoolhouses in order to permit economical and efficient alterations; (2) the flexibility of school building may be enhanced by the selection of school sites which offer ease and economy of expansion; and (3) the flexibility of the schoolhouse design should be implemented through the educational specifications.[26]

DeSimone investigated the relationship between the comprehensiveness of educational facilities planning and

school plant adequacy. No significant statistical differences were found between educational facilities planning and adequacy of school plant. The results of the study indicated that there was a need for further research concerning the relationships between the factors of educational facilities planning and adequacy of school plans.[27] Federal funds were available for purchase or lease of flexible housing in 1966. Their use was suggested to meet shifting enrollment influences.[28]

In 1981, Jeffrey Meadows of the University of Alabama began the development of a manual to evaluate and assess existing school plant facilities. The data were used as barometers to indicate present and future facility needs in relation to enrollment patterns and curricula changes. He concluded that accurate and up-to-date records of educational facilities should be kept. These records should be consulted when planning new facilities and/or remodeling existing educational facilities. In addition, Meadows expressed the need for educational facilities experts nationwide to develop national building standards dependent upon the type of institutions and the students served.[29]

Certain Historical and Legal Aspects of Temporary Classrooms

As the tools and techniques of education evolve and "baby boomers" begin families of their own, there are new demands on education facilities, teachers, and

administrators. School construction, remodeling and retrofitting are once again important issues that school administrators face.[30] Increasingly important due to the economic slow-down is cost of construction, where populations are stable, as in the northeast where there is little interest in temporary school housing. But in rapidly expanding mobile population areas, particularly in the western part of the United States and the south, temporary school housing is increasingly viewed as an alternative.

Temporary classrooms have been used for instructional purposes by public schools in varying degrees for over fifty years. However, only recently have they been used primarily as alternative means of providing student housing. Many of today's temporary classroom vendors have been in business less than twenty years; some, a much shorter period of time. Temporary classroom units were being used in the early 1950's, and the 1960's brought about a significant increase in their use as school divisions attempted to house an ever increasing number of students. However, according to Mr. Kevin Hackey, President of Mobile Modular Office Association, there is little historical data on temporary structures since most companies consider this information proprietary and are reluctant to share what information they have.[31]

John Burgess, President of J. B. Dadts Inc., a California-based firm dealing in temporary housing supported this contention. Few records exist and apparently no

statistics are available. The best estimate of numbers of temporary classroom units in California range from 10,000 to 20,000 statewide. He believes that little available historical information exists.[32] Curry Smith, Comptroller, Roger Carter Corporation, Kingston, North Carolina, indicated that a tremendous increase in the demand for temporary classroom units had occurred during the past two years.[33] Robert Suggs, President, Triple A Custom Builders, Inc., South Hill, Virginia, indicated an upswing in the demand for temporary classrooms about six years ago and stated that the demand has not slowed since that time. The general feeling was that temporary classrooms last as long as most permanent structures before a need to retrofit or replace becomes apparent. All interviewed felt that the quality of the applied maintenance was the most important factor in determining the longevity of temporary units. Some companies now furnish concrete and steel units costing about $50.00 per square foot with permanent-like features.[34]

The passage of Proposition 13 in California, which limited the amount of taxes that could be collected, prompted action.[35] In California, recent legislation (1989) demands that thirty percent of new school construction be temporary and/or modular due to the alleged economic circumstances and the erection time factor. In one school division, Palmdale, California, three schools utilizing temporary housing have been established. One of these schools, Chaparral, opened

with 18 classrooms, a library, cafeteria and music room, all temporary. Recent cost studies for the United States for temporary school housing are not available due to the differential cost of construction in various regions and the recency of this trend.[36]

There is currently a law in California stating that by 1991 all temporary classroom units must meet the Field Act seismic requirements or be removed and be replaced. Such a requirement represents a large and expensive task and is a proposition that must be considered in decision making. Current construction ensures that seismic standards are met and while this converts to cost increases, the time factor should not be affected significantly.[37] State of Virginia Superintendent's Memo No. 225 provides guidelines for relocatable school-housing. The memorandum states that relocatable school-housing is necessarily classified as temporary. The same types of units, installed occasionally for permanent use, are processed like any other permanent project.[38]

The legislating of reduced pupil teacher ratios in Texas has prompted the mandating of temporary classrooms because of the fiscal drain on school districts across the state. More states which provide funds for new school construction may follow California's lead in mandating fund expenditures for temporary classrooms by some percentage in order to lessen the fiscal impact. Alabama has established

procedures and requirements prescribed by the Board of Education and the State Building Commission for all relocatable-type classroom units.[39]

Current Status of Temporary Housing

According to Peter J. Negroni, Superintendent of Schools in Springfield, Massachusetts, temporary classrooms are the answer for immediate space needs. The option to lease or buy provides school districts even more flexibility.[40] Superintendent Richard Willever, West Windsor-Plainsboro Regional School District in New Jersey, states that temporary classrooms have been a rapid solution for a reasonable price. He also noted that the units have been very attractive.[41] The configuration of temporary housing also adds to its flexibility. Concerns over aesthetics may be alleviated by placing the classrooms in modules, giving the appearance of permanent construction, yet retaining the flexibility of movement.

Innovative building design of modular units enabled one school district to cut $32.00 per square foot from anticipated building costs. This allowed the school division to build six schools for the price of five.[42] School officials in Phoenix, Arizona, have coped with unexpected student population shifts by interspersing permanent schools with modular (temporary) ones. Desert Winds Elementary School in a Phoenix suburb was constructed entirely of relocatable modular units.[43]

Government officials and school administrators have endorsed modular technology because of three major benefits: (1) design advantages; (2) upgrade in finishes and; and (3) financing trends. In addition to cost savings, temporary classrooms enable school districts to respond quickly to increased enrollments.[44] A Pennsylvania school district facing an immediate need for additional classroom space at a high school, solved their problem in seven months. A module containing four (4) relocatable classrooms was installed and is considered an attractive addition to the school.[45]

The Pasadena Independent School District in Pasadena, Texas, has approximately 36,600 students and has grown at the rate of 1350 students per year for the past two years. This school district has labeled temporary housing as a means of solving school facility needs and accommodating fluctuating student population.[46] Florida is utilizing relocatable modular classroom units designed to be used when and where needed. Not a surprise when one observes the growth rates throughout the state.[47] Relocatable modular classrooms are valued for their flexibility, speed of occupancy, and economy. Manufacturers advise school districts to seek industry advice when writing specifications for portable classrooms and to deal with reputable companies.[48]

Spurred by the anticipation of burgeoning enrollments and the need for updated facilities, educational construction is booming. *American School & University* projects over $11

billion will be spent from 1989 through 1991 to build new edifices and renovate older structures at the nation's two- and four-year colleges. Not since the early seventies have our campuses experienced such widespread construction activity.

Given its flexibility, relocatability and rapid pace, modular construction is especially compatible with higher education's diversified applications. Contrary to a widely held notion, "modular construction" refers to a method of building a building, not a description of the finished product. While early versions of modular buildings were often austere trailer-like units, the process has evolved dramatically over the last five years. The high-tech, off-site construction techniques utilized by today's leading modular manufacturers yield multi-story buildings are believed to be as architecturally attractive, structurally sound and customized as conventional buildings. In short, modular construction means building a structure of three-dimensional sections manufactured in an off-site factory. Each section, or module, has walls, floor and roof (or ceiling in multiple-story buildings). When substantially completed, the modules are transported to the site where they are assembled into a completed structure.

A modular's biggest advantage is speed of construction. Performing site work (preparing the foundation and installing utility connections) simultaneously with the off-site

construction of the modules comprising the building accelerates construction timetables dramatically, with minimal disruption of normal campus activity. In most cases, modular construction completes a quality building in one-third to one-half the normal time of a conventional structure. Virginia Beach City Public Schools saved over $11 million in charter bond funding by utilizing temporary housing in lieu of permanent structures over a projected ten-year period.[49]

Modulars offer functional flexibility not found in conventional structures. Should its occupant or application change, the modular building can be modified, expanded, reconfigured or even moved, in part or entirely, to a new location. This relocatability enables schools to conform with a master plan while dealing with today's issues. For instance, UCLA projected a new high-rise facility to be built in approximately ten years on the site currently allocated for its new Capital Programs headquarters. Rather than erect a conventional structure that would lose its entire value when razed, the university opted for a three-story modular building that utilizes a strategic piece of ground and can be relocated when construction begins.

In terms of building function, modulars often equate to permanent construction. These buildings appear to be as durable, sturdy, and long-lasting as conventional buildings. Because each individual module is reinforced to withstand the

rigors of factory-to-site transport, the completed modular building actually has more steel.

Every method of building has strengths and weaknesses that make it practical for certain applications, impractical for others. Having to transport three-dimensional sections from the factory to the site over long distances restricts modular's ceiling height capabilities. Consequently, modulars are seldom used as auditoriums, gymnasiums, music rooms or other buildings calling for extremely high ceilings. Floor loading is another critical factor. The shifting stresses created by forklifts moving heavy loads make modulars an inappropriate design for warehouses. With the proper reinforcement, however, modular floors can easily handle the stationary weight associated with computer rooms, libraries, and storage rooms.

Modulars are most effective when the builder interacts with the architect from the beginning of the conceptual phase. Merging the architect's creativity and knowledge of the customer and the campus with the practicalities of modular construction, the builder can calculate and explain the time and cost implications of certain types of features and architectural enhancements. The most effective design is one where the highest possible percentage of construction tasks can be accomplished at the factory. As the proportion of site work increases, generally so does the building's cost. When the customer understands these tradeoffs

initially an enlightened decision can be reached.

Construction costs depend on the specific situation. Using a strict dollars-and-cents formula, modular construction may sometimes be slightly more expensive than conventional construction. But when the time factor is added, modular construction usually becomes the less costly way to build. Moreover, the user can choose from a broad range of financing options; the modular building can be purchased outright, leased with an option to buy, or simply leased and returned to the manufacturer when no longer needed. Those schools borrowing funds for the purchase and construction of a modular structure may reap additional benefits. Because of the construction's rapid pace, many lenders will underwrite a modular project with permanent, rather than temporary financing, saving the user the additional points and higher interest rates.

A modular's versatility is ideally suited to the changing demands of the modern campus. In a fraction of the customary time, educators can erect a functional structure that not only meets their immediate needs, but can be reconfigured, expanded, scaled down and even relocated as future conditions dictate.[50]

Many of the schools built over the past century were designed with a plan for the future. Aesthetic qualities abounded, lending to a more relaxed and educationally stimulating environment. Adequate space was allowed for

growth in student population, based on the best projections and information at hand. Now, even school systems with an abundance of permanent buildings are stretching and bursting out beyond existing space. Population shifts and surges, unforeseen in the 1940s and 1950s, have forced long-term planners to adopt design changes allowing for easier future expansion for sudden overpopulation.

The contemporary needs of students and ongoing physical plant modifications also come into play. Who could have conceived of the need for asbestos abatement and utility upgrading to accommodate every-changing code compliance even ten years ago? Demands for handicapped access, special education capabilities, computer and video technology as well as music and art facilities have also taxed the availability of excess space. Commercial modular facilities have just recently become a practical and economical means of increasing classroom space and allowing for growth. The relocatability factor combined with long-term lease options have greatly reduced the risks connected with modulars being used on a permanent basis. Administrators and planners are beginning to rely more and more on relocatable modular buildings when facing growing student support services.

The major challenge now is correlating space for these support services to keep up with the increase in students and classrooms. A case in point is the Torringford School in Connecticut. The successful integration of 8,600 square feet

of modular classroom space alleviated overcrowding in the original one-story brick school building, but the 120 added students would have certainly overtaxed the original cafeteria. Lunch periods would potentially have to be extended from 10:30 a.m. past 1:00 p.m. in order to ensure that each student had time and a place to sit and eat.

Without knowing the physical layout of the building, an optimistic administrator would probably suggest a traditional or modular addition, much like the addition of classrooms. However, this particular school was constructed in a figure-eight layout with classrooms and offices surrounding two open recreational courtyards. The cafeteria in question was located on the inside of one of these wings, facing the inside courtyard. Consequently, any addition to this space would entail construction personnel to transport all tools and materials through the existing doorways and corridors.

Any administrator who has ever participated in a significant, conventional building renovation knows the chaos that can result when construction contractors begin trucking equipment through tiled hallways and across carpeted floors, while teachers and children remain in the building. Despite its apparently inaccessible location, site evaluation experts at a neighboring modular manufacturer came up with a way to install a modular addition with minimal disruption.

Because of the single-story, low profile construction of the existing school, cafeteria modulars which arrive

complete and ready to erect, could be lifted by crane, carried over the roof and placed into the courtyard adjacent to the existing cafeteria. Then, erection crews with light equipment and hand tools could complete the job.[51] The Northern York County School District in Dillsburg, Pennsylvania, faced an immediate need for additional classroom space at their high school facility. Class sizes increased dramatically in a short period of time due to an influx of building developments. The school district explored all possible alternatives and found difficulty with each possibility. The construction of additional facilities was unreasonable since the district enrollments did not warrant approval from the State Department of Education. Permanent construction would also take too long and would not resolve the enrollment problems for at least two years. Modification of the present facility was not an appropriate option since the building would need to be brought up to present-day standards and the costs would be staggering. The switch of the ninth graders to the middle school facility was philosophically opposed by the Board of Education, community, and the professional staff. The only alternative appeared to be the acquisition of relocatable classrooms. The administration formulated a plan for a module containing four relocatable classrooms and the Board officially adopted the plan.

An architect was hired in March 1984 on a set-fee basis. The preparation of specifications was completed in a

short period of time and bids were sent out in June 1984. In hope that the classrooms would be available for use in September 1984. In July 1984, the Board awarded a contract for $138,504.00 and the project was to begin. The plan of a module and a connecting hallway for the facility allowed the District to provide classrooms that had continuity and meaning. The exterior colors and selection of a common roof structure created an aesthetically pleasing building. The school district acquired local contractors outside the bid specifications to do the necessary electrical and site work so that project could move more rapidly. This approach allowed for a cost savings as well as a saving of valuable time. The coordination of these contractors was the responsibility of the district administration.

The project moved on schedule and while the modular units were being constructed, the preparation of the site was being completed. The details of air conditioning, windows, carpeting, color schemes and other minor details were completed during the period of site preparation. The acquisition of state approvals was handled through the joint cooperation of the architect, contractor and school district and the final approvals came along on a timely basis. Once the units arrived on the scene, the assembly took very little time. The completion of the roof structure over the facility took the greatest amount of time. School district personnel were able to minimize all problems and resolve them

immediately. After the structure was completed, landscaping and a walkway to the building from the main high school facility completed the project. The Board of Education officially accepted the facility in September 1984 and students were housed in the building beginning November 1984.

In seven months, the Northern York County School District was able to accommodate their pupil overload for a total cost of $157,248 or $39,000 per classroom, an outstanding value for the facility received. The facility was still being used in the 1987-88 school year and will probably be in use for many years to come. It was an attractive addition to the educational park and was appreciated by the staff and students using it. The walkway was later covered and the size of the sidewalk expanded since the original construction. Regular maintenance and painting is being handled and no major problems have been encountered. In this manner, the Northern York County School District was able to make use of an alternative to regular school construction and found a way to handle enrollment problems quickly and effectively. This approach may not be practical for all school districts but did work for this district.[52]

One example of population pressures exerted on school districts is found in Las Vegas, Nevada. Here, in Husite, a 39-square-mile planned community, thirty different villages will be designed and built. Schools are an integral part of basic planning. Population of the development is projected

at 250,000 by 2050. Ground was broken for Husite in 1983. A year after ground breaking, The Meadows School was founded. Andrew Stifler, Meadows' principal, has said,

> We are in phase one of a six-phase building process to span twenty years. In June 1988, we'll complete work on three buildings. Over the next twenty years, we'll add at least five other buildings. Such reality can upset the best projections. Student population of Meadows School went up thirty percent, an increase not expected until June, when school construction would be completed. Meadows needed classroom space for about seventy children, but we certainly didn't want to invest in a permanent structure.

Solutions to the problem were modular structures from Gelco Space, which put six classrooms, a computer room, and an administrative office, complete with bathroom, at the disposal of Meadows Schools. At present, the school is using three 576 square foot modulars. The computer room is 336 square feet; the administrative facility 816 square feet. Balance of the space is used for classrooms. Exteriors use blue-grey wood siding and mansard roof trim. By grouping the buildings to face a central courtyard, rimmed by a deck, a canvas umbrella could be installed over the courtyard to protect against the sun. In addition, fire-rated gypsum is used as an acoustic barrier between classrooms. Walls are finished with Furtex, a self-healing material. Cream-colored carpeting is used on floors.

As the pressure is one of population, the solution is increasingly that of the mobile or modular facility. W. Andrew Lindelow, Vice President/Sales for Gelco, points to some of the reasons why modular space is the choice.

Lindelow maintains that standard mobile or modular space can be quickly delivered, unlike conventional construction. Modular and custom space can usually be built and delivered in thirty to sixty days. Gelco permits a unique furniture lease programs fully or partially furnished space within twenty-four hours, with leases for the building and furniture in one transaction. With a wide selection of standard sizes and styles, it is usually a simply matter to get the exact fit for the need. Finally, Lindelow points out in selecting custom design modular space one goes through much the same process as conventional construction, but the process proceeds quickly.[53]

The mobile/modular building industry has evolved over the past fifty years in response to a growing need across the nation for attractive, flexible, cost-efficient space. Today, these practical, time-saving and money-saving alternatives to site-built buildings are effectively meeting the specialized needs of educational institutions and other professional facilities.

Among the many benefits of modular buildings are:

- immediate space;
- speed and efficiency;
- potential savings in construction costs;
- flexibility in usage; and
- lease or purchase options.

Modular buildings are constructed in a factory

environment with assembly-line techniques. These controlled construction conditions minimize weather delays, eliminate material theft and greatly reduce administrative and interest costs. As a result, a modular building will usually realize tremendous savings for the buyer over the cost of a comparable site-built structure. Furthermore, the efficiency of modular construction helps keep costs down and budgets balanced. Most modular buildings require substantially less time than site-built buildings from contract date to ready-for-occupancy completion. Modulars provide a practical solution to changing space needs for institutions. Expansion or reduction is as simple as adding or removing a module. And because modulars are fully relocatable, operating on leased land becomes an innovative, cost-efficient alternative.

While modular buildings may be purchased outright, long- and short-term leases, with or without option to buy, can free up capital for use in other areas. As a capital purchase, modular buildings offer distinct advantages over site-built in that a modular unit can be sold separately from the land upon which it is located, or relocated as demands change. Modulars can also be used to meet the needs of shifting populations, special requirements and additions to existing buildings. When the need for new buildings is required, facilities planners should consider modulars to meet special time and cost conditions, without feeling the

need to sacrifice quality.[54]

Rising construction costs, coupled with increasing enrollment and aging buildings, demand alternatives. Perhaps temporary housing, even with some legislative mandates increasing the cost of temporary units, will be the choice for school systems facing funding/housing dilemmas. This researcher was able to secure current costs from vendors presently providing temporary classroom units to school districts primarily in the east and southeast. Even though placement codes and legislation may vary from state to state, the costs are intriguing and would lead one to believe that temporary housing has considerable merit. Gerald B. Barham, Supervisor of Purchasing, Virginia Beach City Public Schools, indicated that vendors provide standard classroom units with fixed square footage and will also build units to specifications, i.e., larger or for laboratory or other special purpose use. Since the information presented in Table 1 is confidential in nature, the vendors could not be identified by company name.[55]

As a help for the reader, Table 2 presents current state of Virginia classroom size recommendations. While these sizes are not standard across the country based on this researcher's experience in constructing schools over the past twelve years. The specifications appear to be fairly congruent with other states. It is noted that states recommend or mandate classroom size and make note of the

TABLE 1

TEMPORARY CLASSROOM UNIT - COSTS

VENDOR	UNIT COST	SETUP	FURNITURE	SQ. FT. BLDG. ONLY	TOTAL
A	$20,629	$3,500	$2,000	$22.61	$26,129
B	20,384	3,500	2,000	22.35	25,884
C	16,536	3,500	2,000	18.13	22,036
D	21,381	3,500	2,000	23.44	26,881
E	21,796	3,500	2,000	23.89	27,296
F	27,564	3,500	2,000	30.22	33,064
G	20,724	3,500	2,000	22.72	26,224
H	20,430	3,500	2,000	22.40	25,930
I	24,678	3,500	2,000	27.05	30,178

Costs listed in Table 1 are for a standard 24 x 38 (912 sf) classroom unit without toilet. Units with toilets cost approximately $1,100 more. Prices range from a low of $16,536 for a standard unit to a high figure of $27,564.

Furniture costs vary, however, $1,800 to $2,000 approximates the high/low range for elementary and secondary schools. Thirty-five hundred dollars appears to be consistent for setup costs except when extensive infrastructure is provided. Setup costs normally involve transportation of the unit, assembly of the unit and placement of the unit on site. The overall average cost for an individual unit without setup or furniture was $21,569.

recommendation and mandate when plans for new construction are presented for approval. Naturally, most school divisions purchase temporary units of appropriate size to meet their particular state recommendations or requirements. The state of Virginia treats temporary housing as permanent housing in regard to standards and requirements.[56]

TABLE 2

CURRENT STATE OF VIRGINIA CLASSROOM SIZE RECOMMENDATIONS

GRADE LEVEL	SQUARE FOOT STANDARDS
KINDERGARTEN	975 SF
1-3	825 SF
4-7	735 SF
8-12	930 SF

Summary

Educators and architects now envision the school building as a structural envelop. Instruction at one time was conducted in the open air. Makeshift shelters, one room schoolhouses, or converted buildings, e.g., barns, woodsheds, and other outbuildings, were also utilized. Reformers like Henry Barnard and Horace Mann made great progress in fostering the concept that the schoolhouse was to be considered a temple of learning.

In spite of the fact that many early schools were established for religious purposes, without the use of church buildings, there would have been a time span in American with no schools at all. Early schoolhouses or places for instruction were spartan to say the least. Students were seated on rough planks at makeshift desks supported by posts in the

earth floors. The "pot-bellied stove" was a gathering place for instruction and warmth.

The Samuel B. Morse School of Philadelphia and the Central High School of Philadelphia in the 1830s and 1840s were the forerunners of today's modern schools. The Philadelphia Central High School was considered without rival and was a model for other states. A century later, windowless schools were emphasized in the 1960s and schooling became identified with the special place where teaching and learning occur.

The seventies marked the generation of teaching aids with widespread use of supplementary instructional devices. State departments of education also began to play a more vital role in the planning and construction of facilities during this period. Relationships between the comprehensiveness of educational facilities planning and plant adequacy was also studied during this time.

School housing has changed dramatically since the 1700s and philosophies for various reasons have remained static. Flexibility in the context of economy has now surfaced and may mean more spartan facilities during the next decade than would have been anticipated.

Temporary housing appears to be viewed as an alternative to permanent construction and this is understandable in the western part of the United States and in the south where there are rapidly expanding populations. Historic data

on temporary housing appears to be limited even in the states where as many as twenty thousand units may be utilized. Vendors have observed increased demands during the past few years and note that construction is becoming more sophisticated. Demands on states and localities to fund new construction have increased.

Proposition 13 in California limited the amount of taxes that could be collected. Recent legislation mandates that thirty percent (30%) of all new construction be temporary. Square foot construction costs for temporary housing have increased as a result of the California Field Acts' seismic requirements. Costs have also increased in Texas where reduced pupil-teacher ratios have been mandated.

Construction code requirements in Virginia and Alabama are being addressed. Virginia treats temporary housing the same as permanent. Alabama has developed a handbook addressing temporary units. Temporary housing has a brief history but appears to be a viable alternative to permanent construction and legality appears to be no issue. Exceptions can be made when the education of students is jeopardized, but never at the exclusion of safety.

More school districts are utilizing temporary housing. Speed of construction and affordable square foot costs have made the temporary classroom a viable unit on today's construction market. Modular technology provides the flexibility educators appear to be seeking in this time of rapid

increase in construction costs and student enrollment.

Today we are confronted with increased concern not only of educational methods, techniques, and needs but also of increased construction costs, coupled with local tax burdens in rapidly growing systems and the always present possibility of student enrollment declines. The above concerns have prompted consideration for the most cost-effective alternatives in housing. Today's educators and school systems in the United States are often aware of the pressing need to help young people grasp more complex and contradictory concepts and are seeking new ways to accomplish this end. The results of their efforts have led to more accurate methods of teaching students and better ways of grouping them. Architectural plans must continue to be geared to individual study needs; however, permanent construction or attached units may not be the sole answer. To this end, many administrators now are faced with the alternatives of building new facilities, retrofitting existing ones, or providing temporary housing. All have advantages, and the factors that direct the decision must be fully understood. By providing information for a comprehensive survey of school construction facilities, administrators can, following the collection of data and analysis of feasibility, both economically and efficiently find a guideline to make more adequate decisions for future school housing.

ENDNOTES

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CHAPTER III

METHODOLOGY

This chapter presents the Methodology of the Study. The study examined an Assessment of the Utilization of Permanent and Temporary Classrooms as it Relates to Cost and Efficiency in Selected School Division in the fifty largest school systems in the United States, as reported in *Education USA* 1988.[1] The study focused on the use of temporary and permanent classrooms as it pertains to cost and efficiency. Economy of cost between temporary and permanent classroom construction is differentiated by square foot expense. Efficiency relates to the ability to deliver curriculum with approximately equal facility in temporary and permanent classrooms.

Research Procedures

The analytical survey was selected to gather data for the study. This research design is efficient in providing data apropriate to the focus of the study. The study focuses on examining the utilization of temporary and permanent classrooms in the fifty largest school systems in the United States. This particular population was chosen since emphasis for the degree in urban studies focuses on urban issues.

The vast majority of the fifty largest school systems in the United States are urban in nature and therefore meet the requirements of the urban program.

The survey was developed to be two-fold in design, presenting an opportunity for both open and closed responses. The general rule of planned research is to use the largest sample possible.[2] The fifty largest school systems in the United States should encompass a population sufficient to provide data to validate the nature of the study.

A survey instrument was organized to address five major categories: (1) demographics, (2) facilities, (3) finance, (4) rationale for building type, and (5) curriculum and instruction. In order to ascertain possible weaknesses, lack of clarity, or other inadequacies, pilot surveys were sent to four large urban school systems in Virginia. The systems were Chesterfield County Public Schools, Newport News Public Schools, Norfolk Public Schools, and Roanoke City Public Schools.

Questionnaires were received from three of the four systems surveyed with only Norfolk Public Schools abstaining. A review of the returns from school systems responding to the pilot surveys revealed that the survey would probably elicit information appropriate to the focus of the study. The size of the responding systems at the time of survey completion (May 1989) was Chesterfield County Public Schools--42,700, Newport News Public Schools--28,313, and Roanoke City Public

Schools--12,800. Data furnished via the pilot survey were sufficient to give reasonable promise of success to the target survey group.

Surveys were mailed to the superintendents of the fifty largest school systems in the United States as reported in 1988.[3] Telephone interviews were conducted with the school officials of some school districts to clarify data not readily discernible in the returned survey instruments or to collect omitted but needed information. On July 10, 1990, a follow-up survey was mailed to school districts which did not respond to the original survey mailing of May 18, 1990. The pilot survey letter, the survey form, the original survey letter, and the follow-up survey letter are located in Appendix A.

Design of the Study

The research design of this study was an analytical survey. This approach allowed for a concise and understandable presentation of the material. The inferential statistics were employed to determine the statistical difference between two groups, in this case, the temporary and permanent school housing relative to the cost of construction and the efficiency of curriculum delivery.

In order to affirm or deny the null hypothesis (there is no statistically significant difference between the cost-efficient utilization of permanent and temporary classrooms), the t-test was utilized. The decision to reject was set at

.05 level of confidence with reasonable assurance that this is an adequate criterion.

The statistical instruments involving that of a parametric nature (e.g., t-test), as well as data of a non-parametric nature (e.g., Wilcoxon Matched-Pairs Test) were utilized. The t-test was used to determine just how extensive the difference between two means must be for it to be judged significant. For the second null hypothesis (there is no statistically significant difference between the curriculum utilization in permanent and temporary classrooms), descriptive non-parametric statistics were employed via the Wilcoxon Matched-Pairs Test to determine significant differences between two samples. The Wilcoxon is more powerful than the sign test and is the preferred non-parametric test for matched pairs when the scale of measurement permits its use.[4]

Pilot Survey

Pilot surveys were sent to the superintendents of four large urban school systems in Virginia: (1) Chesterfield County Public Schools, (2) Newport News Public Schools, (3) Norfolk Public Schools, and (4) Roanoke City Public Schools. Three of the four districts responded; Norfolk Public Schools did not respond. The purpose of the pilot survey was to determine if the data-gathering ability of the survey was sufficient to provide reliable information to the researcher and to make corrections or modifications, if necessary. Data

furnished were sufficient in validity to assume that the instrument could gather data appropriate to the focus of the research.

Data

Distribution of the Questionnaire

The following school systems received questionnaires appropriate to the study:

1. New York City Public Schools, New York, New York
2. Los Angeles Public Schools, Los Angeles, California
3. Chicago Public Schools, Chicago, Ilinois
4. Dade City Public Schools, Miami, Florida
5. Philadelphia Public Schools, Philadelphia, Pennsylvania
6. Houston Public Schools, Houston, Texas
7. Detroit Public Schools, Detroit, Michigan
8. Hawaii Public Schools (Entire State)
9. Broward County Public Schools, Ft. Lauderdale, Florida
10. Dallas Public Schools, Dallas, Texas
11. Fairfax County Public Schools, Fairfax, Virginia
12. Hillsborough County Public Schools, Tampa, Florida
13. San Diego Public Schools, San Diego, California
14. Baltimore City Public Schools, Baltimore, Maryland
15. Memphis Public Schools, Memphis, Tennessee
16. Prince Georges County Public Schools, Upper Marlboro, Maryland
17. Duval County Public Schools, Jacksonville, Florida
18. Clark County Public Schools, Las Vegas, Nevada

19. Milwaukee Public Schools, Milwaukee, Wisconsin
20. Montgomery County Public Schools, Rockville, Maryland
21. Pinellas County Public Schools, Clearwater, Florida
22. Palm Beach County Public Schools, West Palm Beach, Florida
23. Jefferson County Public Schools, Louisville, Kentucky
24. Washington D.C. Public Schools, Washington, D.C.
25. Orange County Public Schools, Orlando, Florida
26. Orleans Parish Public Schools, New Orleans, Louisiana
27. Albuquerque Public Schools, Albuquerque, New Mexico
28. Baltimore County Public Schools, Towson, Maryland
29. Jefferson County Public Schools, Lakewood, Colorado
30. Charlotte-Mecklenburg Public Schools, Charlotte, North Carolina
31. Cleveland Public Schools, Cleveland, Ohio
32. DeKalb County Public Schools, Decatur, Georgia
33. Granite Public Schools, Salt Lake City, Utah
34. Mobile County Public Schools, Mobile, Alabama
35. Virginia Beach City Public Schools, Virginia Beach, Virginia
36. Fort Worth Public Schools, Fort Worth, Texas
37. Davidson County Public Schools, Nashville, Tennessee
38. Long Beach Public Schools, Long Beach, California
39. Columbus Public Schools, Columbus, Ohio
40. Atlanta Public Schools, Atlanta, Georgia
41. San Antonio Public Schools, San Antonio, Texas
42. Cobb County Public Schools, Marietta, Georgia

43. San Francisco Public Schools, San Francisco, California

44. Anne Arundel County Public Schools, Annapolis, Maryland

45. Austin Public Schools, Austin, Texas

46. Polk County Public Schools, Bartow, Florida

47. Jordan Public Schools, Jordan, Utah

48. Wake County Public Schools, Raleigh, North Carolina

49. Denver Public Schools, Denver, Colorado

50. Jefferson Parish Public Schools, Harvey, Louisiana

Data were collected via the survey instrument utilizing five major categories. Those categories were: (1) demographics, (2) facilities, (3) finance, (4) rationale for building type, and (5) curriculum and instruction.

The survey instrument was sent to the superintendents of the fifty largest school systems in the United States as reported in 1988. Figure 1 identifies the states having systems which received the survey instrument.

Figure 2 identifies the states which had school systems responding to the survey instrument. Thirty-nine or seventy-eight percent of the systems surveyed returned the questionnaires. This represents eighteen states and the District of Columbia. The states and their responding school systems are listed below.

Alabama	1	Michigan	1
California	4	Nevada	1
Colorado	2	New Mexico	1
District of Columbia	1	New York	1
Florida	8	North Carolina	2
Georgia	3	Ohio	2
Hawaii	1	Pennsylvania	1
Illinois	1	Tennessee	2
Kentucky	1	Texas	5
Louisiana	2	Utah	2
Maryland	5	Virginia	2
		Wisconsin	1

Fig. 1. States with School Systems Receiving Questionnaires

Alabama	1	Maryland	4
California	3	Nevada	1
Colorado	1	North Carolina	2
District of Columbia	1	Ohio	1
Florida	8	Tennessee	2
Georgia	3	Texas	3
Hawaii	1	Utah	2
Illinois	1	Virginia	2
Kentucky	1	Wisconsin	1
Louisiana	1		

Fig. 2. States Having School Systems Which Responded to the Questionnaire

Data collected in the five categories were:

Demographics

The data collected in the demographic category were: (1) size of the school system, (2) economic aspects for the past three years, and (3) the rate of growth of the school division during the past three years. This data were collected to give the reader some indication of the economic and growth status of the responding school divisions.

Facilities

The data collected in the facilities category were: (1) number of temporary and permanent buildings, (2) average number of years in use for temporary and permanent buildings, and (3) solicitation of comments on the type of use for temporary classrooms only.

Finance

The data collected in the finance category were: (1) scheduled new facilities for temporary and permanent housing, (2) square foot costs for temporary and permanent housing the past three years, and (3) square foot costs of projected temporary and permanent buildings three years ahead. Comments on finance which were also made by various school division officials are listed in Chapter IV to highlight the material presented there. Hypothesis #1, as listed below, was utilized in this category.

> Hypothesis #1 - There is no statistically significant difference between cost efficient utilization of permanent and temporary classrooms.

Rationale for Building Type

The data collected in this category were relative to criteria for determining building type, temporary or permanent. Comments regarding other reasons for decisions were solicited. The rationale centered around: (1) mandates, (2) economy, (3) aesthetics, (4) land available, and (5)

other factors.

Curriculum and Instruction

The data collected in this category centered on the effect, if any, on curriculum delivery. Effects were measured on a continuum of one to five. Five indicated no effect (conducive to curriculum delivery) and one indicated great effect (not conducive to curriculum delivery). Hypothesis #2 was addressed in this category.

> Hypothesis #2 - There is no statistically significant difference between the curriculum utilization in permanent and temporary classrooms.

Figure 1 identifies the states having systems receiving the survey. Figure 2 describes the states which had school systems responding. Figure 3 identifies the fifty largest school systems in the United States as recorded in 1988.[5]

Of the fifty school systems surveyed, thirty-nine or seventy-eight percent responded. Overall, data furnished were sufficient to provide a reliable sample of the total population researched. The above table may be used for growth comparisons with data furnished in Chapter IV Table 3.

RANK	SCHOOL SYSTEM	ENROLLMENT
1.	New York City, NY	940,940
2.	Los Angeles, CA	592,273
3.	Chicago, IL	419,537
4.	Dade City, FL	253,984
5.	Philadelphia, PA	196,447
6.	Houston, TX	191,831
7.	Detroit, MI	181,601
8.	Hawaii (entire state)	166,512
9.	Broward County, FL	136,650
10.	Dallas, TX	131,473
11.	Fairfax County, VA	128,503
12.	Hillsborough County, FL	115,857
13.	San Diego, CA	115,484
14.	Baltimore City, MD	110,189
15.	Memphis, TN	104,287
16.	Prince Georges County, MD	103,565
17.	Duval County, FL	99,539
18.	Clark County, NV	95,899
19.	Milwaukee, WI	93,197
20.	Montgomery County, MD	92,619
21.	Pinellas County, FL	90,086
23.	Jefferson County, KY	88,501
24.	Washington, DC	87,955
25.	Orange County, FL	85,409
26.	Orleans Parish, LA	83,601
27.	Albuquerque, NM	78,750
28.	Baltimore County, MD	77,583
29.	Jefferson County, CO	75,124
30.	Charlotte-Mecklenburg, NC	73,965
31.	Cleveland, OH	72,639
32.	DeKalb County, GA	71,613
33.	Granite, UT	70,523
34.	Mobile County, AL	68,549
35.	Virginia Beach, VA	67,355
36.	Fort Worth, TX	67,335
37.	Davidson County, TN	66,325
38.	Long Beach, CA	65,940
39.	Columbus, OH	65,463
40.	Atlanta, GA	65,348
41.	San Antonio, TX	64,631
42.	Cobb County, GA	64,234
43.	San Francisco, CA	63,867
44.	Anne Arundel, MD	62,308
45.	Austin, TX	61,402
46.	Polk County, FL	60,743
47.	Jordan, UT	59,708
48.	Wake County, NC	59,587
49.	Denver, CO	59,424
50.	Jefferson Parish, LA	57,856

Fig. 3. Fifty Largest School Systems in the United States

Summary

The methodology of the study was to examine the utilization of temporary and permanent classrooms in the fifty largest school systems in the United States. The emphasis on urban problems was considered when selecting the study. The study focused on cost efficiency as it pertains to square foot cost differentiations between temporary and permanent construction. Efficiency was addressed as it related to the ability to deliver curriculum in temporary and permanent classrooms. A pilot survey was utilized to validate the research instrument. The survey instrument was constructed to address demographics, facilities, finance, rationale for building type, and curriculum and instruction. Use of this data is designed to provide knowledge of the many aspects which are involved in the utilization of temporary and permanent school construction.

The design of the study is an analytical survey. Its two-fold nature incorporates both inferential and descriptive statistics. The critical questions of the study were addressed through two null hypotheses. Hypothesis #1 states that there is not statistically significant difference between the cost-efficient utilization of permanent and temporary classrooms. Hypothesis #2 states that there is no statistically significant difference between the curriculum utilization in permanent and temporary classrooms. One, a parametric approach, utilized a t-test whereas the second, a

non-parametric approach, uses the Wilcoxon Matched-Pairs Tool to challenge the hypothetical validity. The data were displayed through one-way and two-way tables and were grouped under the survey categories.

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CHAPTER IV

PRESENTATION AND ANALYSIS OF DATA

This study examined certain population parameters as a selection basis for studying the utilization of temporary and permanent school housing in the fifty largest school systems in the United States. The central thesis is focused on the cost of school housing and the curriculum delivery.

Demographics

The systems were ranked by size in *Education USA 1988*. Responses were received from thirty-nine of the fifty largest school systems where school populations currently range from a low of 58,276 (Denver, Colorado) to a high of 723,352 (Chicago) based on 1990 data received from the school systems. New York City, the largest system, did not return the survey along with Philadelphia, Houston, Detroit, and Dallas of the ten largest school systems. However, the second largest system, Los Angeles, did respond along with the third and fourth, Chicago and Miami (Dade County) and the eighth and tenth, Honolulu and Ft. Lauderdale. From number eleven through fifty, thirty-four returned completed surveys leaving only six which did not reply or 17.6 percent. The return represented seventy-eight percent compliance which

provides more than adequate survey data. Table 3 presents data on cumulative enrollment of respondents. Table 3 presents the current enrollment of the responding school systems.

Most of the school systems, thirty-three, involved in this reporting enrolled from 57,856 to 95,899 in 1987. Six of the systems from those reporting range from 58,276 to 102,619--reflecting changing growth from 1987 to 1990 among those sized cities. The rank of these represents number fifty to number eighteen in size. The largest number of cities in this study from a single state was Florida (8), others were California (3) and Texas (3). These represent Sunbelt cities where populations are rapidly increasing, and are likely to be accommodating expanding school enrollments in temporary school structures.

Seventy-six percent of the fifty school systems surveyed experienced growth between the fall of 1986 and the fall of 1987. Growth ranged from a low of 0.1 in New York to a high of 9.4 in Virginia Beach, Virginia. Only five of the thirty-nine responding school divisions did not experience increased enrollments between 1987 and 1990. DeKalb County Public Schools, Decatur, Georgia, Columbus Public Schools, Columbus, Ohio, San Antonio Independent School District, San Antonio, Texas, Fairfax County Public Schools, Fairfax, Virginia, and Washington Public Schools, Washington, D.C., reported either slight losses or stable enrollments during that time span.

TABLE 3

CURRENT ENROLLMENT OF RESPONDENT SCHOOL SYSTEMS

SCHOOL SYSTEM	LOCATION	
Anne Arundel County Public Schools	Annapolis,MD	64,280
Austin City Public Schools	Austin,TX	61,712
Baltimore County Public Schools	Towson,MD	84,097
Broward County Public Schools	Ft Lauderdale, FL	152,000
Charlotte-Mecklenburg Public Schools	Charlotte,NC	76,000
City of Atlanta Public Schools	Atlanta,GA	69,000
City of Milwaukee Public Schools	Milwaukee,WI	97,085
Clark County Public Schools	Las Vegas,NV	106,843
Cobb County Public Schools	Marietta,GA	66,380
Columbus Public Schools	Columbus,OH	65,000
Cook County Public Schools	Chicago,IL	723,352
Dade County Public Schools	Miami,FL	279,735
Davidson County Public Schools	Nashville,TN	67,000
Dekalb County Public Schools	Decatur,GA	71,300
Denver County Public Schools	Denver,CO	58,276
Duval County Public Schools	Jacksonville, FL	106,462
Fairfax County Public Schools	Fairfax,VA	127,297
Fort Worth Public Schools	Ft.Worth,TX	70,000
Granite District Public Schools	Salt Lake City,UT	77,000
Hawaii Public Schools	Honolulu,HA	169,193
Hillsborough County Public Schools	Tampa,FL	120,000
Jefferson County Public Schools	Louisville, KY	92,000
Jordan School District	Sandy,UT	63,398
Long Beach Public Schools	Long Beach, CA	68,679
Los Angeles City Public Schools	Los Angeles, CA	610,149
Memphis City Public Schools	Memphis, TN	107,000
Mobile County Public Schools	Mobile, AL	68,000
Montgomery County Public Schools	Rockville, MD	102,619
Orange County Public Schools	Orange County, FL	96,506
Orleans Parish Public Schools	New Orleans, LA	83,000

Table 3 cont.

SCHOOL SYSTEM	LOCATION	
Palm Beach County Public Schools	West Palm Beach, FL	99,438
Pinellas County Public Schools	Clearwater, FL	92,899
Polk County Public Schools	Bartow, FL	62,800
Prince Georges County Public Schools	Upper Marlboro,MD	105,414
San Antonio Independent Schools	San Antonio, TX	60,000
San Diego Public Schools	San Diego, CA	119,315
VA Beach City Public Schools	VA Beach, VA	68,400
Wake County Public Schools	Raleigh, NC	62,424
Washington Public Schools	Washington, DC	81,000

Table 4 delineates the economic aspects of the school community during the past three years. Sixteen of the thirty-seven respondents indicated considerable growth in the economy during the past three years. Nine of the thirty-seven respondents experienced slight growth. A total of twenty-five of the thirty-seven respondents or sixty-seven percent experienced slight or considerable growth while only two, or five percent, of the respondents indicated that growth was depressed. The remaining school systems maintained the status quo or showed a slight decrease. Eighty-seven percent of the reporting school divisions noted some stages of economic growth. Mobile, Alabama, and Orleans Parish Public Schools recorded a depressed economic state. Systems in the Rustbelt, such as Maryland, Illinois, and Ohio, did not identify themselves as being in a depressed economy.

TABLE 4

ECONOMIC ASPECT - PAST THREE YEARS

SCHOOL SYSTEM	LOCATION	1	2	3	4	5
Anne Arundel County Public Schools	Annapolis,MD					*
Austin City Public Schools	Austin,TX		*			
Baltimore County Public Schools	Towson,MD					*
Broward County Public Schools	Ft Lauder-dale, FL				*	
Charlotte-Mecklenburg Public Sch.	Charlotte,NC					*
City of Atlanta Public Schools	Atlanta,GA			*		
City of Milwaukee Public Schools	Milwaukee,WI				*	
Clark County Public Schools	Las Vegas,NV					*
Cobb County Public Schools	Marietta,GA					*
Columbus Public Schools	Columbus,OH					*
Cook County Public Schools	Chicago,IL				*	
Dade County Public Schools	Miami,FL					*
Davidson County Public Schools	Nashville,TN			*		
Dekalb County Public Schools	Decatur,GA				*	
Denver County Public Schools	Denver,CO		*			
Duval County Public Schools	Jacksonville FL				*	
Fairfax County Public Schools	Fairfax,VA					*
Fort Worth Public Schools	Ft.Worth,TX		*			
Granite District Public Schools	Salt Lake City, UT		*			
Hawaii Public Schools	Honolulu,HA					*
Hillsborough County Public Schools	Tampa,FL					*
Jefferson County Public Schools	Louisville KY					
Jordan School District	Sandy,UT		*			
Long Beach Public Schools	Long Bch,CA					*
Los Angeles City Public Schools	L.A., CA				*	

Response Key: 1 = depressed; 2 = slight decrease; 3 = status quo; 4 = slight growth; 5 = considerable growth; NR = no response.

Table 4 cont.

SCHOOL SYSTEM	LOCATION	1	2	3	4	5
Memphis City Public Schools	Memphis, TN				*	
Mobile County Public Schools	Mobile, AL	*				
Montgomery County Public Schools	Rockville,MD					*
Orange County Public Schools	Orange County, FL					*
Orleans Parish Public Schools	New Orleans, LA	*				
Palm Beach County Public Schools	West Palm Beach, FL				*	
Pinellas County Public Schools	Clearwater, FL					*
Polk County Public Schools	Bartow, FL		*			
Prince Georges County Public Sch.	Upper Marlboro, MD	NR				
San Antonio Indep. Schools	San Antonio, TX			*		
San Diego Public Schools	San Diego,CA	NR				
VA Beach City Schools	VA Beach, VA				*	
Wake County Public Schools	Raleigh, NC					*
Washington Public Schools	Washington, DC		*			

Response Key: 1 = depressed; 2 = slight decrease; 3 = status quo; 4 = slight growth; 5 = considerable growth; NR = no response.

Table 5 addresses the rate of growth of the respondents' school populations during the past three years. Thirty-six school systems responded to this survey question. Fourteen school systems experienced considerable gain in school populations, while eleven showed a slight gain in school populations. This reflects that sixty-nine percent of the respondents showed a considerable or slight gain in student populations, while only nineteen percent encountered a slight

TABLE 5

RATE OF GROWTH - PAST THREE YEARS

SCHOOL SYSTEM	LOCATION	1	2	3	4	5
Anne Arundel County Public Sch.	Annapolis, MD		*			
Austin City Public Schools	Austin, TX				*	
Baltimore County Public Schools	Towson, MD	NR				
Broward County Public Schools	Ft Lauder-dale, FL					*
Charlotte-Mecklenburg Pub.Sch.	Charlotte, NC					*
City of Atlanta Public Schools	Atlanta, GA			*		
City of Milwaukee Public Sch.	Milwaukee, WI					*
Clark County Public Schools	Las Vegas, NV					*
Cobb County Public Schools	Marietta, GA					*
Columbus Public Schools	Columbus, OH		*			
Cook County Public Schools	Chicago, IL			*		
Dade County Public Schools	Miami, FL					*
Davidson County Public Schools	Nashville, TN				*	
Dekalb County Public Schools	Decatur, GA				*	
Denver County Public Schools	Denver, CO		*			
Duval County Public Schools	Jacksonville, FL				*	
Fairfax County Public Schools	Fairfax, VA			*		
Fort Worth Public Schools	Fort Worth, TX				*	
Granite District Public Schools	Salt Lake City, UT				*	
Hawaii Public Schools	Honolulu, HA					*
Hillsborough County Public Sch.	Tampa, FL					*
Jefferson County Public Schools	Louisville, KY		*			
Jordan School District	Sandy, UT				*	
Long Beach Public Schools	Long Beach, CA					*
Los Angeles City Public Schools	L.A., CA					*

Response Key: 1 = considerable loss; 2 = slight low; 3 = status quo; 4 = slight gain; 5 = considerable gain; NR = no response.

Table 5 cont.

SCHOOL SYSTEM	LOCATION	1	2	3	4	5
Memphis City Public Schools	Memphis, TN		*			
Mobile County Public Schools	Mobile, AL				*	
Montgomery County Public Schools	Rockville,MD					*
Orange County Public Schools	Orange County, FL					*
Orleans Parish Public Schools	New Orleans, LA		*			
Palm Beach County Public Schools	West Palm Beach, FL	NR				
Pinellas County Public Schools	Clearwater, FL					*
Polk County Public Schools	Bartow, FL				*	
Pr.Georges County Public Schools	Upper Marlboro, MD				*	
San Antonio Indep. Schools	San Antonio, TX			*		
San Diego Public Schools	San Diego,CA					*
VA Beach City Schools	VA Beach, VA				*	
Wake County Public Schools	Raleigh, NC	NR				
Washington Public Schools	Washington, DC		*			

Response Key: 1 = considerable loss; 2 = slight low; 3 = status quo; 4 = slight gain; 5 = considerable gain; NR = no response.

loss. Eleven percent maintained the status quo. All Florida school systems increased in student populations as did those in California and Virginia. Slight losses were recorded in Anne Arundel Public Schools, Annapolis, Maryland, Columbus Public Schools, Columbus, Ohio, Denver County Public Schools, Denver, Colorado, Jefferson County Public Schools, Louisville, Kentucky, Memphis City Public Schools, Memphis, Tennessee, and Orleans Parish Public Schools, New Orleans,

Louisiana. These slight decreases occurred over a three year period. Therefore, growth could have occurred during the past two years and did, in some instances, according to the respondents' data.

Table 6 lists the number of temporary classrooms being utilized by the respondents. All but two of the responding school systems provided data on this survey question. Approximately ninety-five percent of the respondents answered the question. One hundred percent of the respondents listed the use of at least one temporary classroom unit. The overall average of temporary classrooms used was 574 per each of the school systems responding with the range being from one in the city of Milwaukee school district to 3,429 in the Los Angeles school district. All told, 21,255 units were being utilized by the responding school divisions. Data revealed that many systems have been availing themselves of housing alternatives for some time. Based on square foot costs of current temporary housing, it would appear that considerable monies have been saved through the use of temporary structures. Hawaii Public Schools, Broward Public Schools, Ft. Lauderdale, Florida, Dade County Public Schools, Miami, Florida, Hillsborough County Public Schools, Tampa, Florida, Los Angeles City Public Schools, Los Angeles, California, Orange County Public Schools, Orlando, Florida, Palm Beach County Public Schools, West Palm Beach, Florida, and San Diego Public Schools, San Diego, California, are good

TABLE 6

NUMBER OF TEMPORARY CLASSROOMS UTILIZED BY RESPONDENTS

SCHOOL SYSTEM	LOCATION	
Anne Arundel County Public Schools	Annapolis, MD	33
Austin City Public Schools	Austin, TX	800
Baltimore County Public Schools	Towson, MD	101
Broward County Public Schools	Ft Lauderdale, FL	2000
Charlotte-Mecklenburg Public Schools	Charlotte, NC	186
City of Atlanta Public Schools	Atlanta, GA	174
City of Milwaukee Public Schools	Milwaukee, WI	1
Clark County Public Schools	Las Vegas, NV	578
Cobb County Public Schools	Marietta, GA	249
Columbus Public Schools	Columbus, OH	29
Cook County Public Schools	Chicago, IL	18
Dade County Public Schools	Miami, FL	1486
Davidson County Public Schools	Nashville, TN	470
Dekalb County Public Schools	Decatur, GA	201
Denver County Public Schools	Denver, CO	NR
Duval County Public Schools	Jacksonville, FL	700
Fairfax County Public Schools	Fairfax, VA	327
Fort Worth Public Schools	Ft.Worth, TX	310
Granite District Public Schools	Salt Lake City,UT	157
Hawaii Public Schools	Honolulu, HA	1025
Hillsborough County Public Schools	Tampa, FL	1250
Jefferson County Public Schools	Louisville, KY	110
Jordan School District	Sandy, UT	129
Long Beach Public Schools	Long Beach, CA	405
Los Angeles City Public Schools	Los Angeles, CA	3429
Memphis City Public Schools	Memphis, TN	139
Mobile County Public Schools	Mobile, AL	410
Montgomery County Public Schools	Rockville, MD	186
Orange County Public Schools	Orlando, FL	1470
Orleans Parish Public Schools	New Orleans, LA	467

Table 6 cont.

SCHOOL SYSTEM	LOCATION	
Palm Beach County Public Schools	West Palm Beach, FL	1100
Pinellas County Public Schools	Clearwater, FL	269
Polk County Public Schools	Bartow, FL	600
Prince Georges County Public Schools	Upper Marlboro,MD	225
San Antonio Independent Schools	San Antonio, TX	272
San Diego Public Schools	San Diego, CA	1236
VA Beach City Public Schools	VA Beach, VA	261
Wake County Public Schools	Raleigh, NC	462
Washington Public Schools	Washington, DC	NR

NR = No response

examples of school systems effecting cost savings by utilizing temporary housing.

Table 7 presents the number of permanent classrooms reported by the respondents. Responses to this question varied considerably as many of the school systems simply listed the number of schools in the district while others listed schools and then included a number of free-standing permanent structures. Dade County, Florida, listed 1,486 temporary classrooms and broke down the inquiry on permanent structures by schools, i.e., 183 elementary, 49 middle, and 26 senior high schools. San Diego listed 3,954 permanent buildings at 152 different school sites. Since the overall number of permanent buildings was not the major feature of the study and was presented for comparison purposes only, no major effort was made to clarify these responses. It was

TABLE 7

NUMBER OF PERMANENT CLASSROOMS UTILIZED BY RESPONDENTS

SCHOOL SYSTEM	LOCATION	NUMBER
Anne Arundel County Public Schools	Annapolis, MD	120
Austin City Public Schools	Austin, TX	94
Baltimore County Public Schools	Towson, MD	148
Broward County Public Schools	Ft Lauderdale,FL	1400
Charlotte-Mecklenburg Public Schools	Charlotte, NC	400
City of Atlanta Public Schools	Atlanta, GA	113
City of Milwaukee Public Schools	Milwaukee, WI	149
Clark County Public Schools	Las Vegas, NV	900
Cobb County Public Schools	Marietta, GA	81
Columbus Public Schools	Columbus, OH	207
Cook County Public Schools	Chicago, IL	1232
Dade County Public Schools	Miami, FL	258
Davidson County Public Schools	Nashville, TN	172
Dekalb County Public Schools	Decatur, GA	112
Denver County Public Schools	Denver, CO	123
Duval County Public Schools	Jacksonville, FL	750
Fairfax County Public Schools	Fairfax, VA	186
Fort Worth Public Schools	Ft Worth, TX	120
Granite District Public Schools	Salt Lake City, UT	90
Hawaii Public Schools	Honolulu, HA	2230
Hillsborough County Public Schools	Tampa, FL	180
Jefferson County Public Schools	Louisville, KY	155
Jordan School District	Sandy, UT	70
Long Beach Public Schools	Long Beach, CA	437
Los Angeles City Public Schools	L.A., CA	650

Response Key: 1 = considerable loss; 2 = slight low; 3 = status quo; 4 = slight gain; 5 = considerable gain; NR = no response.

Table 7 cont.

SCHOOL SYSTEM	LOCATION	NUMBER
Memphis City Public Schools	Memphis, TN	550
Mobile County Public Schools	Mobile, AL	400
Montgomery County Public Schools	Rockville, MD	185
Orange County Public Schools	Orlando, FL	1066
Orleans Parish Public Schools	New Orleans, LA	123
Palm Beach County Public Schools	West Palm Beach, FL	110
Pinellas County Public Schools	Clearwater, FL	1087
Polk County Public Schools	Bartow, FL	102
Pr.Georges County Public Schools	Upper Marlboro, MD	199
San Antonio Indep. Schools	San Antonio, TX	514
San Diego Public Schools	San Diego, CA	3954
VA Beach City Schools	VA Beach, VA	73
Wake County Public Schools	Raleigh, NC	420
Washington Public Schools	Washington, DC	186

Response Key: 1 = considerable loss; 2 = slight low; 3 = status quo; 4 = slight gain; 5 = considerable gain; NR = no response.

clear, however, from the responses that some systems included permanent units and probably some permanent modules that are being utilized. One hundred percent of the thirty-nine school systems responded to this question. Even though some answers may be difficult to decipher, the focus of the study was in no way jeopardized by the responses. Additionally, the pilot surveys clearly elicited the desired responses. Differences in semantics probably accounted for the responses.

Table 8 includes the average number of years that

TABLE 8

AVERAGE NUMBER OF YEARS IN USE - TEMPORARY

SCHOOL SYSTEM	LOCATION	NUMBER
Anne Arundel County Public Schools	Annapolis, MD	10
Austin City Public Schools	Austin, TX	12.4
Baltimore County Public Schools	Towson, MD	20
Broward County Public Schools	Ft Lauderdale, FL	20
Charlotte-Mecklenburg Public Schools	Charlotte, NC	20
City of Atlanta Public Schools	Atlanta, GA	10
City of Milwaukee Public Schools	Milwaukee, WI	22
Clark County Public Schools	Las Vegas, NV	6
Cobb County Public Schools	Marietta, GA	6.7
Columbus Public Schools	Columbus, OH	1
Cook County Public Schools	Chicago, IL	5
Dade County Public Schools	Miami, FL	NR
Davidson County Public Schools	Nashville, TN	15.2
Dekalb County Public Schools	Decatur, GA	11.5
Denver County Public Schools	Denver, CO	NR
Duval County Public Schools	Jacksonville, FL	5
Fairfax County Public Schools	Fairfax, VA	15
Fort Worth Public Schools	Fort Worth, TX	20
Granite District Public Schools	Salt Lake City, UT	10
Hawaii Public Schools	Honolulu, HA	20
Hillsborough County Public Schools	Tampa, FL	15
Jefferson County Public Schools	Louisville, KY	12
Jordan School District	Sandy, UT	11
Long Beach Public Schools	Long Beach, CA	30
Los Angeles City Public Schools	L.A., CA	20

NR = No response

Table 8 cont.

SCHOOL SYSTEM	LOCATION	NUMBER
Memphis City Public Schools	Memphis, TN	8
Mobile County Public Schools	Mobile, AL	35
Montgomery County Public Schools	Rockville, MD	7
Orange County Public Schools	Orlando, FL	10
Orleans Parish Public Schools	New Orleans, LA	30
Palm Beach County Public Schools	West Palm Beach, FL	NR
Pinellas County Public Schools	Clearwater, FL	18
Polk County Public Schools	Bartow, FL	NR
Pr.Georges County Public Schools	Upper Marlboro,MD	10
San Antonio Indep. Schools	San Antonio, TX	20
San Diego Public Schools	San Diego, CA	35
VA Beach City Schools	VA Beach, VA	37
Wake County Public Schools	Raleigh, NC	5
Washington Public Schools	Washington, DC	NR

NR = No response

temporary housing has been in use in the responding school systems. All but 14.7 percent of the districts responded to this survey question. Average years in use ranged from a low of one year to a high of thirty-seven years. Of the 34 districts responding, twenty-five listed ten years or more of average years in use. Interviews revealed that vendors believed that if properly maintained, temporary classroom units would reflect the life of permanently constructed classrooms. Data revealed that Virginia Beach, Virginia, San Diego, California, Mobile, Alabama, and Long Beach, California, have availed themselves of temporary classrooms for at least the past three decades. Virginia Beach City

Public Schools, Virginia Beach, Virginia, San Diego Public Schools, San Diego, California, Mobile County Public Schools, Mobile, Alabama, Long Beach Public Schools, Long Beach, California, and Orleans Parish Public Schools, New Orleans, Louisiana, reported temporary housing average use of thirty or more years. Austin City Public Schools, Austin, Texas, reported a mean of 12.4 years. Columbus Public Schools, Columbus, Ohio, reported an average use of one year for its total of twenty-nine temporary units.

Table 9 presents the average number of years existing permanent classroom units have been in use in the responding school systems. Thirty-two school divisions responded to this portion of the survey. The average number of years in use for permanent construction ranged from twenty to one hundred years. No respondent reported fewer than twenty years of use and sixty-two percent reported average years of use to be thirty years or more. This would certainly lead one to believe that many school districts will be facing large retrofitting or replacement costs in the very near future. Jordan School District, Sandy, Utah, reported an average number of years in use for its seventy permanent buildings to be seventy years. They anticipated no new temporary or permanent facilities and showed only a slight gain in school population during the past three years. Most permanent buildings for reporting school systems averaged over thirty years in use, prompting one to recognize a need

TABLE 9

AVERAGE NUMBER OF YEARS IN USE - PERMANENT

SCHOOL SYSTEM	LOCATION	NUMBER
Anne Arundel County Public Schools	Annapolis, MD	25
Austin City Public Schools	Austin, TX	31
Baltimore County Public Schools	Towson, MD	35
Broward County Public Schools	Ft Lauderdale, FL	20
Charlotte-Mecklenburg Public Schools	Charlotte, NC	30
City of Atlanta Public Schools	Atlanta, GA	30
City of Milwaukee Public Schools	Milwaukee, WI	NR
Clark County Public Schools	Las Vegas, NV	20
Cobb County Public Schools	Marietta, GA	24
Columbus Public Schools	Columbus, OH	45
Cook County Public Schools	Chicago, IL	NR
Dade County Public Schools	Miami, FL	NR
Davidson County Public Schools	Nashville, TN	38
Dekalb County Public Schools	Decatur, GA	20
Denver County Public Schools	Denver, CO	40
Duval County Public Schools	Jacksonville, FL	37
Fairfax County Public Schools	Fairfax, VA	30
Fort Worth Public Schools	Fort Worth, TX	40
Granite District Public Schools	Salt Lake City,UT	25
Hawaii Public Schools	Honolulu, HA	NR
Hillsborough County Public Schools	Tampa, FL	NR
Jefferson County Public Schools	Louisville, KY	30
Jordan School District	Sandy, UT	70
Long Beach Public Schools	Long Beach, CA	46
Los Angeles City Public Schools	L.A., CA	30

NR = No response

Table 9 cont.

SCHOOL SYSTEM	LOCATION	NUMBER
Memphis City Public Schools	Memphis, TN	25
Mobile County Public Schools	Mobile, AL	45
Montgomery County Public Schools	Rockville, MD	25
Orange County Public Schools	Orlando, FL	27
Orleans Parish Public Schools	New Orleans, LA	50
Palm Beach County Public Schools	West Palm Beach,FL	NR
Pinellas County Public Schools	Clearwater, FL	22.5
Polk County Public Schools	Bartow, FL	NR
Pr.Georges County Public Schools	Upper Marlboro, MD	29
San Antonio Indep. Schools	San Antonio, TX	50
San Diego Public Schools	San Diego, CA	35
VA Beach City Schools	VA Beach, VA	45
Wake County Public Schools	Raleigh, NC	34
Washington Public Schools	Washington, DC	NR

NR = No response

for retrofitting or replacement. For discussion purposes only, assume the average life of permanent construction to be thirty-five years and the total life of temporary classroom units to be thirty-five years. Based on that assumption and current retrofitting prices, it would cost approximately $116,666 to retrofit each individual room in a school building, or $3,333 per year deterioration of that unit for the thirty-five years. A new temporary unit can be purchased for an average price of $43.00 per square foot or $38,000 per unit, with another thirty-five year life span and deterioration of only $1,086 per year over the thirty-five year period.

Table 10 introduces data pertinent to the subjects and grade levels housed in temporary classrooms. Comments were solicited for this question and responses indicated that there are few restrictions on the use of temporary classroom units by any of the surveyed population.

Fifty-three percent of the respondents indicated that all grades, K-12, were housed in temporary units. While three of the twenty-four respondents noted that only elementary grades were housed in temporary units. Sixty-one percent of the systems surveyed responded to the grades housed question.

Of the twenty-one respondents referencing subjects taught in temporary units, ninety percent indicated all subjects. Broward County, Florida, Clark County, Las Vegas, Nevada, Davidson County, Tennessee, Fairfax County, Virginia, Fort Worth, Texas, and Prince Georges County Public Schools, Maryland, excepted high school laboratories. Anne Arundel Public Schools, Maryland, noted that cultural arts, special education, drivers education, and intermediate level students were housed in temporary units. They also responded that temporary units were utilized for storage. Davidson County Public Schools, Nashville, Tennessee, did not house kindergarten students in temporary units. Many programs, such as gifted, psychologists, social workers, and occupational physical therapy, are housed in temporary units in Cook County Public Schools, Chicago, Illinois. Classroom

TABLE 10

TYPE OF USE - TEMPORARY ONLY

SCHOOL SYSTEM	LOCATION	GRADES	SUBJECTS	
Anne Arundel County Pub Sch	Annapolis,MD	NR	(2)	
Austin City Public Schools	Austin,TX	K-12	ALL	
Baltimore County Public Sch	Towson,MD	K-12	ALL	
Broward County Public Sch	Ft Lauder-dale, FL	K-12	ALL(1)	
Charlotte-Mecklenburg Pub. Sch.	Charlotte,NC			NR
City of Atlanta Public Sch	Atlanta,GA	K-12	ALL	
City of Milwaukee Public Sch	Milwaukee,WI			NR
Clark County Public Schools	Las Vegas,NV	K-12	ALL(1)	
Cobb County Public Schools	Marietta,GA			NR
Columbus Public Schools	Columbus,OH	4 or 5		
Cook County Public Schools	Chicago,IL			NR
Dade County Public Schools	Miami,FL	K-12	ALL	
Davidson County Public Sch	Nashville,TN	K-12	ALL(1)	
Dekalb County Public Schools	Decatur,GA			NR
Denver County Public Schools	Denver,CO			NR
Duval County Public Schools	Jacksonville FL			NR
Fairfax County Public Sch	Fairfax,VA	K-12	ALL(1)	
Fort Worth Public Schools	Fort Worth,TX	K-12	ALL(1)	
Granite District Public Sch	Salt Lake City,UT	K-12	MOST	
Hawaii Public Schools	Honolulu,HA	K-12	ALL	
Hillsborough County Pub Sch	Tampa,FL	K-12	NR	
Jefferson County Public Sch	Louisville, KY	K-5	NR	
Jordan School District	Sandy,UT			NR
Long Beach Public Schools	Long Beach,CA	NR	ALL	
Los Angeles City Public Sch	L.A.,CA	K-12	NR	

NR = No response
(1) = Except High School Labs
(2) = Cultural Arts, Special Education, Drivers Education, Intermediate LRC

Table 10 cont.

SCHOOL SYSTEM	LOCATION	GRADES	SUBJECTS	
Memphis City Public Schools	Memphis,TN	K-12	ALL	
Mobile County Public Schools	Mobile, AL	K-12	ALL	
Montgomery County Public Sch	Rockville,MD			NR
Orange County Public Schools	Orlando,FL	K-12	ALL	
Orleans Parish Public Schools	New Orleans,LA	NR	ALL	
Palm Beach County Public Sch	West Palm Beach,FL	K-12	ALL	
Pinellas County Public Schools	Clearwater,FL	ELEM.	NR	
Polk County Public Schools	Bartow,FL	K-12	ALL	
Pr.Georges County Public Sch	Upper Marlboro, MD	K-12	ALL(1)	
San Antonio Indep. Schools	San Antonio,TX			NR
San Diego Public Schools	San Diego,CA	K-12	NR	
VA Beach City Schools	VA Beach,VA	K-12	ALL	
Wake County Public Schools	Raleigh,NC			NR
Washington Public Schools	Washington,DC			NR

NR = No response
(1) = Except High School Labs
(2) = Cultural Arts, Special Education, Drivers Education, Intermediate LRC

trailers were used for driver training simulation in Cook County Public Schools, Chicago, Illinois. Orleans Parish Public Schools, New Orleans, Louisiana, indicated that every program imaginable was housed in temporary units. Baltimore County Public Schools, Towson, Maryland, houses pre-K through 12 in temporary units and have 101 units. Use varies according to the need at the location. Cobb County Public Schools, Marietta, Georgia, indicated that they were in the process of moving units and had no way of assessing the use

at that time. Polk County Public Schools, Bartow, Florida, use six hundred portable units for every purpose, K-12. Los Angeles City Public Schools, Los Angeles, California, reported the use of 3,429 temporary classrooms for all purposes. The range and extent of uses certainly seems to attest to the flexibility of temporary housing.

Table 11 addresses the scheduled new temporary facilities anticipated by the responding school divisions. Thirty-four of the thirty-nine respondents answered this survey question. New temporary facilities scheduled ranged from zero to 275. Of the eighty-seven percent that responded, sixty-four percent have scheduled new temporary facilities. All eight school divisions in Florida and the three in California have scheduled new temporary facilities. Some school divisions appear to have recognized certain perceived advantages of temporary housing, i.e., cost, speed of construction and flexibility of housing. Austin, Texas, Salt Lake City, Utah, Honolulu, Hawaii, and Towson, Maryland, have also scheduled new temporary facilities.

Table 12 addresses scheduled new permanent facilities and thirty-six of thirty-nine responding school divisions indicated new permanent construction. New classrooms or schools range from a high of 320 in San Diego, California, to zero in Washington, D.C., and Fort Worth, Texas, Salt Lake City, Utah, and Columbus, Ohio. Los Angeles, California, has scheduled twenty-five new school buildings and forty-nine new

TABLE 11

SCHEDULED NEW FACILITIES - TEMPORARY

SCHOOL SYSTEM	LOCATION	NUMBER
Anne Arundel County Public Schools	Annapolis, MD	11
Austin City Public Schools	Austin, TX	90
Baltimore County Public Schools	Towson, MD	15
Broward County Public Schools	Ft Lauderdale,FL	2
Charlotte-Mecklenburg Public Schools	Charlotte, NC	29
City of Atlanta Public Schools	Atlanta, GA	0
City of Milwaukee Public Schools	Milwaukee, WI	0
Clark County Public Schools	Las Vegas, NV	0
Cobb County Public Schools	Marietta, GA	NR
Columbus Public Schools	Columbus, OH	0
Cook County Public Schools	Chicago, IL	6
Dade County Public Schools	Miami, FL	200
Davidson County Public Schools	Nashville, TN	0
Dekalb County Public Schools	Decatur, GA	50
Denver County Public Schools	Denver, CO	NR
Duval County Public Schools	Jacksonville, FL	0
Fairfax County Public Schools	Fairfax, VA	0
Fort Worth Public Schools	Fort Worth, TX	0
Granite District Public Schools	Salt Lake City, UT	20
Hawaii Public Schools	Honolulu, HA	40
Hillsborough County Public Schools	Tampa, FL	200
Jefferson County Public Schools	Louisville, KY	0
Jordan School District	Sandy, UT	0
Long Beach Public Schools	Long Beach, CA	15
Los Angeles City Public Schools	L.A., CA	275

NR = No response

Table 11 cont.

SCHOOL SYSTEM	LOCATION	NUMBER
Memphis City Public Schools	Memphis, TN	3
Mobile County Public Schools	Mobile, AL	20
Montgomery County Public Schools	Rockville, MD	10
Orange County Public Schools	Orlando, FL	140
Orleans Parish Public Schools	New Orleans, LA	6
Palm Beach County Public Schools	West Palm Beach, FL	NR
Pinellas County Public Schools	Clearwater, FL	24
Polk County Public Schools	Bartow, FL	100
Pr.Georges County Public Schools	Upper Marlboro, MD	NR
San Antonio Indep. Schools	San Antonio, TX	NR
San Diego Public Schools	San Diego, CA	120
VA Beach City Schools	VA Beach, VA	12
Wake County Public Schools	Raleigh, NC	0
Washington Public Schools	Washington, DC	0

NR = No response

schools are programmed for Dade County, Miami, Florida, Hillsborough County, Tampa, Florida, plans to build twenty-three new elementary schools. Montgomery County, Maryland, has eleven elementary and four middle schools on the drawing board and have reopened one elementary school and one middle school. Major construction programs are underway in the majority of the school systems surveyed. If school systems are using temporary housing in the conventional context this is understandable, since permanent buildings would replace the temporary units. One school district noted that temporary housing is a temporary solution to a permanent problem.

TABLE 12

SCHEDULED NEW FACILITIES - PERMANENT

SCHOOL SYSTEM	LOCATION	NUMBER
Anne Arundel County Public Schools	Annapolis, MD	8
Austin City Public Schools	Austin, TX	6
Baltimore County Public Schools	Towson, MD	2
Broward County Public Schools	Ft Lauderdale, FL	5
Charlotte-Mecklenburg Public Schools	Charlotte, NC	4
City of Atlanta Public Schools	Atlanta, GA	1
City of Milwaukee Public Schools	Milwaukee, WI	3
Clark County Public Schools	Las Vegas, NV	60
Cobb County Public Schools	Marietta, GA	5
Columbus Public Schools	Columbus, OH	0
Cook County Public Schools	Chicago, IL	NR
Dade County Public Schools	Miami, FL	49
Davidson County Public Schools	Nashville, TN	NR
Dekalb County Public Schools	Decatur, GA	39
Denver County Public Schools	Denver, CO	4
Duval County Public Schools	Jacksonville, FL	NR
Fairfax County Public Schools	Fairfax, VA	2
Fort Worth Public Schools	Fort Worth, TX	0
Granite District Public Schools	Salt Lake City, UT	0
Hawaii Public Schools	Honolulu, HA	120
Hillsborough County Public Schools	Tampa, FL	23
Jefferson County Public Schools	Louisville, KY	6
Jordan School District	Sandy, UT	0
Long Beach Public Schools	Long Beach, CA	60
Los Angeles City Public Schools	L.A., CA	25

NR = No response

Table 12 cont.

SCHOOL SYSTEM	LOCATION	NUMBER
Memphis City Public Schools	Memphis, TN	4
Mobile County Public Schools	Mobile, AL	1
Montgomery County Public Schools	Rockville, MD	15
Orange County Public Schools	Orlando, FL	7
Orleans Parish Public Schools	New Orleans, LA	2
Palm Beach County Public Schools	West Palm Beach, FL	39
Pinellas County Public Schools	Clearwater, FL	11
Polk County Public Schools	Bartow, FL	4
Pr.Georges County Public Schools	Upper Marlboro, MD	3
San Antonio Indep. Schools	San Antonio, TX	0
San Diego Public Schools	San Diego, CA	320
VA Beach City Schools	VA Beach, VA	4
Wake County Public Schools	Raleigh, NC	11
Washington Public Schools	Washington, DC	0

NR = No response

Table 13 includes the responses from twenty-seven of the thirty-nine respondents addressing square foot costs of temporary classrooms. Sixty-nine percent of the respondents proffered their square foot costs for temporary classroom units. Costs ranged from a low of $17 per square foot in Mobile, Alabama, to a high of $111 in Los Angeles, California. Hawaii lists $75,000 per classroom, however, this is misleading. Eugene Imai, Assistant Superintendent, Hawaii school district, indicates that all projected infrastructure costs are figured into the unit costs and additional land, sidewalks, and traffic signals miles away

TABLE 13

SQUARE FOOT COSTS - TEMPORARY - LAST THREE YEARS

SCHOOL SYSTEM	LOCATION	NUMBER
Anne Arundel County Public Schools	Annapolis, MD	75
Austin City Public Schools	Austin, TX	62
Baltimore County Public Schools	Towson, MD	55
Broward County Public Schools	Ft Lauderdale, FL	33
Charlotte-Mecklenburg Public Schools	Charlotte, NC	36
City of Atlanta Public Schools	Atlanta, GA	42
City of Milwaukee Public Schools	Milwaukee, WI	NR
Clark County Public Schools	Las Vegas, NV	31
Cobb County Public Schools	Marietta, GA	30
Columbus Public Schools	Columbus, OH	38
Cook County Public Schools	Chicago, IL	NR
Dade County Public Schools	Miami, FL	35
Davidson County Public Schools	Nashville, TN	25
Dekalb County Public Schools	Decatur, GA	NR
Denver County Public Schools	Denver, CO	NR
Duval County Public Schools	Jacksonville, FL	NR
Fairfax County Public Schools	Fairfax, VA	47
Fort Worth Public Schools	Fort Worth, TX	NR
Granite District Public Schools	Salt Lake City, UT	40
Hawaii Public Schools	Honolulu, HA	75000
Hillsborough County Public Schools	Tampa, FL	33
Jefferson County Public Schools	Louisville, KY	70
Jordan School District	Sandy, UT	23
Long Beach Public Schools	Long Beach, CA	50
Los Angeles City Public Schools	L.A., CA	111

NR = No response

Table 13 cont.

SCHOOL SYSTEM	LOCATION	NUMBER
Memphis City Public Schools	Memphis, TN	NR
Mobile County Public Schools	Mobile, AL	17
Montgomery County Public Schools	Rockville, MD	49
Orange County Public Schools	Orlando, FL	32
Orleans Parish Public Schools	New Orleans, LA	35
Palm Beach County Public Schools	West Palm Beach, FL	NR
Pinellas County Public Schools	Clearwater, FL	NR
Polk County Public Schools	Bartow, FL	NR
Pr.Georges County Public Schools	Upper Marlboro, MD	NR
San Antonio Indep. Schools	San Antonio, TX	30
San Diego Public Schools	San Diego, CA	80
VA Beach City Schools	VA Beach, VA	21
Wake County Public Schools	Raleigh, NC	27
Washington Public Schools	Washington, DC	NR

NR = No response

from the classroom site. The Hawaii School System does not isolate the classroom unit cost. Table 14 will show that $75,000 per unit is still a bargain when compared to a $200,000 cost for permanent classrooms. Currently, four temporary classrooms being placed in a module in Honolulu will cost $3,000,000 or $750,000 each. Excluding Hawaii, costs of $75,000 per unit, the average cost per square foot for the total number of respondents is $43 per square foot.

Square foot costs for temporary housing in some schools districts has skyrocketed in the past few years. This results from increased fire safety requirements. In Los

Angeles City Public Schools, Los Angeles, California, mandatory handicap access and fire panel requirements have jumped square foot costs to $111.00. Even so, with time and flexibility factors considered, temporary construction appears to be a bargain.

Table 14 responses on square foot costs for permanent classroom construction over the past three years came from thirty-three of the thirty-nine school divisions responding. The cost of permanent school construction according to this survey ranged from a low of $29 per square foot in Austin, Texas, to a high of $68 per square foot in the city of Milwaukee, Wisconsin. Mid-ranges were from $72 per square foot in Raleigh, North Carolina, to $85 per square foot for Montgomery County Schools in Rockville, Maryland. Those in the highest category reported from $87 per square foot in Prince Georges County, Maryland, to $130 per square foot in San Diego, California. As in Table 13, Hawaii's square foot costs are not calculated since infrastructure is also included in permanent construction, and unit costs are not available. Hawaii has $19 million in construction projects underway and are considering year-round schools. Overall, average square foot costs for permanent construction for the respondents addressing this question are $73 per square foot.

Table 15 addresses the comparison of square foot costs between temporary and permanent classrooms. Hypothesis 1 of this study states there is no statistically significant

TABLE 14

SQUARE FOOT COSTS - PERMANENT - LAST THREE YEARS

SCHOOL SYSTEM	LOCATION	NUMBER
Anne Arundel County Public Schools	Annapolis, MD	95
Austin City Public Schools	Austin, TX	29
Baltimore County Public Schools	Towson, MD	95
Broward County Public Schools	Ft Lauderdale, FL	75
Charlotte-Mecklenburg Public Schools	Charlotte, NC	50
City of Atlanta Public Schools	Atlanta, GA	75
City of Milwaukee Public Schools	Milwaukee, WI	68
Clark County Public Schools	Las Vegas, NV	65
Cobb County Public Schools	Marietta, GA	50
Columbus Public Schools	Columbus, OH	NR
Cook County Public Schools	Chicago, IL	NR
Dade County Public Schools	Miami, FL	98
Davidson County Public Schools	Nashville, TN	52
Dekalb County Public Schools	Decatur, GA	58
Denver County Public Schools	Denver, CO	75
Duval County Public Schools	Jacksonville, FL	NR
Fairfax County Public Schools	Fairfax, VA	72
Fort Worth Public Schools	Fort Worth, TX	65
Granite District Public Schools	Salt Lake City, UT	60
Hawaii Public Schools	Honolulu, HA	200
Hillsborough County Public Schools	Tampa, FL	67
Jefferson County Public Schools	Louisville, KY	67
Jordan School District	Sandy, UT	55
Long Beach Public Schools	Long Beach, CA	120
Los Angeles City Public Schools	L.A., CA	78

NR = No response

Table 14 cont.

SCHOOL SYSTEM	LOCATION	NUMBER
Memphis City Public Schools	Memphis, TN	55
Mobile County Public Schools	Mobile, AL	50
Montgomery County Public Schools	Rockville, MD	85
Orange County Public Schools	Orlando, FL	73
Orleans Parish Public Schools	New Orleans, LA	80
Palm Beach County Public Schools	West Palm Beach, FL	95
Pinellas County Public Schools	Clearwater, FL	80.92
Polk County Public Schools	Bartow, FL	NR
Pr.Georges County Public Schools	Upper Marlboro, MD	87
San Antonio Indep. Schools	San Antonio, TX	NR
San Diego Public Schools	San Diego, CA	130
VA Beach City Schools	VA Beach, VA	55
Wake County Public Schools	Raleigh, NC	72
Washington Public Schools	Washington, DC	NR

NR = No response

difference between the cost efficient utilization of permanent and temporary classrooms.

H(o) : No difference in costs/sq. ft. of permanent vs temporary classrooms.

The respondents were asked to provide square foot costs for both permanent and temporary classrooms. All school systems not responding for either permanent, temporary, or both were eliminated from the analysis, as was Hawaii due to peculiarities in their costing process explained elsewhere.

To test for a statistically significant difference in costs, the student t-test was utilized. This procedure tests

TABLE 15

SQUARE FOOT COSTS - PERMANENT AND TEMPORARY

SCHOOL SYSTEM	LOCATION	PERM.	TEMP.
Anne Arundel County Public Sch	Annapolis, MD	95	75
Austin City Public Schools	Austin, TX	29	62
Baltimore County Public Schools	Towson, MD	95	55
Broward County Public Schools	Ft Lauderdale, FL	75	33
Charlotte-Mecklenburg Public Sch.	Charlotte, NC	50	36
City of Atlanta Public Schools	Atlanta, GA	75	42
Clark County Public Schools	Las Vegas, NV	65	31
Cobb County Public Schools	Marietta, GA	50	30
Dade County Public Schools	Miami, FL	98	35
Davidson County Public Schools	Nashville, TN	52	25
Fairfax County Public Schools	Fairfax, VA	72	47
Granite District Public Schools	Salt Lake City,UT	60	40
Hillsborough County Public Sch	Tampa, FL	67	33
Jefferson County Public Schools	Louisville, KY	67	70
Jordan School District	Sandy, UT	55	23
Long Beach Public Schools	Long Beach, CA	120	50
Los Angeles City Public Schools	Los Angeles, CA	78	111
Mobile County Public Schools	Mobile, AL	50	17
Montgomery City Public Schools	Rockville, MD	85	49
Orange County Public Schools	Orlando, FL	73	32
Orleans Parish Public Schools	New Orleans, LA	80	35
San Diego Public Schools	San Diego, CA	180	60
VA Beach City Public Schools	VA Beach, VA	55	21
Wake County Public Schools	Raleigh, NC	72	27

Mean	72.86	41.16
Sample Variable	530.41	536.53
Sample Size	24.00	24.00
Pooled Sample Variable	533.47	
t-test Statistic	4.75	
Degrees of Freedom	46	
Critical Values	(p = .05) T<.-1.96 & T> 1.96	

for equality of means of the two sets of cost data, using sample means and a pooled sample variance. Our test statistic t was found to be 4.75.

The critical value of t for rejecting the null hypothesis at the .05 level of significance is $|t|>1.96$. Therefore, we clearly reject H(o) and find the cost / square foot of temporary classrooms to be significantly lower than the cost of permanent at the .05 level.

Costs differed by as much as $163 per square foot from high to low between permanent and temporary housing costs. Naturally, construction region and local building codes vary costs from state to state.

The mean difference from $72.86 for permanent construction to $41.16 for temporary construction was $31.70 per square foot. A quick review of Tables 13 and 14 indicates that significant cost differences exist between temporary and permanent school building construction.

In Table 16, eighteen of the thirty-nine respondents did not address the projected square foot costs for temporary buildings over the next three years. In the case of Los Angeles, California, they simply assume a five percent inflation rate for projected costs per square foot. Also, their significant increases are the result of local codes and the Field Act, concerning seismic requirements. Other divisions not scheduling new facilities, temporary or permanent, had no reason to respond or simply assume such projections to be

guesswork at best.

The average projected square foot cost of temporary housing for three years ahead was $50.73. This is $30.27 per square foot below projected cost for permanent construction, which was $81.00 per square foot as noted in Table 17.

Thirty of the thirty-nine respondents, or seventy-seven percent, answered the question concerning projected square foot costs for permanent construction in Table 17. A significant point made was that permanent costs appear to be increasing from an already strong construction perspective.

Assuming that costs projected were figured over a three-year span, in 1993, average square foot costs for permanent construction in the responding school divisions would be $81.00 per square foot for construction only. Hawaii was not averaged in order to give an accurate picture of future projections. As previously stated, Hawaii includes all infrastructure costs in their square foot building projections. It is surmised that the projected high construction costs in California stem from seismic requirements in part.

Twenty-nine, or seventy-four percent of the thirty-nine respondents provided decision-making rationales for the selection of temporary housing. Table 18 presents data derived from the survey which is pertinent to the decision-making factors involved in making final determinations in the housing of students.

TABLE 16

SQUARE FOOT COSTS PROJECTED - TEMPORARY

SCHOOL SYSTEM	LOCATION	NUMBER
Anne Arundel County Public Schools	Annapolis, MD	83
Austin City Public Schools	Austin, TX	54
Baltimore County Public Schools	Towson, MD	65
Broward County Public Schools	Ft Lauderdale, FL	36
Charlotte-Mecklenburg Public Schools	Charlotte, NC	45
City of Atlanta Public Schools	Atlanta, GA	NR
City of Milwaukee Public Schools	Milwaukee, WI	NR
Clark County Public Schools	Las Vegas, NV	NR
Cobb County Public Schools	Marietta, GA	35
Columbus Public Schools	Columbus, OH	NR
Cook County Public Schools	Chicago, IL	NR
Dade County Public Schools	Miami, FL	NR
Davidson County Public Schools	Nashville, TN	28
Dekalb County Public Schools	Decatur, GA	NR
Denver County Public Schools	Denver, CO	NR
Duval County Public Schools	Jacksonville, FL	NR
Fairfax County Public Schools	Fairfax, VA	56
Fort Worth Public Schools	Fort Worth, TX	NR
Granite District Public Schools	Salt Lake City, UT	45
Hawaii Public Schools	Honolulu, HA	100,000
Hillsborough County Public Schools	Tampa, FL	40
Jefferson County Public Schools	Louisville, KY	NR
Jordan School District	Sandy, UT	NR
Long Beach Public Schools	Long Beach, CA	60
Los Angeles City Public Schools	L.A., CA	128

NR = No response

Table 16 cont.

SCHOOL SYSTEM	LOCATION	NUMBER
Memphis City Public Schools	Memphis, TN	NR
Mobile County Public Schools	Mobile, AL	23
Montgomery County Public Schools	Rockville, MD	50
Orange County Public Schools	Orlando, FL	37
Orleans Parish Public Schools	New Orleans, LA	37
Palm Beach County Public Schools	West Palm Beach, FL	NR
Pinellas County Public Schools	Clearwater, FL	NR
Polk County Public Schools	Bartow, FL	NR
Pr.Georges County Public Schools	Upper Marlboro, MD	NR
San Antonio Indep. Schools	San Antonio, TX	NR
San Diego Public Schools	San Diego, CA	85
VA Beach City Schools	VA Beach, VA	25
Wake County Public Schools	Raleigh, NC	32
Washington Public Schools	Washington, DC	NR

NR = No response

Although several factors were listed by the responding school divisions, it would appear that economy is an overriding consideration. Fifty-eight percent of the respondents list economy as a major decision-making variable. Forty-eight percent responded that mandates are the determining factor. Chapter II, Review of the Literature, made particular mention of California's mandate of thirty percent funding for temporary school housing. Additionally, many localities, due to increasing needs to retrofit and/or provide new facilities, are being burdened with the high construction costs of new classrooms.

TABLE 17

SQUARE FOOT COSTS PROJECTED - PERMANENT

SCHOOL SYSTEM	LOCATION	NUMBER
Anne Arundel County Public Schools	Annapolis, MD	110
Austin City Public Schools	Austin, TX	30
Baltimore County Public Schools	Towson, MD	102
Broward County Public Schools	Ft Lauderdale, FL	80
Charlotte-Mecklenburg Public Schools	Charlotte, NC	63
City of Atlanta Public Schools	Atlanta, GA	75
City of Milwaukee Public Schools	Milwaukee, WI	88
Clark County Public Schools	Las Vegas, NV	70
Cobb County Public Schools	Marietta, GA	55
Columbus Public Schools	Columbus, OH	NR
Cook County Public Schools	Chicago, IL	NR
Dade County Public Schools	Miami, FL	NR
Davidson County Public Schools	Nashville, TN	60
Dekalb County Public Schools	Decatur, GA	NR
Denver County Public Schools	Denver, CO	80
Duval County Public Schools	Jacksonville, FL	NR
Fairfax County Public Schools	Fairfax, VA	85
Fort Worth Public Schools	Fort Worth, TX	NR
Granite District Public Schools	Salt Lake City, UT	65
Hawaii Public Schools	Honolulu, HA	300,000
Hillsborough County Public Schools	Tampa, FL	75
Jefferson County Public Schools	Louisville, KY	70
Jordan School District	Sandy, UT	NR
Long Beach Public Schools	Long Beach, CA	130
Los Angeles City Public Schools	L.A., CA	90

NR = No response

Table 17 cont.

SCHOOL SYSTEM	LOCATION	NUMBER
Memphis City Public Schools	Memphis, TN	63
Mobile County Public Schools	Mobile, AL	55
Montgomery County Public Schools	Rockville, MD	97
Orange County Public Schools	Orlando, FL	80
Orleans Parish Public Schools	New Orleans, LA	85
Palm Beach County Public Schools	West Palm Beach, FL	108
Pinellas County Public Schools	Clearwater, FL	95
Polk County Public Schools	Bartow, FL	NR
Pr.Georges County Public Schools	Upper Marlboro, MD	96
San Antonio Indep. Schools	San Antonio, TX	65
San Diego Public Schools	San Diego, CA	140
VA Beach City Schools	VA Beach, VA	70
Wake County Public Schools	Raleigh, NC	78
Washington Public Schools	Washington, DC	NR

NR = No response

Land available is also a contributing factor in making decisions to provide temporary school housing. Some respondents cite time and cost involving land purchases as a reason to decide on temporary housing. Other reasons given which center around decisions for temporary housing were rapid growth, overcrowding, fluctuating enrollments, and quick construction response. Temporary housing meets these concerns. Orleans Parish Public Schools, New Orleans, Louisiana, currently utilizing 467 temporary classroom units note shifts in population, age of old buildings, more pre-K classes, which must be on the first floor, as other rationale

TABLE 18

RATIONALE FOR BUILDING TYPE - TEMPORARY

SCHOOL SYSTEM	LOCATION	MAN-DATE	ECON-OMY	AES-THETIC	LAND AVAIL.	OTHER
Anne Arundel County Public Sch	Annapolis, MD	*				Necessitated by overcrowding
Austin City Public Schools	Austin, TX	*	*			Rapid student growth
Baltimore County Public Schools	Towson, MD		*			
Broward County Public Schools	Ft Lauderdale, FL					NR
Charlotte-Mecklenburg Public Sch.	Charlotte, NC	*				
City of Atlanta Public Schools	Atlanta, GA	*				
City of Milwaukee Public Schools	Milwaukee, WI					NR
Clark County Public Schools	Las Vegas, NV					NR
Cobb County Public Schools	Marietta, GA					(2)
Columbus Public Schools	Columbus, OH		*			
Cook County Public Schools	Chicago, IL					Overcrowding
Dade County Public Schools	Miami, FL					Rapid student growth
Davidson County Public Schools	Nashville, TN					Relieve overcrowding
Dekalb County Public Schools	Decatur, GA		*			School over capacity
Denver County Public Schools	Denver, CO					NR

Table 18 cont.

SCHOOL SYSTEM	LOCATION	MAN-DATE	ECON-OMY	AES-THETIC	LAND AVAIL.	OTHER
Duval County Public Schools	Jacksonville, FL					Fluctuating enrollments
Fairfax County Public Schools	Fairfax, VA		*			
Fort Worth Public Schools	Fort Worth, TX		*			
Granite District Public Schools	Salt Lake City, UT		*		*	
Hawaii Public Schools	Honolulu, HA	*	*		*	Quick response
Hillsborough County Public Sch	Tampa, FL		*			
Jefferson County Public Schools	Louisville, KY					NR
Jordan School District	Sandy, UT		*			
Long Beach Public Schools	Long Beach, CA	*			*	
Los Angeles City Public Schools	L.A., CA	*	*		*	(1)
Memphis City Public Schools	Memphis, TN					NR
Mobile County Public Schools	Mobile, AL		*			
Montgomery County Public Schools	Rockville, MD					NR
Orange County Public Schools	Orlando, FL	*	*			
Orleans Parish Public Schools	New Orleans, LA	*	*			
Palm Beach County Public Sch	W Palm Beach, FL					NR
Pinellas County Public Schools	Clearwater, FL					NR

NR = No response

Table 18 cont.

SCHOOL SYSTEM	LOCATION	MAN-DATE	ECON-OMY	AES-THETIC	LAND AVAIL.	OTHER
Polk County Public Schools	Bartow, FL	*				
Prince Georges County Public Schools	Upper Marlboro, MD		*	*		
San Antonio Indep. Schools	San Antonio, TX	*				
San Diego Public Schools	San Diego,CA	*				
VA Beach City Public Schools	VA Beach,VA	*	*		*	
Wake County Public Schools	Raleigh,NC	*	*			
Washington Public Schools	Washington, DC					NR

NR = No response
(1) = Land acquisition to construct schools is difficult and time consuming
(2) = Mobile classrooms used while permanent under construction

for building type. The popularity of magnet schools and what the Orleans Parish Public Schools, New Orleans, Louisiana, describe as historic under-funding for school facilities are other factors affecting decisions.

Thirty-one of thirty-nine, or seventy-seven percent of the school divisions responded to questions relative to decisions for permanent housing. Pertinent data are presented in Table 19.

Fifty-eight percent of the respondents noted that aesthetics played a major role in determining the use of permanent school housing. Forty-two percent cited mandates. Austin, Texas, which reported increased square foot costs in terms of temporary housing, explained that changes in educational specifications and size caused the reduced estimate for future projections. The state mandates in Texas of no more than twenty-two students per classroom in grades K-4 had significant impact, in addition to growth, and has prompted increased use of both temporary and permanent facilities.

Thirty-eight percent responding said that economy was a factor in determining building type. This probably centers around beliefs about functional life of school buildings. Twenty-nine percent listed land availability as a factor in rationale for building type.

Other comments related to philosophies to use permanent construction were to relieve overcrowding or replace obsolete

TABLE 19

RATIONALE FOR BUILDING TYPE - PERMANENT

SCHOOL SYSTEM	LOCATION	MANDATE	ECONOMY	AES-THETIC	LAND AVAIL.	OTHER
Anne Arundel County Public Schools	Annapolis,MD					NR
Austin City Public Schools	Austin,TX	*		*		(2)
Baltimore County Public Schools	Towson,MD	*			*	
Broward County Public Schools	Ft Lauder-dale, FL					NR
Charlotte-Mecklenburg Public Sch.	Charlotte,NC		*		*	
City of Atlanta Public Schools	Atlanta,GA	*	*	*		
City of Milwaukee Public Schools	Milwaukee,WI		*	*		
Clark County Public Schools	Las Vegas,NV					(4)
Cobb County Public Schools	Marietta,GA	*		*		
Columbus Public Schools	Columbus,OH					NR
Cook County Public Schools	Chicago,IL					NR
Dade County Public Schools	Miami,FL					(1)
Davidson County Public Schools	Nashville,TN					(3)
Dekalb County Public Schools	Decatur,GA		*			
Denver County Public Schools	Denver,CO	*	*	*	*	
Duval County Public Schools	Jacksonville FL					NR

Table 19 cont.

SCHOOL SYSTEM	LOCATION	MANDATE	ECONOMY	AES-THETIC	LAND AVAIL.	OTHER
Fairfax County Public Schools	Fairfax, VA					(6)
Fort Worth Public Schools	Fort Worth TX	*		*		
Granite District Public Schools	Salt Lake City, UT			*		
Hawaii Public Schools	Honolulu, HA	*		*	*	
Hillsborough County Public Schools	Tampa, FL	*				
Jefferson County Public Schools	Louisville, KY		*	*		
Jordan School District	Sandy, UT			*	*	
Long Beach Public Schools	Long Beach, CA		*	*		
Los Angeles City Public Schools	L.A., CA	*	*	*		
Memphis City Public Schools	Memphis,TN					(5)
Mobile County Public Schools	Mobile, AL	*				
Montgomery County Public Schools	Rockville,MD					NR
Orange County Public Schools	Orlando, FL		*	*		
Orleans Parish Public Schools	New Orleans, LA			*		

Table 19 cont.

SCHOOL SYSTEM	LOCATION	MANDATE	ECONOMY	AES-THETIC	LAND AVAIL.	OTHER
Palm Beach County Public Schools	West Palm Beach, FL					NR
Pinellas County Public Schools	Clearwater, FL	*	*	*	*	
Polk County Public Schools	Bartow, FL	*				
Prince Georges County Public Schools	Upper Marlboro, MD		*	*	*	
San Antonio Indep. Schools	San Antonio, TX		*	*		
San Diego Public Schools	San Diego,CA					NR
VA Beach City Public Schools	VA Beach,VA	*			*	
Wake County Public Schools	Raleigh,NC			*	*	
Washington Public Schools	Washington, DC					NR

NR = No response
(1) = Temporary and permanent needed for rapid growth in student population
(2) = State mandates no more than 22 students per room in grades K-4
(3) = Permanent used to relieve overcrowding or replace obsolete structures
(4) = District builds permanent structures for student housing
(5) = New neighborhoods require new schools
(6) = Ability to efficiently accommodate projected membership and planned program of studies

structures. According to Memphis City Public Schools, new neighborhoods require new schools. Fairfax County, Virginia, responds that the ability to efficiently accommodate projected membership and planned programs of studies affects their decisions. Aesthetics topped the decision making rationale with sixty percent of the thirty respondents making this a major factor. Mandates, forty-three percent, were the second most important factor. While economy, forty percent, and land available, thirty percent, were lesser considerations in the decision matrix.

Table 20 presents data on curriculum and instruction and its perceived affects on the curriculum delivery if classes are housed in temporary classrooms. Sixty-eight percent of the respondents indicated little or no effect on the ability to deliver the curriculum in temporary classrooms. No respondents noted a great effect while only one listed considerable effect. Twenty-nine percent responded with moderate effect.

Comments from Austin, Texas, indicated that the greatest effect would be the impact on the core facility; however, they noted little effect on curricula delivery. Hawaii listed no effect on regular programs, but felt that temporary units were sub-standard for music and homemaking classes. Los Angeles, California, prefers not to schedule science in temporary units. Jefferson County Public Schools in Louisville, Kentucky, feel that temporary science labs have

TABLE 20

CURRICULUM DELIVERY - TEMPORARY

SCHOOL SYSTEM	LOCATION	1	2	3	4	5	
Anne Arundel County Pub Sch	Annapolis,MD				*		
Austin City Public Schools	Austin,TX				*		
Baltimore County Public Schools	Towson,MD					*	
Broward County Public Schools	Ft Lauder-dale, FL			*			
Charlotte-Mecklenburg Pub Sch.	Charlotte,NC			*			
City of Atlanta Public Schools	Atlanta,GA					*	
City of Milwaukee Public Schools	Milwaukee,WI						NR
Clark County Public Schools	Las Vegas,NV				*		
Cobb County Public Schools	Marietta,GA			*			
Columbus Public Schools	Columbus,OH				*		
Cook County Public Schools	Chicago,IL			*			
Dade County Public Schools	Miami,FL					*	
Davidson County Public Schools	Nashville,TN				*		
Dekalb County Public Schools	Decatur,GA				*		
Denver County Public Schools	Denver,CO						NR
Duval County Public Schools	Jacksonville FL				*		
Fairfax County Public Schools	Fairfax,VA				*		
Fort Worth Public Schools	Fort Worth TX				*		
Granite District Public Schools	Salt Lake City,UT			*			
Hawaii Public Schools	Honolulu,HA					*	
Hillsborough County Pub Sch	Tampa,FL			*			
Jefferson County Public Schools	Louisville, KY			*			
Jordan School District	Sandy,UT					*	
Long Beach Public Schools	Long Beach, CA				*		

1 = Great effect (not conducive to curriculum delivery)
2 = Considerable effect
3 = Moderate effect
4 = Little effect
5 = No effect (conducive to curriculum delivery)
NR = No response

Table 20 cont.

SCHOOL SYSTEM	LOCATION	1	2	3	4	5
Los Angeles City Public Schools	L.A.,CA					*
Memphis City Public Schools	Memphis,TN				*	
Mobile County Public Schools	Mobile,AL			*		
Montgomery County Public Schools	Rockville,MD					*
Orange County Public Schools	Orlando,FL				*	
Orleans Parish Public Schools	New Orleans LA		*			
Palm Beach County Pub Sch	West Palm Beach,FL					*
Pinellas County Public Schools	Clearwater, FL			*		
Polk County Public Schools	Bartow,FL			*		
Pr.Georges County Pub Sch	Upper Marlboro, MD				*	
San Antonio Indep. Schools	San Antonio, TX			*		
San Diego Public Schools	San Diego,CA					*
VA Beach City Schools	VA Beach,VA					*
Wake County Public Schools	Raleigh,NC					*
Washington Public Schools	Washington, DC				*	

1 = Great effect (not conducive to curriculum delivery)
2 = Considerable effect
3 = Moderate effect
4 = Little effect
5 = No effect (conducive to curriculum delivery)
NR = No response

no effect on curricula delivery unless they are not fully equipped. Duval County in Jacksonville, Florida, stated that they have so many temporary classrooms that they are an accepted way of life. Davidson County Public Schools, Nashville, Tennessee, indicated that the only significant effect is inconvenience. They noted that classes are not

scheduled in temporary classrooms if curriculum would be adversely affected. Palm Beach County Public Schools, West Palm Beach, Florida, responded that there was almost no effect at elementary and little effect at secondary. In spite of having 1,200 plus temporary units, William V. Hukill, P.E., Architect for Palm Beach's Growth Management Center, indicated the choice for construction is always permanent. Funding and timing simply does not permit it.

Table 21 demonstrates that ninety percent of the respondents answered this question. Seventy-one percent of those responding listed no effect on curriculum delivery in permanent classrooms. Fourteen percent noted little effect and another fourteen percent indicated moderate effect. It is assumed that respondents with large numbers of older buildings listed those concerns. The average number of years in use in school systems like Mobile, Alabama, and San Antonio, Texas, where buildings average forty-five and fifty years respectively in use would tend to validate that assumption. Although a majority of the respondents reported no effect on curriculum delivery in permanent classrooms, Wake County Public Schools, Raleigh, North Carolina, rated temporary units with no effect and permanent units with little effect. The average years in use of their 420 permanent buildings is thirty-four and their 462 temporary units average only five years of use.

Table 22 presents data relative to curriculum delivery

TABLE 21

CURRICULUM DELIVERY - PERMANENT

SCHOOL SYSTEM	LOCATION	1	2	3	4	5	
Anne Arundel County Pub Sch	Annapolis,MD				*		
Austin City Public Schools	Austin,TX					*	
Baltimore County Public Schools	Towson,MD					*	
Broward County Public Schools	Ft Lauder-dale, FL			*			
Charlotte-Mecklenburg Pub Sch.	Charlotte,NC					*	
City of Atlanta Public Schools	Atlanta,GA					*	
City of Milwaukee Public Schools	Milwaukee,WI					*	
Clark County Public Schools	Las Vegas,NV				*		
Cobb County Public Schools	Marietta,GA					*	
Columbus Public Schools	Columbus,OH						NR
Cook County Public Schools	Chicago,IL			*			
Dade County Public Schools	Miami,FL					*	
Davidson County Public Schools	Nashville,TN					*	
Dekalb County Public Schools	Decatur,GA				*		
Denver County Public Schools	Denver,CO						NR
Duval County Public Schools	Jacksonville FL					*	
Fairfax County Public Schools	Fairfax,VA					*	
Fort Worth Public Schools	Fort Worth, TX					*	
Granite District Public Schools	Salt Lake City,UT				*		
Hawaii Public Schools	Honolulu,HA					*	
Hillsborough County Pub Sch	Tampa,FL			*			
Jefferson County Public Schools	Louisville, KY					*	
Jordan School District	Sandy,UT					*	
Long Beach Public Schools	Lg Beach, CA					*	
Los Angeles City Public Schools	L.A.,CA					*	

1 = Great effect (not conducive to curriculum delivery)
2 = Considerable effect
3 = Moderate effect
4 = Little effect
5 = No effect (conducive to curriculum delivery)
NR = No response

Table 21 cont.

SCHOOL SYSTEM	LOCATION	1	2	3	4	5	
Memphis City Public Schools	Memphis,TN					*	
Mobile County Public Schools	Mobile,AL			*			
Montgomery County Public Schools	Rockville,MD					*	
Orange County Public Schools	Orlando,FL					*	
Orleans Parish Public Schools	New Orleans LA					*	
Palm Beach County Public Schools	West Palm Beach,FL					*	
Pinellas County Public Schools	Clearwater FL						NR
Polk County Public Schools	Bartow,FL					*	
Pr.Georges County Public Schools	Upper Marlboro, MD					*	
San Antonio Indep. Schools	San Antonio, TX			*			
San Diego Public Schools	San Diego,CA					*	
VA Beach City Schools	VA Beach,VA					*	
Wake County Public Schools	Raleigh,NC				*		
Washington Public Schools	Washington, DC						NR

1 = Great effect (not conducive to curriculum delivery)
2 = Considerable effect
3 = Moderate effect
4 = Little effect
5 = No effect (conducive to curriculum delivery)
NR = No response

in temporary and permanent classrooms. Hypothesis #2 is addressed with these data. Hypothesis #2 stated that there is no statistically significant difference between the curriculum utilization in permanent classroom housing and temporary housing.

Eighty-seven percent or thirty-four of thirty-nine total respondents addressed this question. The four school

districts not responding, Milwaukee, Wisconsin, Denver Colorado, Pinellas, Clearwater, Florida, and Washington, D.C., were not included in Table 2.

Seventy percent of the respondents noted no effect on curriculum delivery in permanent housing. Thirty-two respondents indicated no effect on curriculum delivery in temporary housing. Another thirty-five percent indicated little effect on curriculum delivery in temporary housing. A total of sixty-eight percent of the respondents believed there was little or no effect on curriculum delivery in temporary housing. The effect of temporary and permanent classrooms on the delivery of curriculum was ranked by the participants on a scale of one to five, with five indicating no effect and one, great effect.

To test for a statistically significant difference between the facility types, the non-parametric Wilcoxon Matched-Pairs Test was employed. The absolute differences of the original measurements (halving ties) were ranked and then the sign of the actual difference was attached to the corresponding rank. The test statistic W(s), calculated by summing these signed ranks, was found to be 34.

The critical value of W(s) for rejecting the null hypothesis H(o) at the .05 level is W(s)>183. Therefore, we cannot reject H(o) and conclude there is not statistically significant difference on curriculum delivery due to classroom type at the .05 level.

TABLE 22

CURRICULUM DELIVERY - TEMPORARY AND PERMANENT

SCHOOL SYSTEM	LOCATION	PERM.	TEMP.	DIFF.	DIFF.	SIGNED RANK
Anne Arundel County Public Schools	Annapolis, MD	4	4	0	0	9.5
Austin City Public Schools	Austin, TX	5	4	1	0	9.5
Baltimore County Public Schools	Towson, MD	5	5	0	0	9.5
Broward County Public Schools	Ft Lauderdale,FL	3	3	0	0	9.5
Charlotte-Mecklenburg Public Schools	Charlotte, NC	5	3	2	0	9.5
City of Atlanta Public Schools	Atlanta, GA	5	5	0	0	9.5
Clark County Public Schools	Las Vegas, NV	4	4	0	0	9.5
Cobb County Public Schools	Marietta, GA	5	3	2	0	9.5
Cook County Public Schools	Chicago, IL	3	3	0	0	9.5
Dade County Public Schools	Miami, FL	5	5	0	0	9.5
Davidson County Public Schools	Chicago, IL	5	4	1	0	9.5
DeKalb County Public Schools	Decatur, GA	4	4	0	0	9.5
Duval County Public Schools	Jacksonville, FL	5	4	1	0	9.5
Fairfax County Public Schools	Fairfax, VA	5	4	1	0	9.5
Fort Worth Public School	Fort Worth, TX	5	4	1	0	9.5
Granite District Public Schools	Salt Lake City, UT	4	3	1	0	9.5
Hawaii Public Schools	Honolulu, HA	5	5	0	0	9.5

Table 22 cont.

SCHOOL SYSTEM	LOCATION	PERM.	TEMP.	DIFF.	DIFF.	SIGNED RANK
Hillsborough County Public Schools	Tampa, FL	3	3	0	0	9.5
Jefferson County Public Schools	Louisville, KY	5	3	2	1	24
Jordan School District	Sandy, UT	5	5	0	1	24
Long Beach Public Schools	Long Beach, CA	5	4	1	1	24
Los Angeles City Public Schools	Los Angeles, CA	5	5	0	1	24
Memphis City Public Schools	Memphis, TN	5	4	1	1	24
Mobile County Public Schools	Mobile, AL	3	3	0	1	24
Montgomery County Public Schools	Rockville, MD	5	5	0	1	24
Orange County Public Schools	Orlando, FL	5	4	1	1	24
Orleans Parish Public Schools	New Orleans, LA	5	2	3	1	24
Palm Beach County Public Schools	West Palm Beach, FL	5	5	0	1	24
Polk County Public Schools	Bartow, FL	5	3	2	1	24
Pr. Georges County Public Schools	Upper Marlboro, MD	5	4	1	2	31.5

1 = Great effect (not conducive to curriculum delivery)
2 = Considerable effect
3 = Moderate effect
4 = Little effect
5 = No effect (conducive to curriculum delivery)
NR = No response

Table 22 cont.

SCHOOL SYSTEM	LOCATION	PERM.	TEMP.	DIFF.	DIFF.	SIGNED RANK
San Antonio Indep. Schools	San Antonio, TX	3	3	0	2	31.5
San Diego Public Schools	San Diego, CA	5	5	0	2	31.5
VA Beach City Public Schools	VA Beach, VA	5	5	0	2	31.5
Wake County Public Schools	Raleigh, NC	4	5	-1	3	-34
	Rank Sums	155	135			
	Wilcoxon Signed Rank W(s)					34
	Crit. Value (= .05)	183				

1 = Great effect (not conducive to curriculum delivery)
2 = Considerable effect
3 = Moderate effect
4 = Little effect
5 = No effect (conducive to curriculum delivery)
NR = No response

H_o : No difference in delivery of curriculum in permanent vs temporary rooms

Reject if W(s) > 183 with p = .05

W(s) = 34

we do not reject H_o assume no differences in delivery of curriculum

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary

Introduction

This study focused on the utilization of temporary and permanent classrooms in the fifty largest school systems in the United States. Increasing fiscal demands have affected the ability of states and localities to provide classroom space for rapidly growing student populations. This dilemma has prompted many school districts to explore alternative means of housing students. Square foot cost differentiations between temporary and permanent facilities along with the effects, if any, on curriculum delivery in temporary and permanent classrooms was studied.

Difficulty in securing funds from state governments and localities make the investigation of alternatives more palatable. Aging buildings precipitating the need to retrofit or replace pose major problems when current construction costs are explored. Information gathered by this study may serve as a basis for policy in public school systems experiencing a need to refurbish or provide new facilities for housing student populations.

The principal instrument of data collection was the

analytical survey. A pilot study to determine the validity of the instrument was utilized. The survey instrument was mailed to the superintendents of the fifty largest school systems in the United States. Thirty-nine of the fifty school systems surveyed returned the questionnaires. The seventy-eight percent response was considered sufficient to provide data significant to the study.

Certain limitations such as responses to number of permanent buildings and the educational background of the respondents limited the study. The study addressed demographics, facilities, finance, rationale for building type, and curriculum and instruction.

Historical Perspective of School Buildings

Instruction once carried on in the open air or makeshift enclosures moved into one-room school houses and other spartan structures that were available in the 1700s and 1800s. Through the efforts of reformers like Horace Mann, educators developed new perceptions of the school building. Unlike the small single room facilities with dirt floors and "stick" furniture, the Philadelphia Central High School was "without rival." For years it was the standard for other schools in the nation. The Northwest Ordinance of 1787 provided that the sixteenth section of every township in the western lands be reserved for the maintenance of schools. The presence of large heterogeneous student bodies prompted many school districts to adopt the "Quincy Plan." This

school was designed to provide greater specialization of instruction. As late as 1920 there were still about two hundred thousand one-room school houses in the United States. More functional school buildings appeared in the 1950s; and in the 1960s, windowless schools were featured. Air conditioning had a great influence on this architectural design. The 1970s marked a major beginning in the use of teaching and instructional aids. State departments of education began to plan major roles in planning and approving construction facilities.

Certain Historical and Legal Aspects of Temporary Housing

Educational philosophies have remained fairly stable in spite of the many "fads" permeating the profession. For over fifty years, temporary facilities have been used in varying degrees of concentration. Flexibility is now the "watch word" in providing school facilities.

Temporary housing is now viewed as an alternative for providing classroom space for rapidly growing student populations in lieu of retrofitting. California has mandated that thirty percent of all new construction be temporary. Construction codes appear to increase square foot costs of temporary housing in areas where large numbers of temporary units are utilized. Recently, manufacturers of temporary classrooms have noticed an increase in the use of temporary facilities by school systems. Speed of construction and

economy are the apparent advantages.

Current Status of Temporary Housing

Use of temporary housing is increasing in large, rapidly growing school systems. Better construction techniques and rapid construction time, coupled with flexibility and economy, have made temporary housing a viable alternative for housing students. The degree of applied maintenance appears to be congruent with longevity, another factor supporting this type of construction. Concerns over aesthetics may be alleviated by placing the classroom in modules, giving the appearance of permanent construction, yet retaining the flexibility of movement.

Motivated by the anticipation of burgeoning enrollments and the need for updated facilities, educational construction is rapidly increasing. *American School and University* projects over $11 billion will be spent from 1989 through 1991 to build new edifices and renovate older structures at the nation's two- and four-year colleges. Not since the early seventies have our campuses experienced such widespread construction activity.

A modular's biggest advantage is the reduced construction period. Performing site work (preparing the foundation and installing utility connections) simultaneously with the off-site construction of the modules comprising the building accelerates construction timetables dramatically, with minimal disruption of normal campus activity. In most

cases, modular construction completes a quality building in one-third to one-half the normal time of a conventional structure. Virginia Beach City Public Schools saved over $11 million in charter bond funding by utilizing temporary housing in lieu of permanent structures over a projected ten-year period.

Government officials and school administrators have endorsed modular technology because of three major benefits: (1) design advantages; (2) upgrade in finishes; and, (3) financing trends. In addition to cost savings, temporary classrooms enable school districts to respond quickly to increased enrollments. A Pennsylvania school district, facing an immediate need for additional classroom space at a high school, solved their problem in seven months. A module containing four relocatable classrooms was installed and is considered an attractive addition to the school.

Methodology

The purpose of the study was to assess the utilization of temporary and permanent classrooms in the fifty largest school systems in the United States. The fifty largest systems as reported in 1988 were surveyed and data were solicited in five categories. Those categories were: (1) demographics; (2) facilities; (3) finance; (4) rationale; and (5) curriculum and instruction. These data were presented in Chapter IV in tabular form along with an analysis and discussed in their categorical order.

The focus of the study was to assess the use of temporary and permanent classrooms as it pertained to cost and efficiency. The null hypotheses were:

Hypothesis 1: There is no statistically significant difference between the cost efficient utilization of permanent and temporary classrooms.

Hypothesis 2: There is no statistically significant difference between the curriculum utilization in permanent classroom housing and temporary housing.

Cost was referenced in terms of square foot costs over the past three years and costs projected ahead for three years. Historical data and projected costs were applied to temporary and permanent buildings. Efficiency was researched in terms of the delivery of curriculum in temporary and permanent facilities and the associated effects were tabulated.

The Null Hypothesis number one was rejected. Data indicated that significant cost differentials existed between temporary and permanent building construction favoring the former type of school housing. The Null Hypothesis number two was accepted. Data revealed that the delivery of curriculum in temporary and permanent buildings was not effected in a statistically significant way.

Parametric and non-parametric statistics were used utilizing the t-test and Wilcoxon Matched-Pairs Test respectively. The criteria for rejection was set at the .05

level of confidence.

Demographics

Demographics revealed that a majority of the school districts experienced some growth during the past three years. In all, sixty-seven percent experienced growth while only five percent of the thirty-seven respondents in this category noted a depressed economy. Those districts were Mobile, Alabama, and New Orleans, Louisiana. Rate of growth responses indicated that sixty-seven percent of the school systems surveyed experienced growth ranging from considerable to slight. Eleven percent of the thirty-six respondents maintained the status quo. All Florida, California, and Virginia school systems responding had growth increases.

Facilities

One hundred percent of the ninety-five percent responding to number of temporary classrooms indicated the use of at least one unit for instructional purposes. The number of temporary units per school districts responding averaged at 574 units per school division. Thirty-seven of the thirty-nine school districts responded. Naturally, all school divisions utilize permanent buildings. Responses varied from school district to school district in listing schools or individual buildings.

The average number of years in use for both temporary and permanent classrooms was significant. Years of use for

temporary units ranged from a low of one year to a high of thirty-seven years. Permanent buildings were in use from twenty to one hundred years. It was noted in Chapter II that some manufacturers of temporary units feel that years of service without retrofitting are directly related to the amount of applied maintenance to the temporary unit.

Fifty-three percent of twenty-four respondents housed grades K-12 in temporary units. Three of the twenty-four respondents, Columbus Public Schools, Columbus, Ohio, Jefferson County Public Schools, Louisville, Kentucky, and Pinellas County Public Schools, Clearwater, Florida, reported that they only house elementary students in temporary units.

Finance

Sixty-four percent of the respondents have scheduled new temporary facilities. All eight school divisions in Florida and the three in California have scheduled new facilities. Thirty-six of the thirty-nine responding school districts report that new permanent construction is scheduled.

Costs for temporary units over the past three years for all reporting school divisions, with the exception of Hawaii, averaged $43.00 per square foot for temporary construction. Permanent construction costs, excluding Hawaii because of the infrastructure inclusion, averaged $73.00 per square foot. Thirty-three or eighty-five percent of the respondents reported on this question.

Square foot costs for both permanent and temporary units

were analyzed with a parametric statistical technique, the t-test. The number one null hypothesis was rejected. Temporary construction costs appear not to be equal with that of permanent construction. Cost differentials were as much as $163.00 per square foot between temporary and permanent housing, with $12.00 per square foot being the least differentiation.

Only forty-six percent of respondents addressed projected square foot cost for temporary school housing and only eighteen of the thirty-nine school divisions reporting responded to this question. Costs projected for temporary units three years ahead were from a low of $23.00 per square foot to a high of $128.00 per square foot. Again, Hawaii was excluded due to the inclusion of infrastructure costs.

Thirty of the thirty-nine school divisions or seventy-seven percent projected square foot costs for permanent construction. Lows to highs ranged from $30.00 per square foot to $140.00 per square foot.

Rationale for Building Type

Economy appeared to be the overriding criteria for the selection of temporary school housing. A high of fifty-eight percent of the respondents noted economy as the criteria for selection. Forty-eight percent noted mandates which may be due to economy or reduced pupil-teacher ratios which bring about impacts that are fiscal in nature.

Seventy-seven percent of the group responded to

rationale for permanent buildings. Fifty-eight percent listed aesthetics as a major factor in selection. Forty-two percent cited mandates and, thirty-eight percent reported economy as a variable. Land availability was listed by twenty-nine percent of the respondents.

Curriculum and Instruction

Effects on the delivery of curriculum in temporary housing appeared to be of little significance. Sixty-eight percent of the respondents noted little or no effect and only one, Orleans Parish Public Schools, New Orleans, Louisiana, listed considerable effects. Seventy-one percent of those responding to curriculum delivery in permanent units cited no effect. Twenty-eight percent reported little or moderate effect.

Thirty-four of thirty-nine respondents or eighty-seven percent total reported on temporary and permanent housing and its effects on curriculum delivery. Seventy percent reported no effect on curriculum delivery in temporary housing. An additional thirty-five percent listed little effect on curriculum delivery in temporary housing. A total of sixty-eight percent believed there was little or no effect on curriculum being delivered in temporary classrooms.

The null hypotheses number two was addressed using a non-parametric statistical tool, Wilcoxon Matched-Pairs Test. The null was not rejected, therefore, it is assumed that there is no significant statistical difference in curriculum

delivery between temporary and permanent classroom housing.

Conclusions

Trends toward temporary housing appear to be increasing. This trend is especially noticeable in the Sunbelt states, where rapid growth is taking place. Specifically, this phenomenon appears to be occurring in Florida, California, Texas and Georgia. In areas such as California and Texas, certain mandates are increasing the cost of temporary housing. The trend remains unchanged as a result of significant square foot cost differences between temporary and permanent structures.

It would appear that where the use of temporary housing is increasing that certain building code requirements may become more stringent. This is probably due to the high visibility of temporary units and a growing segment of capital outlay is being directed to this type of school housing.

Historically California has been a trend setter and it is likely that many states will pass legislation mandating temporary construction due to the economic feasibility and practicality in serving the various programs in public education. It appears that based upon the experience in California, many newly organized schools will be created almost instantly via the facilitation of temporary school construction.

The literature seems to suggest that the nature of the

school building is increasingly characterized by pragmatism. A prerequisite for the expenditure of funds for any building is flexibility in terms of classroom use, computer and health facilities, cafeterias, libraries, and any other special room requiring adaptability. Speed of construction and finance, land costs and infrastructure are also variables in this equation.

Significant differences in construction costs between temporary and permanent facilities appear to exist. The parametric statistical tool, the t-test, was used to test the null hypothesis number one and the null was rejected with a .05 level of confidence. This equates to significant statistical differences in costs between temporary and permanent construction.

There was no statistically significant difference between the curriculum delivery in temporary and permanent facilities. The non-parametric statistical tool, the Wilcoxon Matched-Pairs Test, was used and the null hypothesis was not rejected. There was no statistically significant differences in the delivery of curriculum in temporary or permanent classrooms.

Recommendations

The first recommendation for further research would be to do a companion study surveying state attorneys' general offices to ascertain whether legislation similar to California's is being contemplated. Further, there is a need

to ascertain what regulatory mandates states are likely to require regarding capital outlay expenditures for new construction, and land and infrastructure regulations.

A second possible study that should be conducted would be to survey and interview teachers concerning their perceptions of the compatibility considering aesthetics and the function of temporary facilities. A complementary investigation to the above study would be to survey central administrators, principals, supervisors, teachers, students, and auxiliary personnel on perceived problems encountered with temporary housing units.

The final recommendation would be to replicate this study in five years to determine if existing trends appear to remain constant. It would be interesting to determine if economy continues to determine what appears to be the number one criteria in scheduling temporary facilities over permanent construction.

APPENDIX A

VIRGINIA BEACH CITY PUBLIC SCHOOLS
SCHOOL ADMINISTRATION BUILDING • P O. BOX 6038 • VIRGINIA BEACH, VIRGINIA 23456-0038
E. CARLTON BOWYER
SUPERINTENDENT OF SCHOOLS

May 8, 1990

Mr. Donald S. Bruno, Superintendent
Newport News City Public Schools
12365 Warwick Boulevard
Newport News, Virginia 23606

Dear Mr. Bruno:

I am in the process of completing my Ph.D. in Urban Studies at Old Dominion University in Norfolk, Virginia. The title of my dissertation is An Assessment of the Utilization of Permanent and Temporary Classrooms as It Relates to Cost and Efficiency in Selected School Divisions.

I am surveying the fifty largest school systems in the United States. The demographics of your city and school system, and a review of the decision process involved in determining the use of permanent or temporary classrooms will be reviewed. Additionally, the cost of permanent and temporary classrooms, and the study of efficiency, defined as the ability to deliver your standard curriculum in temporary classrooms, will be analyzed.

Prior to the release of the study, I am sending a small pilot study to selected school divisions to ensure the data-gathering validity of the survey. You are one of the pilot samples.

I would be very appreciative if you would complete, or have a member of your staff complete, the attached survey and return it to me in the enclosed envelope as soon as possible. I will be more than happy to apprise you of the results of the study if you are desirous.

Thanking you in advance for your prompt response, I am

Sincerely,

E. Carlton Bowyer
Division Superintendent

ECB/sa

APPENDIX B

VIRGINIA BEACH CITY PUBLIC SCHOOLS
SCHOOL ADMINISTRATION BUILDING • P O BOX 6038 • VIRGINIA BEACH, VIRGINIA 23456-0038
E. CARLTON BOWYER
SUPERINTENDENT OF SCHOOLS

May 18, 1990

Dear Colleague:

I am Superintendent of Schools in Virginia Beach, Virginia and I am in the process of completing my Ph.D. in Urban Studies at Old Dominion University in Norfolk, Virginia. The title of my dissertation is An Assessment of the Utilization of Permanent and Temporary Classrooms as It Relates to Cost and Efficiency in Selected School Divisions.

I am surveying the fifty largest school systems in the United States. The demographics of your city and school system, and a review of the decision process involved in determining the use of permanent or temporary classrooms will be reviewed. Additionally, the cost of permanent and temporary classrooms, and the study of efficiency, defined as the ability to deliver your standard curriculum in temporary classrooms, will be analyzed.

I would be very appreciative if you would complete, or have a member of your staff complete, the attached survey and return it to me in the enclosed envelope as soon as possible. I will be more than happy to apprise you of the results of the study if you are desirous.

Thanking you in advance for your prompt response, I am

Sincerely,

E. Carlton Bowyer
Division Superintendent

ECB/sa

Enclosure

APPENDIX C

SURVEY

An Assessment of the Utilization of Permanent and Temporary Classrooms as it Relates to Cost and Efficiency in Selected School Systems

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DEMOGRAPHICS

Name and location of school system: _____

Size of school system: _____

Current population: _____

(Circle appropriate number)

ECONOMIC ASPECTS
(past three years)

5 considerable growth
4 slight growth
3 status quo
2 slight decrease
1 depressed

RATE OF GROWTH OF SCHOOL POPULATION (past three years)

5 considerable gain
4 slight gain
3 status quo
2 slight loss
1 considerable loss

FACILITIES

	Temporary	Permanent
Number of buildings:	_____	_____
Average number of years:	_____	_____

Type of use: (Please indicate subjects and grade levels housed in temporary classroom units, e.g., sixth grade math.)

_____

_____

_____

FINANCE

	Temporary Housing	Permanent Housing
Scheduled new facilities: (Number)	_____	_____
Square foot cost of buildings: (the last three years)	_____	_____
Square foot cost of projected: buildings (three years ahead)	_____	_____

Comment: _____

_____

RATIONALE FOR BUILDING TYPE

	Temporary	Permanent
Mandate	: _____	_____
Economy	: _____	_____
Aesthetic	: _____	_____
Land Available (Please comment)	: _____	_____

Other comments: _____

_____

CURRICULUM AND INSTRUCTION

Rank 1 - 5 (highest)

5 - no effect (conducive to curriculum delivery)
4 - little effect
3 - moderate
2 - considerable
1 - great effect (not conducive to curriculum delivery)

	Temporary	Permanent
Effect on curriculum delivery, if any, in use of temporary classroom, laboratories, etc. :	_____	_____

Comment: _____

_____

APPENDIX D

VIRGINIA BEACH CITY PUBLIC SCHOOLS
SCHOOL ADMINISTRATION BUILDING • P O. BOX 6038 • VIRGINIA BEACH, VIRGINIA 23456-0038
E. CARLTON BOWYER
SUPERINTENDENT OF SCHOOLS

July 10, 1990

Dear Colleague:

I sent the attached survey to you on May 18, 1990. As I indicated, I am in the process of completing my Ph.D. in Urban Studies at Old Dominion University in Norfolk, Virginia.

I am surveying the fifty largest school systems in the United States relative to the use of temporary versus permanent classrooms.

I realize that this is a very busy time of the year; however, if you could take a few minutes to complete the survey and return it to me in the enclosed envelope, I would be most appreciative.

As I indicated earlier, I will be more than happy to furnish you with the results of the study if you so desire.

A prompt response would be most appreciated.

Sincerely,

E. Carlton Bowyer
Division Superintendent

ECB/ds

Attachment

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AUTOBIOGRAPHY

E. Carlton Bowyer

EDUCATION

Certificate of Advanced Study
Old Dominion University. 1971.

Master of Science Degree.
Old Dominion University. 1967.

Bachelor of Arts
Wofford College, Spartanburg, SC. 1960.

EXPERIENCE

Superintendent, Virginia Beach City Public Schools
Virginia Beach, VA. 1989 to present.

Associate Superintendent for Instructional Services
Virginia Beach City Public Schools, Virginia Beach, VA. 1989.

Assistant Superintendent for Operational Services
Virginia Beach City Public Schools, Virginia Beach, VA. 1978-1989.

Director of Program Administration
Virginia Beach City Public Schools, Virginia Beach, VA. 1975-1978.

Principal, First Colonial High School
Virginia Beach City Public Schools, Virginia Beach, VA. 1967-1975.

Assistant Principal, First Colonial High School
Virginia Beach City Public Schools, Virginia Beach, VA. 1966-1967.