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A Feasibility Study and Conceptual Design of an Educational Facility for Skidway Island, Georgia as a Part of Savannah's Public Educational System

John Terry Dismukes III
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A FEASIBILITY STUDY AND CONCEPTUAL DESIGN OF AN
EDUCATIONAL FACILITY FOR SKIDAWAY ISLAND, GEORGIA
AS A PART OF SAVANNAH'S PUBLIC EDUCATIONAL SYSTEM
by
John Terry Dismukes, III
A terminal project submitted to the Faculty of the
College of Architecture, Clemson University in
partial fulfillment of the requirements
for the degree of
Master of Architecture

Approved:

Committee Chairman

Major Advisor

Dean, Dept. Architectural Studies  Dean, College of Architecture
To my mother and father who have given me love.
The author wishes to express sincere appreciation of the assistance and encouragement by those who have so generously contributed to the preparation of this study:

To Harlan E. McClure, F.A.I.A., Dean of the College of Architecture, who has provided the opportunity for this educational endeavor;

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Educational Policy
ABSTRACT
ABSTRACT

A young child brings total humanity into the school environment. He learns who he is and he learns what he does. Often he is encouraged or discouraged, inspired or threatened by what the affective environment holds in store for him, for out of this environment will grow the hundreds and thousands of actions and interactions with people which will help shape his life.

In the past, the planning of schools was simple. They were a series of classrooms strung together by corridors to which were added libraries, cafeterias, offices, and gymnasiums. Architects were hired by school boards and made most planning decisions with the superintendent and the chairman of the school building committee.

In recent years forward thinking educationists have begun to re-examine the process of elementary education. It is no longer thought of in terms of knowledge to be acquired and facts to be stored, but rather in terms of activity and experience. "Teaching and learning methods which once focused on the development of the child's ability to pace himself and pursue interests in an individualized way." The need today is for an environment which values and reflects the diverse qualities and capabilities of children, and it is the architect and educator who must create this environment.

But what is an environment for education? It is the sum of the physiological, psychological, and social feelings needed and experienced by children, teachers, and people which follow from their use of a school. Although architects deal with material
constructions and many technologies, it is those feelings that buildings evoke in their users which they must ultimately be concerned. The provision of a good environment is the goal of an architect’s endeavor and the successful creation of a better environment can only come from an increased understanding of those feelings and their relationship to the function of education.
INTRODUCTION
HISTORY OF SKIDAWAY ISLAND

Skidaway Island, Georgia is located 12 miles south of the heart of the port city of Savannah, Georgia. It is approximately 8 miles in length with an average width of 2 miles. The northern most part of the 12 1/2 square mile Island divides the Wilmington and Skidaway rivers, while its southerly tip juts into the Vernon river which empties into the Atlantic ocean. The Island is bounded by navigable narrows to the west and marshes to the east.

Skidaway Island is rich in history. One thousand years ago nomadic indians roamed the Island following migratory birds, fishing its creeks, and hunting and feasting on its game. "In the 18th century the English came to settle using Skidaway and neighboring islands to establish a defensive network to protect Savannah." But after one short decade the colonists departed, returning Skidaway to the sun, winds, and nature. "At the outbreak of the Civil War, confederate forces placed batteries and fortifications upon Skidaway, but late in the war union troops seized Savannah and Skidaway suffered widespread burning and destruction." Skidaway was once again returned to nature and remained primarily uninhabited for the following 100 years.

In 1968 the Branigar organization, a Union-Camp subsidiary, purchased the Island, recognizing her natural potential as a site for an island residential community, and employed Hideo Sasaki of Sasaki, Dawson, Demay Associates to develop a master plan for the Island.

"In 1969 land located on the farthest eastern portion of the Island was donated to the University of Georgia to create a center for research in oceanography." In 1971 the Skidaway Institute of
Oceanography was completed marking the first true development of modern technology on the Island today. The Ocean Science Center offers graduate research programs relating to environmental quality for animal life in the ocean and salt water marshes.

The next marked development on the Island occurred in 1972 with the completion of a bridge connecting Skidaway and her marshes with the mainland 2 miles away. Development of "The Landings," the first of three phases of the master plan, began. In 1973 families first began living on the Island. Later that year land was again donated to the State for the development of a state park located near the entry to the Island. Recently the park was dedicated and soon will include picnicking, camping, cabins, boating docks, a lake, and an arboretum.

In looking ahead at Skidaway and her future, one envisions the development of a prosperous community centered around the preservation of nature and an island way of life. An important consideration in the growth of Skidaway as a community will be the development and implementation of a sound educational system for the children of the Island. Currently the children of the 72 families living on the island attend schools in Savannah approximately 9 to 12 miles away.

In years to come Skidaway will grow into an island of 3,000 families, capable of supporting a lower school educational facility. The author feels that the development of this system and facility for the Island might serve as a key in her growth to becoming a community, but only if it is well-planned part of Skidaway's total development rather than simply a facility built when the need arises.

In order to properly design an educational facility for such an island the author feels the need to investigate the function of education and the relationship of this function to its built environment, for
only out of a good understanding of both can an effective and meaningful solution be developed.
The purpose of this terminal project is to provide a feasibility study and conceptual design solution for a public elementary educational facility on Skidaway Island, Georgia, as a part of the Savannah Public Educational System, which encompasses contemporary and future developments in education, and perhaps may serve as a model for future public educational facilities on the coastal islands of Georgia.

The terminal project will encompass five major parts:

I. The Function of Education
   An examination of the history and the aims of education and their relationship to the user

II. The Built Environment
   An examination of educational policy and the factors in the built environment of schools and their relationship to education and its users

III. Case Studies
   Visitation and observation of existing schools in an effort to understand present situations and possible future developments

IV. Feasibility
   A system, island, and community analysis to determine feasibility and impact upon the existing educational system

V. Conceptual Architectural Solution
   Consists of site analysis, synthesis of information, development of concepts, and appropriate design solution

Throughout this study the author will cite examples of schools and children's thoughts in the United Kingdom. There is a strong relationship between England and America in the development of methods for educating children. Many of America's emerging strategies have grown from earlier British methods.
"The architect's responsibility to the people who will live in and use his buildings is enormous, greater by far than any other of his widely ranging responsibilities, for in some respects he virtually determines how those people spend their lives."\(^5\) Although patterns of architectural education are changing it is still generally true that an architect's education gives him little special insight into people's needs or behaviors. As a result his methods for making design decisions have been largely subjective. The author believes that while those methods of the past may have been appropriate for some jobs, they are no longer suitable for making design decisions on the complex buildings of today and of the future.

The crucial question now facing architects and the building industry today is 'What should be built?' Although there is great need for research into practically every aspect of design and building, it seems as though the most serious lack of knowledge is of the function, purpose, use, and future of common building types such as schools. We should understand why we build them, what physical conditions they should provide, what the personal and social expectations of their users are, and how those users are likely to respond to different types of environments and to change. At present most of these are matters of guesswork, or taken for granted without ever being questioned or considered.

Although a majority of architects may believe that school design is based upon an analysis of problems, the customary approach is really by way of concepts which are neither rationally established nor forward looking. This happens because most people, including educationists and
architects, have a "mind's eye" picture of a school that is little affected by expectation of change. It is this concept that is most usually designed and built.

If schools are to be designed so that they allow the maximum use of new, forward looking educational practices, then it is necessary to begin by questioning established practices and design concepts. This done, it should be possible to develop design criteria much more precise than the vague notions which currently influence design decisions. These criteria could also be employed to appraise completed buildings in use, but even more valuable is that the experience and data derived from this sort of activity could then be used to improve the design of future buildings.

The author will employ a design process used by the Health Care Facilities Planning and Design Studio in the College of Architecture of which he is a member. The process involves three major parts:

(1) **Problem Seeking:** The identification of criteria and parameters through research, observation, case studies, and other means concerning the function, purpose, use, and future of the structured educational environment.

(2) **Synthesis:** The assignment of priorities to criteria and parameters leading to the combination of parts into a whole.

(3) **Problem Solving:** Development of concepts and the design of an appropriate solution.

Through this design process will come the development of a physical environment for educating the children of Skidaway Island which will provide the best possible working conditions, contribute to the children's emotional needs, and exploit the many possibilities of influencing the development of the desired social environment.
THE FUNCTION OF EDUCATION
INTRODUCTION

In this chapter the author will examine the following categories in "The Function of Education:"

A. History: Briefly problems in the past, emerging beliefs

B. Aims: Self-direction, co-operation, and the role of the teacher

C. Children And The Learning Process: Conclusions of psychologists and educators concerning children and learning in the classroom and at play

D. The Teacher's Task: The striving of teachers to develop physical, intellectual, emotional, and social growth in children

E. Traditional Strategies: Relationship of old buildings and methods of teaching to certain emotional, social, and intellectual criteria

F. Emerging Strategies: Team teaching, change in group sizes, teacher-student ratios, methods of instruction

A conclusion will follow the chapter and also a listing of key points of the categories examined.
The history of innovation in American education is not a happy one. "For a variety of reasons many sound ideas for improvements in schools have been rejected without adequate trial." It has been said that "every good idea in education takes 20 years to find its way into the classroom." If that is true, we have been buying time for so long that we face ideological bankruptcy. At best, under our decentralized system, change comes in different rates in different schools. But it is now clear that, as a nation, we have entered into a period of dramatic educational reform in an attempt to solve problems that will bring substantial changes to all levels of education, from the nursery school through the university.

"One of the greatest single problem of education today seems to be the pervasive attitude that any interaction between education and society must be avoided." This problem stems from the myth that education should not deal with values. This myth that education should not deal with values condemns education to failure for two reasons. First, "The ultimate function of education is to prepare students to be members of our society. Attempting to do this without structuring in societal interaction is as foolish as it would be for a parent to raise a child without ever exhibiting personal desires or emotions." The child does become shaped by his parents, but also he learns to define his personal needs and to respond to the personal needs of others. Similarly, education based on values may influence students, but it also enables them to define their own beliefs about society, and to respond to the beliefs of others.
Secondly, "Education values a focus which is confined to cognitive achievement. We reward a small range of abstract, cognitive skills and ignore all other attributes thus labeling them as inferior." These values that are built into our present educational system are dangerous, not because they are values, but because they are covering up problems. Future societal problems can greatly be aided through education. But this can be done only if the educational system is an integral part of society, for as long as education is constrained, our society will be without one of its most potent tools for shaping its future.

Many of the ideas and strategies that have been emerging in an effort to improve the education of children in America are not nearly as innovative as they might seem. Most of them can be traced back through decades, yet many of them took their current shape and significance in the mid-1950's. Between 1955 and 1960, these strategies went through several stages of design, exploratory implementation, redesign, and growth.

Many educators of today now see emerging an environment for education which is thought of in terms of activities and experiences which value and reflect the diverse qualities and capabilities of children, rather than knowledge to be acquired and facts to be stored by all children. Along with the development of ideas and strategies for a better environment for education has come the realization that architecture must play an equally important role in this development. Not so long ago it was relatively easy to specify the kinds and sizes of space which then dictated an environment. "Loyalty to the self-contained classroom, confidence in the desirability of class sizes with libraries, cafeterias, offices, and multipurpose rooms as supplementary spaces combined to persuade school administrators that
what they needed was an 'egg-crate' of equal sized compartments plus modest auxiliary facilities.\textsuperscript{11} And this is what architects gave them.

Now the situation is changing. School practices are in a state of flux and although the needed environment for tomorrow's schools is beginning to be understood, there are still many unanswered questions. It is not known, for example, how the computer and other technological devices will influence instructional programs in another twenty or thirty years. Nor is as much known as needed about pupil grouping, evaluation of pupil performance, and other factors that will influence the environment of school design in the future. Therefore, one of the greatest necessities in the designing of new environments for future schools is that they be adaptable to conditions that cannot yet be foreseen.
"If you ask a child what he learned in school today, you should not be surprised if he asks back, 'Which subject do you mean?' A problem in textbook education today is a failure in realizing the need for organizing and understanding the interconnected parts that are necessary for the child to comprehend his education as a whole.

"At present our entire educational system is geared to the G.C.E. examinations. Indeed, our grammar schools in particular are nothing more than G.C.E. sausage machines: eleven plus mincemeat is fed in at one end and 'O' and 'A' level sausages emerge at the other." Peter, Age 13

"By assuming that people learn at equivalent rates, we have based our advancement criteria on time." But a most important part of growing up is not time, but learning how to direct oneself. Rather than sameness and objectivity there seems to be a need for independence and co-operation.

We tend to often to think of resources as time and money, but the greatest resources of any group are the talents and creative energies and motivation of its members. In the past co-operation and sharing in the classroom has been a greatly wasted resource. In the future cooperation will hopefully replace the competition that is now stressed and will help produce adults who understand how to give and take.

"The school I would like would be perfect, glorious in every way, where you wouldn't worry yourself to death over things, wouldn't get bored, and yet wouldn't get lethargic. It would be a friendly school, everyone familiar with everyone, everyone co-operative with ambitions and big ideas for the future." Gillian, Age 13

Classroom discussions, small group work, and independent study projects will replace the teacher's lecture as a standard teaching tactic. There will be more questions than answers and more asking than telling. The
important aims in educating our children of the future seem to focus "no longer on the acquisition of knowledge and facts, but the opening up of the mind, development of intellectual curiosity and the will and ability to find the answers."  

"The school I'd like would be one whose primary aim was to teach me how to live, and make me a responsible member of society. Today, academic knowledge has become the sole interest of many schools, and few are daring enough to abandon the rat race for the job of creating thinking, adult individuals." Christa, Age 16

This cannot be accomplished by the development of their intellectual capacities alone, but must be complimented by the development of their social, emotional, and physical capacities out of which come a variety of experiences. The role of the teacher will then be to help the child learn from these experiences and to synthesize from them an understanding of the world around him.
CHILDREN AND THE LEARNING PROCESS

Traditional school activities in the past have focused upon two dominate senses: hearing and seeing. Recent research has realized the importance of all the senses in the development of intellectual abilities. Experiments have shown that children who were able to handle objects as they were named learned more rapidly than children who were merely shown the object. This emphasizes the need not only for materials that a child can listen to, look at, feel, put together, take apart and explore, but also a physical environment that accommodates the necessary activity for different styles of learning.

"Art resource teacher, third grade, Richmond, Va.: The children entered the room and found two pieces of construction paper on their desks. The teacher held up a fold fan—the sort we have all made, she asked, 'Do you know what this is?' Yes,' 'Can you make one?' 'Sure,' 'Well, go ahead.' All of the children very quickly folded their papers into little fans. The teacher then had them put the fans on their desks and listen as she slowly read the instructions on how properly to fold a fan. She then told them to make fans. Not one child could make a fan. She went around the room and tried to get them to go back to their old fan and make one like it. They could not. The verbal instructions had gotten in the way. The evidence is already overwhelming that verbal, curriculum-centered instruction is destructive of an individual's ability."

Studies by psychologists and educators have led to five conclusions concerning the relationship of children and the learning process.

1. "Children have individual rates of learning." Some children learn certain skills quite rapidly while others do so at a more leisurely pace. Some children make distinct growth spurts and then taper off to consolidate their gains. Some children progress at a more orderly and predictable rate. These individual rates of learning are evident in every classroom, and teachers are aware
of the need to have different programs for different children.

(2) "Children learn in different ways." Some children may sit
for a long time with a good level of concentration, as they pick
up information slowly and steadily. "Some reach a saturation
point after only twenty minutes and must stop and change activities,
but information simmers and they return to the task with fresh
insight."  

(3) "Children learn from both individual and group experiences." Children naturally want to come together and share. Planning a
class newspaper or mural together develops attitudes not only about
a specific task, but about co-operation, competition, and organization.

(4) "Children learn best when they are actively involved. 'I'm
measuring the length of the wall because I want to know how long
it really is.' 'Tim and I are making a bookshelf together because
we need it and we're going to use it in the room over there. 'The
shell collection on that table is mine and I'm still adding to it,
and see that book next to it? I took it from the library because
it tells a lot about my shells.'"

(5) "Children's interests are varied and transitory." Children
want to read, write, and communicate in a variety of ways. In a
way the child is seeking a "range of experiences like a gigantic
tasting party in which one becomes acquainted with a variety of
the world's recipes and ingredients."  

Learning through organized play is another important aspect of
child development which must not be neglected. "Play is a forerunner
of work and creativity. It is more than an activity. It is a medium
through which people mature and cultures are made richer." Through
play, social, psychological, and cognitive development takes place.
"The playgrounds—these are for both girls and boys. They may fight, but if a boy cannot be allowed to be with a girl, then when he grows up, he shall be downright shy of them (when first meeting a girl) or be rotten to them."

Christopher, Age 13

Behavior in play deals with that very special balance between individuality and collective organization. Play is the child's first opportunity to develop a sense of autonomy and competence, and learn the meaning of choice as well as constraint. "Through play a child develops a sense not merely of freedom and expression, but, ironically, a need to be constrained, or at least, to have expressions defined." Play, therefore, is one of the first steps of personal and social development in children.
The task of each teacher "must be to encompass the fullest possible development of each child's physical, intellectual, emotional, and social capacities." The means which lead to the accomplishment of these tasks are complex and intertwined involving an understanding of the growth rates of children, the processes of learning, the complexities of social interactions of home and school, and an awareness of the stresses and strains of emotional tensions found within individuals.

"May that race of strange beings, the teaching profession, flourish! Though teachers are ridden with idiosyncrasies and varied prejudices, it is in observing their little foibles that we learn to recognize and to control our own; we learn that other people see things in a different light from ourselves, and we learn to respect their right to do so. A computer could not teach us to live." Anne, Age 16

Their task is a formidable one. From their knowledge of children and their patterns of growth, the aims of education and the teaching-learning process, teachers strive constantly to fulfill their tasks.

The following is a brief summary of these tasks:

1. "Physical development: The fostering of physical growth, good health, and hygiene."

2. "Intellectual development: The organization of the numerous and diverse sense-stimuli which children receive constantly into meaningful patterns so that an overall understanding of the world around them may develop and give rise to the acquisition of skills enabling communication with others and acquaintance with knowledge."

3. "Emotional development: The encouragement of children's curiosity, interest, wonder, initative, and growth to independence and their appreciation of beauty."
Some teachers feel that the achievement of these goals should produce well-rounded personalities, each different from the other, fully capable of dealing with the tasks to be faced in succeeding stages of development.

Many elementary school teachers set their sights high and believe the true aim of the education process should be 'life-long' education, but 'life-long' education cannot take place as it should if the years of compulsory schooling do not leave in the minds of children "a memory of hours of stimulus, of mental occupation which was delightful, even if sometimes it was strenous...so it is far more important that children should leave school ignorant but keen to know; healthy and with a delight in the use of their bodies, capable of enjoying music and all the arts, kind and cooperative with their peers, than they should leave school crammed with information, physically and culturally 'illiterate,' selfishly competitive and conceited." Many more children could be led by teachers to this goal except for the present factors hindering their progress. The hindrances to the forward-looking practices of teachers are many and these should be understood by architects responsible for planning schools if we are to look forward to schools worthy of the children, their teachers, the methods they wish to use in their teaching and the community which supports the schools.
"A major hindrance to the development of new strategies in elementary education is the existence of a large number of old, cramped buildings." 37 Often even new buildings for elementary schools make no concessions in their planning for newer concepts of teaching or technological changes which have long since affected life outside school. The results are that traditional methods of teaching have been reinforced by unimaginative planning of school buildings, and teachers are trapped into perpetuating traditional teaching because of lack of space and facilities.

In the traditionally organized elementary school, certain spaces are used at specific times of each day. For short periods of time the corridors are used throughout the day to permit the movement of children by class to assembly, to playgrounds, or to the mid-day meal. At fixed times smaller groups move along these corridors to a space for music, physical education, or for a film, but for long periods of time these corridors remain empty. Throughout the day, except during times of class movement, each classroom will be filled with its quota of persons.

The very inflexibility of these classrooms provided for teachers seem to dictate a method of teaching with few alternatives. Movement into and out of the building is often rigidly controlled. In the classroom the desks are arranged in rows. Linear demarcations operate under these conditions to keep child from child, and teacher from those taught. "The teacher teaches, the child listens. He soon appreciates the value of conformity." 38

"The fault with a lot of schools today is that teachers are not
prepared to listen. There is a teacher at our school who is very keen on discussions until somebody makes a point which she is unable to explain, and she gets angry and tells us to sit down. I think that's the attitude of most teachers today. They don't mind discussing various topics as long as it ends up with them being able to prove a point to you and not the other way."

Lyne, Age 14

Teachers who practice this less open pattern of teaching may do so because they know of no other approach to teaching, or because they feel that the only safe way of dealing with an extremely complex human situation is to reduce it to simple terms, or they may believe that without adequate space, materials and help no worthwhile change can be brought to the learning we demand of our children in schools.

"Whatever the justifications for defending traditional methods of teaching, psychologists and a growing number of teachers appreciate that, if children are to be educated, important emotional, social, and intellectual criteria have to be satisfied before learning can flourish. It is known that:

(1) Varied friendship groupings having strong influence on children's motivation to learn exist in every classroom;"

"To become interested in a subject the pupil has to enjoy it, and half the enjoyment of lessons is taken away if they are held in enforced silence." Gillian, Age 13

(2) "The social climate within a classroom and school enhances or inhibits learning;"

"We would not be thrown out at lunchtime but would be allowed to go somewhere to sit and talk." Janet, Age 13

(3) "Social pressures give rise to conflict situations, feelings of anxiety and rejection;"

"Respect for the pupil is just as important as respect for the teacher, because after a young person's opinion has been disregarded three or four times the young person may never express an opinion again." Sheila, Age 14

(4) Emotionally disturbed 'anxious' children provide complex
problems of inter-personal relationships in any learning situation;"46

(5) "Children's rates of learning are individual. The pace of
learning for even a highly selected group of children will be
variable;"47

(6) When individuals have some responsibility for structuring
the learning situation they are more strongly motivated to learn
and they retain more;48

"...most of all Lord, let those in authority realize that we are
human beings, with brains and minds capable of acting without
prompting, not computers to be programmed and switched off."49
Anne, Age 16

These and very many other criteria which have influenced the thinking of
educators have led and are still leading primary school teachers away
from the comparatively simple routines of traditional teaching.

"I hope that all the schools of tomorrow will primarily have much
more freedom and variety than those of today. By freedom I mean
much more time to work individually on subjects or aspects of
subjects the pupils find interesting; and by variety I mean more
flexibility in the weekly program of lessons."50 Gillian, Age 13
EMERGING STRATEGIES

One of the most interesting and potentially significant developments in American education was the beginning of implementation during the late 1950's of an organizational structure known as "team teaching." Team teaching organization has emerged as an alternative to the self-contained classroom approach to learning.

The word 'team' suggests a type of working relationship among individuals that does not presently exist in most schools. It is based on the assumption that "one of the major functions of teaching is the control and direction of the necessary and sufficient variables that form or directly influence the teaching-learning process." A team relationship occurs when a group of teachers and students as an organized unit, accept and carry out decision-making responsibilities on matters such as time, space, group size, group composition, teacher assignment, and material allocation.

"A team can vary in size from two, to an infinite number, but generally speaking, somewhere between three and six persons is probably the most manageable." The student-teacher ratio is about 1 teacher per 25 students. The team is composed of a team leader, teachers, teacher specialists, and teacher aides, and between 75-125 students. A team leader is necessary to insure proper functioning and role fulfillment by individual team members, and to maintain appropriate communication between the team, the administration, and parents. The teacher specialist is a certified teacher who has achieved a high level of skill in the performance of specific functions such as art, music, physical education, or the teaching of children with specific learning disabilities. The
teacher specialist serves all teams. The teacher aide is often a university student serving an internship before graduation, or volunteer adults of the community giving their time in an effort to help a school.

One of the major contributions team teaching can provide to a classroom is the advantage of student groupings. Through team teaching students are provided the opportunity to receive large group, small group, and individualized instruction. The use of closed and open circuit television, of video tape, together with the developments in programmed learning leads to a new emphasis being placed upon individual and group instruction. The traditional classroom provides the following breakdown of teacher-student ratio: see figure #1.

<table>
<thead>
<tr>
<th>Group Size</th>
<th>Teacher-Student Ratio</th>
<th>Time Per Week</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personal Tutoring</td>
<td>1 to 1</td>
<td>5%</td>
</tr>
<tr>
<td>Discussion Group</td>
<td>1 to 12</td>
<td>25%</td>
</tr>
<tr>
<td>Class Group</td>
<td>1 to 30</td>
<td>70%</td>
</tr>
</tbody>
</table>

Team teaching coupled with the proper physical environment provides the following breakdown of teacher-student ratio: see figure #1.

<table>
<thead>
<tr>
<th>Group Size</th>
<th>Teacher-Student Ratio</th>
<th>Time Per Week</th>
</tr>
</thead>
<tbody>
<tr>
<td>Independent Study</td>
<td>teacher directed</td>
<td>25%</td>
</tr>
<tr>
<td>Personal Tutoring</td>
<td>1 to 1</td>
<td>5%</td>
</tr>
<tr>
<td>Small Group Work</td>
<td>1 to 6</td>
<td>25%</td>
</tr>
<tr>
<td>Discussion Group</td>
<td>1 to 12</td>
<td>30%</td>
</tr>
<tr>
<td>Instruction Group</td>
<td>1 to 120</td>
<td>15%</td>
</tr>
</tbody>
</table>

The major advantage of team teaching is that children are studying independently or in a group of 12 or less for 85% of the week, whereas in the self-contained classroom this grouping of 12 or less occurs 30% of the week.

The value of smaller group relationships lies in the possibilities the teacher has of motivating individuals through better knowledge of their interests and needs. Individual attention and encouragement from the teacher, backed by the opportunities for independent study, allow individual rates of learning and the growth of personal responsibility.
PERSONAL TUTORING 5% PER WEEK

DISCUSSION GROUP 25% PER WEEK

CLASS GROUP 70% PER WEEK

TRADITIONAL METHODS

INDEPENDENT STUDY 25% PER WEEK

PERSONAL TUTORING 5% PER WEEK

GROUP WORK 25% PER WEEK

DISCUSSION GROUP 30% PER WEEK

INSTRUCTION GROUP 15% PER WEEK

EMERGING METHODS
Education's preoccupation with doing something to and for children has often led to a failure to recognize the importance of favorable attitudes and emotional well being in teachers. They, as well as children, need a feeling of belonging, acceptance, and involvement in order to function effectively. "The provision of opportunities to teachers for sharing thoughts and feelings with peers may well be the salient contribution of team teaching."53 Each person has a chance to contribute to the improvement of the team function through co-operative planning and each comes to feel a part of the process of growth and becoming better.

There are, of course, certain disadvantages to team teaching. "At present there is no clear evidence either supporting or refuting the superiority of team teaching."54 Almost all studies carried out to date have, however, "indicated a positive change in the morale or attitude of those students and teachers in the experimental situations."55 Team teaching does seem to be a positive step in the future direction of education.
The function of education today must be to prepare students to become members of society. It is realized that this preparation must encompass not only the development of the intellectual capacities of children, but also the development of the social, emotional, and physical capacities.

"No one has adequately stated the function of a school, which must be to produce a complete human being useful to society. This is by no means the present aim of the majority of schools in this country. Their aim can be summed up in one word-qualifications."  

Peter, Age 16

Teaching and learning methods which once focused on the total class are now being focused on the development of the child's ability to pace himself and to pursue interests in an individualized way. Important aspects of education are no longer the acquisition of knowledge and the storage of facts, but the opening up of the child's mind, the development of his intellectual curiosity, and his will and ability to find the answers.

"Schools should be made better and made into a place all children like to go to and a place you go to because you want to go. Subjects should be made more exciting instead of sitting in a desk reading or half listening to a teacher going on and on about a particular thing. I should like to be doing things, finding what I can do and what I can't do; not just talking about it, e.g. a dairy farm but talking to the people who work there and trying to milk a cow by yourself."  

Angela, Age 13

The schools of today and of tomorrow need an environment which values and reflects the diverse qualities and capabilities of children, which encourages cooperation and sharing, and which may be adaptable to newer and better innovations in the future that cannot yet be foreseen.
Key Points:

1. "The ultimate function of education is to prepare students to be members of our society."

2. One of the greatest necessities in the designing of new environments for future schools is that they be adaptable to conditions that cannot yet be foreseen.

3. A most important part of growing up is not time, but learning how to direct oneself.

4. The role of the teacher is to help the child learn from experience and to synthesize from them an understanding of the world around him.

5. Children have individual rates of learning, they learn in different ways from both individual and group experiences, they learn best when they are actively involved, and their interests are varied and transitory.

6. Learning through organized play is another important aspect of child development which must not be neglected.

7. "A major hindrance to the development of new strategies in elementary education is the existence of a large number of old, cramped buildings."

8. Team teaching is a strategy of teacher organization that has emerged as an alternative to the self-contained classroom method in which teachers and students make decisions on matters such as time, space, group size, teacher assignment, and material allocation.

9. Teachers, as well as children, need a feeling of belonging, acceptance, and involvement in order to function effectively.
THE BUILT ENVIRONMENT
INTRODUCTION

In this chapter the author will examine the following categories in "The Built Environment:"

A. Educational Policy: Briefly examine the elements of the system level and school level educational policy of Georgia

B. Practical Criteria: Adaptability, economy and construction in use, building life and standard of maintenance

C. The External Environment: Site, vegetation, scale, external teaching spaces, recreation

D. The Spatial Environment: Space, flexibility, the open classroom, furniture and storage

E. The Visual Environment: Daylight, view, electric lighting design, color, surfaces and finishes, furniture and equipment, use of the interior

F. The Acoustical Environment: Acoustical considerations, teachers response

G. The Thermal Environment: Thermal comfort, thermal design

H. Community Use: Frequency of use, possibilities of change in the future

A conclusion will follow the chapter and also a listing of key points of the categories examined.
"Standards are applied annually to every public school and system in the State of Georgia to help determine areas of program, personnel and facilities that need improvement. Their purpose is to help schools and districts become more effective in accomplishing the goal of a complete, individual, quality education for every school age person in Georgia. 59"

The author feel it is essential to examine and include relevant criteria of both the school system level and the individual school level of the educational policy of the State of Georgia. Through an understanding of these criteria a relevant architectural solution can then be developed in accord with the state policy.

The system level standards are composed of criteria concerning the board of education, the superintendent, specialized services, school maintenance and operation, pupil transportation, fiscal policies, school food service, and services for exceptional children.

The school level standards are composed of criteria concerning school organization, administration, teaching staff, resource staff, school plant, media center, school food service, interscholastic activities, and curriculum.

For an in depth listing of the various criteria, refer to the appendix.
Adaptability

"It is now evident that society's use of buildings is inevitably subject to change and the rate of change is likely to become faster." This is a natural development brought about by changing social conditions, a large number of technical innovations, and the rapidity with which they are introduced. Just as with many of America's common building types, the problem of adaptability to changing needs has become a major factor in planning the built environment for schools. Education as a science and many other questions concerning child development are in a constant state of evolution. Therefore, the greatest possible adaptability must be planned for whenever development of a new school takes place.

School buildings can be expected to have to meet change in at least three ways. The first is in the manner of use and the teaching practices that are likely to be more widespread in the future. A second way is the extent of their use. "Although there is at present little evidence of any change of this type in prospect, it cannot be assumed that either the density of use or the hours which modern primary schools are now used will continue unchanged." The third way is by a change of user. If the possibility should come about that new types of educational organization and practice require buildings substantially different from those now built then there will be few alternative uses for today's highly specialized school buildings. The danger to be most feared is that school districts will have such a substantial economic investment in out of date buildings that educational advance will be halted for years
while those buildings are 'used up.'

Most schools today are so precisely tailored to their unique design concepts that any modifications may result in unhappy compromises. One has only to look at many school buildings today to see how difficult it would be to join only one additional classroom. But even if there should be no change of user, there still exists the possibility of more change in use. With typical school hours of 8 A.M. to 3 P.M., a five day week and long holidays, the number of hours in a year that a primary school is used are few. Whether society will be able to continue such specialized and limited use is open to question.

There are two main solutions to this widespread problem of adaptability that can be seen evolving. On one hand are specialized buildings for specific functions. These buildings normally have a relatively short economic life. On the other hand are general-purpose buildings, in theory adaptable to many uses, seen or unforeseen. These buildings are normally expected to have a relatively long life. It is possible that the practical solution may involve combinations of the two extremes.

Economy and Construction in Use

The official criterion of school building cost is the construction cost per square foot. There are no yard sticks for costs of maintenance, heating and lighting, and it is more likely that these matters do not receive any systematic examination in the appraisal of a new building project.

"An even more neglected aspect of school building economics is the value of the building as it is actually utilized, that is, the economics of its performance."62 How well, for example, does it utilize the teachers' energies? What flexibility does it provide for the educational function? What is the rating of a school building in terms of educational
value-for-money?

"I think the educational committee might allow my school to be built if they like it and also if it didn't cost too much. As a rough estimate I would say at least L5000. But the committee might say, 'Britain can't afford that much money to waste on a building, even if it is a school.' If they said this I would write a letter telling them that Mr. Wilson spends more than that in a week. This might make them change their minds and agree to build my ideal school."63 Leone, Age 13

These more relevant economic criteria must eventually receive some attention. At present this criteria is difficult to assess. Therefore, architects have worked within existing cost limits. These are found so stringent that, too often, design degenerates to the use of specifications to achieve mandatory areas of teaching space. In the future the author feels it will be necessary for educationists, architects, and economists to jointly derive these more relevant economic criteria and apply them to achieve a more meaningful environment for the education of children.

Building Life and Standard of Maintenance

The functional life of a modern school building is uncertain, but it is quite likely that it will have to be a long one. "It has not yet become economically possible to build schools for a short life and, indeed, there are few building types for which it is possible."64 Yet it is easy to believe that in times of rapidly developing techniques, buildings as young as twenty or thirty years will place serious restrictions on educational practice and therefore be both inefficient and educationally uneconomic. Much will depend on the buildings' design and the degree of adaptability they permit.

The maintenance of a school building varies with design, types of materials, standard of building workmanship, social character of the district in which it is built, and many other matters. High maintenance
costs, if they occur, may be acceptable on short lived buildings, but would be a serious imposition on buildings with long lives, and the likelihood of their occurring in schools must therefore be restricted.
THE EXTERNAL ENVIRONMENT

Site

Next to the people who will use it, the site on which a school stands and its surrounding spaces are probably the most important determinants of the pleasantness and quality of that school's internal environment. The main environmental needs of such a site encompass facilities for health, for pleasure, and more specifically educational functions.

The site and the approach to it help determine a person's first impressions. One head master has pointed out, "...it should be remembered that under-school age children pass 'their' school hundreds of times before enrollment, and must be impressed for good or bad by the appearance of the building and grounds."65

"The very sight of the old, red-bricked schools, with tiled walls and big ugly blackboards, could never inspire anyone to learn."66 Peter, Age 14

"A child's happiness and success in it, therefore, may only be modified by his experiences."67

One important aspect of the site and the school building is a pre-entry into the school. The pre-entry is an outdoor area associated with entering and leaving the school. It serves as an environment transition between the community and the school. This space and its character is important in dispelling the fears of children who are coming to the school for the first time. Being in the pre-entry and being able to look through the buildings exterior and into classrooms and play areas is reassuring to children and also might serve as a socializing function for children and the visitors to gather.

Vegetation
The advantages of mature trees on a school site are obvious, for they provide visual interest and are an environmental asset. Smaller trees, shrubs, flowers and grass can further help to create an attractive landscaped environment.

"I like plenty of space to play in at the breaks, with a variation of grass, concrete, trees, and bushes." Janet, Age 13

Used properly, vegetation can help break up the hard edges of playing fields. Design of playing fields is a visual problem rarely solved successfully. A start could be made by questioning the need for large unbroken areas that are so often seen.

"The first and foremost functions of the school grounds are physiological and regenerative." A child should be allowed to spend as much time as possible out of doors. "Play, games, and even outdoor lessons are of fundamental importance for the child's physical, mental, and moral growth." Good landscaping and green spaces will give the child what he needs: a proper balance between organized and free physical and intellectual activities.

Another important function of landscaping is educational. The environment provides an opportunity for the observation of nature and science. Therefore, it should resemble as much as possible a natural wooded landscape.

The planning and design of a landscaped environment demands close cooperation between the architect, landscaping consultant, and the builder, instead of being considered only after the school is completed. Lack of attention to the landscaping of a site is especially noticeable in the early days of a school's life. Schools visited soon after they are open, where an early start had not been made on landscaping, are complete inside but not outside, and as a result overall impressions of the school
"Physical settings must satisfy the need for a sense of identity." This is particularly true in the primary school. Through a human scale in the school a child should be able to answer the questions: Where do I belong? Where can I hide? Where can I work, alone or with others?

Most people would agree that the scale of a primary school should be small and in character with children, but this is not always achieved. Most architects in the past have failed to realize that "the most potent physical factor determining a school's character and the degree of intimacy it invokes is probably its sheer physical size, and this stems mainly from administrative decisions about the number of children to be accommodated." When schools are designed with children in mind, monumentalism is neglected and humanism is stressed. The message of their architecture is that schools are for children. They are symbols, too, of the hope that parents place in the future of their children and of community pride in the way it cares for its young. Unhappily, that is often where the school house goes wrong, for these symbols override human functions and force the structure into an out-of-scale monument. To put meaning back into this symbol, architects must realize that schools must serve the people in them: primarily children and secondarily teachers.

External Teaching Spaces

"Architects of primary schools often have stringent limitations to their work and little scope for manipulation, and in most cases it is not possible for them to provide covered space additional to but outside the normal teaching spaces. Yet this is a need that teachers constantly express."
There are two main possibilities for the layout of outdoor teaching facilities, one is to add to each classroom an outdoor terrace. The advantage in this solution is that it provides a direct relationship with nature and more usable floor area. The disadvantage is the possible accoustical and visual disturbances that might be caused by neighboring classes.

Another possibility is to provide outdoor teaching areas in appropriate parts of a natural landscaped park. This allows acoustical and visual independence and the area can be used by different classes. The distance from the classroom may exceed the easy movement of chairs. Therefore permanent seating would be necessary.

In outdoor teaching spaces shade and appropriate protection against glaring sunlight, wind, and reflective pavements are necessary. The objections raised occasionally by teachers to outdoor teaching spaces are due mostly to inappropriate design and lack of equipment.

Recreation

The needs of primary school children for well planned uncovered space arise from the importance of play in the development of children. "From educators such as Froebel and Montessori, Herbert Spencer and Karl Groos, Piaget and Jersild, and many others, we learn of the key role of play in the development of children, their findings on play and its importance are summed up in sentences such as:

'Play is the way the child learns what none can teach him.'

'Play is the child's work!'

'Play is preparation for life!'

'Sound play habits are as important for living as sound work habits.' They agree that in their play children develop the physical intellectual, emotional, and social aspects of their personality. Children develop their
physical abilities through jumping, climbing, skipping, and by handling sand, clay, paint, and other materials. The co-ordination of hand and eye movements, and the growth of small and large muscles are developed in their play. "Children's emotional responses, their fears and aggression, their constructiveness and destructiveness, their curiosity, pleasure and pain find a process of maturation during dramatic, imitative, constructive or destructive periods of play." They learn that there is a need to give and take, to adhere to rules, and to cooperate.

The ability to play and to cooperate with others grows between the ages of four and seven. In order to meet the play needs of these children the architect must recognize the necessity for:

1. "Covered spaces in which individual and small group play may take place without undue hindrance in good or in poor weather;"

2. "A spacious asphalted area on which children can ride tricycles or scooters; place seats or work benches; construct 'homes; play with balls, with water and sand, and paint. This area will be enhanced by a few mature trees;"

3. "A grassed area on which to sit, walk, run, climb, or scramble up fixed apparatus;"

4. "A small garden in which to house and tend pets, to dig and to grow plants;"

5. "Paved pathways, flower borders, shrubs, a fish pond and occasional seating to add to the pleasure of the environment of the school;"

For children between the ages of seven and eleven, their play activities become more expansive. Their physical activities, as they approach the age of eleven, are vigorous, and should contain more space and challenging equipment. "Characteristic social forces acting among the children may lead to the formation of larger groupings, often of one sex." Growing intellectual, physical, and emotional differences will be reflected in their widening interests in different types of play. Team games will begin to occupy more time in the lives of these children,
but a number of children of this age may prefer to play in pairs or singly. The development traits of these children provide a challenge. Design provisions should include:

1. "Covered spaces where individual and small groups of children may develop their abilities guided by personal, spontaneous activity;"82

2. "A spacious asphalted area planted with mature trees and having a few low walls against which children may play with balls. On this hard surfaced playground children may run, play games, paint at easels, and read or use a carpenter’s bench;"83

3. "A grassed area large enough for team games;"84

4. "An adventure area, distinctly marked off from those already described and left ‘rough’ in which children may climb trees, build shacks, or dismantle an old car;"85

5. "A garden area in which the children may keep and tend pets, grow vegetables and flowers;"86

6. "A pleasing outdoor environment around the main buildings including paths and provision for flower borders, shrubbery, a fish pond and occasional seating."87

Imaginative planning of uncovered space surrounding primary schools is likely to meet the play needs and the personality development of a wide range of children only if school boards and legislators appropriate the necessary funds for architects to properly design these spaces.
THE SPATIAL ENVIRONMENT

Space

"Of the major components of the school environment, the one most under scrutiny is the provision of space."88 This is because reduction in the overall area of a school is the most obvious and direct way of reducing building costs. In the examination and re-examination of school design that has been dictated by the nation's continuing need for economy, a main emphasis has been to minimize circulation area while obtaining the maximum area usable for teaching purposes.

Since the end of the second world war, school plans have been continually tightened. The 'finger-plan', once so common and in some cases still being built, in which classrooms were located off long corridors, has evolved into plans today of tight clusters of classrooms around a central assembly hall. When circulation space in these classrooms is combined with and used as teaching space then much traffic within the school is likely to take place out-of-doors in order to avoid distracting other classes.

Classroom teaching space and practical space for such activities as manipulative play, construction activities, and dramatic play are usually grouped in two alternative ways: adjacent but separate, or coupled together. In the first the practical space is located outside and near the classroom. In the second the practical space is integrated with the classrooms but additional to the normal teaching area. Many teachers agree that economic stringency has not allowed the proper allocation of practical space, but it has had a most beneficial effect in making the whole of a primary school less rigid and compartmentalized
than it has been.

"A room especially for drama is a good idea. You cannot make a successful attempt at a play in a space about three feet by nine feet. A drama room and interest is better than a classroom and boredom." 89 Jennifer, Age 14

The need to conserve both money and space has forced architects to seek less rigid plan forms and to insure a coupling and multiple use of space.

Apart from the obvious functional requirement of sufficient space for a wide range of activities, other spatial needs of a school can be expressed in terms of visual and acoustical separation. Sometimes, though, this isolation needs to be complete. "Partial isolation, or even 'psychological' isolation, obtained from some vestage of screening, will often be adequate." 90 Some degree of separation will be needed for different sized groups comprising individuals, small groups of a few children, half classes, normal size classes of up to 30 children, groups of two or more classes, and the whole school.

**Flexibility**

A new school must possess flexibility. First, it should be versatile --that is, it should lend itself to a variety of uses, both immediately and over the long run. Second, it should be capable of on-the-spot internal arrangement with minimum effort. Third, it should be capable of economic modernization when educational requirements change.

There are several ways to achieve these kinds of flexibility. One is to build a school with a variety of spaces, each suited to a different function. An example of such "planned variability" is the Estabrook Elementary School in Lexington, Massachusetts. "One of the first buildings specifically designed for team teaching, Estabrook is equipped with an amphitheater-type room for large group instruction, a wing with
six permanent (but convertible) small rooms of about 300 square feet each, a study center joining a large library, a separate work area for team teachers and for non-professional aides, and several clusters of conventional-sized classrooms.\textsuperscript{91}

A second way of achieving flexibility is through the use of the so-called "loft plan." This is achieved by locating roof-supporting and other load bearing partitions in such a way that the interior space of the building is left free and open. It is then possible to subdivide the interior space by means of movable partitions which can provide various sized spaces. These spaces can then be used for large, medium-sized, and small groups with relatively little difficulty or loss of time. "The great majority of new schools in which provisions are being made for flexible grouping have chosen the loft plan."\textsuperscript{92}

A third way of achieving flexibility is to deny the need for any space partitions either permanent or temporary. The major disadvantage is that it is often difficult to subdivide interior space quickly when necessary.

The Open Classroom

Open plan classrooms are composed of broad expanses of enclosed space unbroken by walls. Their clear span interiors are usually carpeted and air-conditioned, and are subdivided in smaller discrete areas by the use of movable partitions, plants, or movable furniture. As activities and group sizes shift throughout the day, these space dividers may also move to create new spatial relationships. "Gone are the frozen rows of classrooms containing rows of desks, which in turn freeze class sizes and activities and prevent communication and interaction among the school occupant."\textsuperscript{93} Open planned space has the potential for quick physical response to changing daily requirements, and over a period of time the
potential to yield to unpredictable changes in educational philosophy and methods.

There are problems in open plan classrooms. These problems are concerned with human factors—the need for a sense of space and the need for visual and auditory privacy. "Often, the first generation open plan schools were simply huge seas of undifferentiated space in which the absence of landmarks, reference points, or territorial markers left students disoriented, not knowing where to go or where they belonged when they got there." Later, architects recognize the need for defining subspaces in such a way as to provide orientation and conditions for the visual and auditory interaction of a specific group within a subspace.

Sometimes, open plan schools turn out to be unsatisfactory because of misconceptions of cost. One misconception is that they are cheaper to build than conventional school buildings. Another is that more children can be crammed in them. Either view for building the open plan classroom is a misconception.

Schools without walls are not likely to cost less than conventional schools. True, money is saved on the elimination of interior walls and doors. And it is also true that without them, and with reclaimed corridor space, the "net usable area of a building may be 80% or more, compared with 66% net usable area in a conventional building." But the money saved must be spent elsewhere. The interior walls and doors, once part of the construction budget, must be used on furniture and equipment. The reason is that the lack of interior walls demands a better environment because of the concentration of large numbers of children in a single space. "And so, with the furniture, equipment,
and other interior elements costing more because of the greater diversity and highly refined quality demanded of them, it is wiser to expect a trade off in cost rather than a savings."^96

"It's all very odd. We have a brand-new language laboratory, with a film-projector affair which shows cartoons with French commentary on a T.V. screen, but our text books are falling to pieces. We have several large science laboratories that are clean enough to perform brain surgery in, while our lavatories are usually minus chains or minus door locks or minus toilet paper—or minus all three."^97 Ellen, Age 13

Open plan schools work well because they are intended for active, individualized programs which require more spatial "give" than is required for inactive, sitting-listening groups. Usually additional reserve square footage is included in the classroom for construction and expansion of sub-spaces within the school. "There is an understandable temptation to use reserve square footage for additional pupils should enrollment increase, but to do so hampers activities and movement and may cause acoustical friction."^98

Open plan seems to be the direction of the future because the teacher can no longer be the sole source of information, because of the need of varying group sizes, because children learn from each other and in a variety of ways, and because the time of a teacher and para-professional can be more effectively used.

Furniture and Storage

The current practice in the arrangement of furniture in classroom is to adopt what is usually known as informal arrangements. In contrast to additional layouts where every child faces toward the blackboard and teacher, these consist of clusters of four or more desks or tables with children sitting around them in groups facing all directions. In practice the number and arrangement of the desks depends more on their
shape and weight, the geometry of the room and space available rather than activity, which should be the real purpose of the arrangement. "One might think that the formal, orderly arrangement would be the one most economic in its use of space, but teachers say this is not so."99 Because circulation space in the formal pattern belongs to each individual desk and chair it is more space demanding than the informal arrangement where space not occupied by desks is used for many chairs and much movement.

"Probably few teachers pay much attention to the size and adjustment of classroom furniture, except perhaps at the opening of the school term when seating assignments are being made."100 The proper fitting of desks and chairs to pupils has become a problem because of team teaching and other arrangements that cause children to move about the building frequently.

"...more space instead of being cramped in about 1 square yard of hard wood. Tables would replace desks, which are small and an enemy of knees."101 Angela, Age 12

The problem is further complicated by multi-aged grouping plans and other procedures that call for children of different ages and size to use spaces throughout the room for a variety of purposes. Many children find themselves using furniture that is too big or too small, and possibly dangerous because unsuitable seats may cause incorrect posture which produces fatigue and can lead to physical defects.

"Another problem in schools where people move freely about is that of providing easy access to loose supplies and equipment."102 Pupils in self contained classrooms usually have an assigned desk in which they keep crayons, paper, rulers, pencils, books and other equipment. In the open plan where chairs and tables are for all children, small "cubbies" for storage must be provided to give a child a sense of belong-
ing and orientation.

The biggest and most frequent complaint that teachers voice is that their storage space is inadequate. Suitable storage space for immediate and long-term use must be provided in each classroom for the various products and projects on which the pupils are working. Some schools have small storage units on wheels which may be moved around within the classroom. These are especially useful as space dividers for they can form the 'corners' for which teachers express so much need, and within which small numbers of children may carry or group activities with the group's identity defined and differentiated from other groups.
THE VISUAL ENVIRONMENT

"It is generally believed that peoples' visual senses provide most information about an environment."\(^{103}\) This certainly seems true of their first impressions, though these may be modified when the senses which provide information about the acoustical, thermal, and other components have contributed to a total impression. Like every other environment factor, the visual environment comprises both quantitative and qualitative matters. "The most important visual criterion in a school is the provision of facilities that allow for the efficient performance of such visual tasks as reading and observation."\(^ {104}\)

Daylight

"The importance of daylight is one of those questioned assumptions that has dominated the design of schools more, perhaps, than of any other building type."\(^ {105}\) The desire to illuminate by daylight alone has produced the most characteristic visual feature of contemporary school buildings - the wall-to-wall and ceiling-to-ceiling glass of classrooms. The percent daylight factor that has to be provided on the working plane in a classroom is intended to insure a high standard of daylight provision. In practice this factor is all too often applied uncritically as a basic criterion for window area. The influence of daylighting attitudes is evident in various other ways. In primary schools interior spaces in single levels are in some cases lit by skylights, even when the required illumination could be provided more efficiently by well-designed electric lighting. Current assumptions about daylight need a critical re-examination. The overriding concern should not be that one type of illumination or another is used. The choice should rest with
the most satisfactory combination of quality, quantity, and cost.

"Although, more recently, the basis for daylighting has been modified, clerestory windows are still seen even on new buildings and in assembly halls as well as classrooms. It would be interesting to know whether they are valued as sources of light or are provided to insure a particular effect, for they have a number of disadvantages."¹⁰⁶ If designed properly they can provide beneficial lighting, but they must be accessible for cleaning and able to be curtained in rooms where film projection may be used. They should also provide a good view whenever possible. If designed properly they can provide effective ventilation by stack affect.

View

"The Victorian attitude towards school windows was to place them so high that children, being unable to look through them, were more likely to concentrate upon the teacher and their work."¹⁰⁷ Such an attitude can still be found.

A view of one of the major features of an internal environment. It may even be that the ability to see something through a window is of greater importance than obtaining sunlight through it. Schools should have attractive views, undulating landscapes, mature trees, and a combination of distance, interest, and variety.

Good visual interest can be obtained from the planting and small construction of play equipment for which the school itself may be responsible. But often the architect's intentions may not be appreciated by the user's needs. It is quite common to see large classroom windows whose effective area of glass is substantially reduced by children's drawings or other things taped to the windows. This is usually a result of pin-up space.
Another feature of window design requiring further development than at present is the provision of screening. At present, the choice seems to lie between either curtains or venetian blinds, or screens of cotton or plastic fabric. It would be valuable to have an assessment of these choices concerning appearance, cost, cleaning, and maintenance, but at present none are available.

Electric Lighting Design

Electric lighting is one part of the building's design that architects have tended to neglect. Although they usually have clear ideas about the visual effects they require, most of these are imagined in daylight conditions. Little attention is paid to the way in which environments are experienced at night when electric lighting is in use. At present this is not a very important matter in primary schools which are expected to be used during the daytime only, but this will require more attention if schools are used out of "school hours."

Due mainly to heavier installation costs and expected few hours of use, incandescent lighting is used in many cases over fluorescent lighting. Incandescent lights do produce more heat but are probably less expensive than fluorescent lights.

Color

Color needs to be considered as both a functional aid to lighting design and as an artistic medium that will be viewed in both electric light and daylight. But colors tend to be specified for daylight conditions and viewing under electric lighting can sometimes produce a different color. This should be taken into consideration when designing and specifying color schemes.

Except in a few places of special emphasis color is often a needless distraction from the basic requirements of the school itself.
White, or near white, provides the best possible background for the naturally bright colors of the school environment that can be seen in the children's clothes, pictures on the walls, plants, flowers, and furniture. It also works well in both daylight and electric light. Its main disadvantage is that it can become dirty, but it should be the responsibility of the teachers to encourage the children to help keep the walls of their school clean. Decorative color schemes are often regarded as an opportunity for the exercise of a personal desire. "In one school a total of ten colors could be seen applied to the ceiling and wall surfaces in a single classroom." Attempts to introduce children to an appreciation of art is desirable, but to do so in this manner is questionable, for the child is interested above all in his own artistic creations, and these should in fact become the decoration of the classroom.

Surfaces and Finishes

Much of the visual quality of a room is determined by the quality, condition, color and texture of the finishes. Light colored floors are desirable because besides creating a feeling of "freshness," they also assist in the reflection of light.

Walls with a "pin-up" surface are a great asset in any classroom. All too often there is not enough pin-up surfaces and those that do exist tend to be designed as framed areas of material stuck to wall surfaces. Their appearance is more successful and they function better when they constitute the entire wall surface or at least the area within limits defined by some major features of the wall design.

Furniture and Equipment

All of the visual qualities of furniture and equipment, the suitability for its purpose, its quality, condition, color, and textures
contribute to the total visual impression of a classroom. Furniture covers much of the floor area and being nearer the children's eye level will seem a larger factor to them than it does to adults. Such things as electric conduits should be carefully thought out in an open plan classroom and placed with an approach to the total environment.

Use of the Interior

Teaching spaces are used intensively, so it is necessary that an architect's aim should be to provide the most functional space for all of the activities that might take place within the building. Much equipment and additional material will be introduced by teachers and children and will add to the architect's original design. Everyone realizes this will happen but it receives little recognition during the design process. "Architecture, it has to be realized, is not static: A completed building is never left as the architect intended it should be."109 One reason is that nobody could ever imagine and provide for all of the uses a building must serve. Another is that completely designed school interiors sometimes intrude more upon the people who will use the building than they are prepared to accept.

Occasionally children and teachers create visual clutter in the classroom. This is something for which the architect cannot plan for except by insuring that sufficient storage for equipment and materials and the best possible facilities for displaying childrens' work are provided.
"Acoustical comfort depends largely on certain individual standards that are mainly derived from expectations and attitudes, the subjective impressions of the actual noise levels experienced, and the quality of the sound." Experience has led people to expect that schools are not perfectly quiet spaces and that there is always a hum of activity in certain spaces. But children and teachers in open classrooms expect this hum of activity and adjust to it. This hum of activity itself helps mask potentially distracting sounds.

Acoustical Considerations

"The basic acoustical conditions of a school stem from its timetable and teaching methods, in conjunction with the social environment that has been created. An architect employs a hierarchy of decisions to modify these conditions and determine the acoustical quality." His first decisions must concern the choice and use of a site. His next decisions are in planning the location of different spaces within that site.

"Classrooms should be sound proof, so that if a math lesson is going on on top of the music rooms, each lesson will not be distracted. It could have disasterous results: 166532 x 695 = Beethoven." Lietta, Age 12

After this comes the detailed design of those space in terms of their volume, shape, separation of activities, and materials.

Acoustical Materials

"The principle sound conditioning material provided in open plan school's is carpet, which is especially effective in classrooms because it eliminates a great deal of disruptive noise - books being dropped,
chairs being pushed around, feet scraping, and so forth - at its source; the floor." In most cases the additional cost of using carpet is saved within a short period of time by reduced maintenance costs.

One of the problems that has arisen in some open plan schools has been the over use of sound absorbing materials therefore creating "acoustical deadness." This occurs when carpet and acoustical ceiling tile are both used and there is a lack of hard surfaces such as walls and partitions to properly reflect sound. When this occurs children must sit in closer clusters for optimum hearing.

The following are two basic acoustical rules for planning open plan schools:

1. "Of the two horizontal surfaces in the room, floor and ceiling, treat only one acoustically - the floor. Treatment of both may have a deadening effect on the space. An acoustically absorptive (i.e. carpeted) floor stops unwanted sound where it starts; a hard ceiling reflects wanted sounds to where they are wanted."

2. "Make the total dimensions of the room large enough so there can be adequate separation between work groups - and make sure the population of the room does not exceed the number of noise makers it was planned for."

Teachers

Different teachers accept different types of noise in their classrooms with varying degrees of comfort. Many teachers feel comfortable among the hum and activity of open classrooms. But some will be reluctant to accept it. The real problem it seems is then a human one: an unwillingness to experiment and change and a preference for the known and recognized.
"After two years of trial and error in moving into individualizing, I really thought I was ready for my third year. So I set up the environment, gave children the opportunity to make choices, made a variety of materials and working spaces available, and readied myself for that first day. After a month we were still in an unhappy state of chaos. I had ignored the most important factor: the children - a set of students who had little experience with making choices and assuming real responsibility at school. They seem to need support and training in how to make appropriate decisions and carry through the same process that I had gone through: taking small steps and beginning with one area. We set up a decision-making center where all the activities were geared to teach and reinforce the process of decision making. We had lots of class meetings, some with imaginary situations and others with actual happenings in our class. We began some self-scheduling for one time block a day. Slowly, I gave and they accepted and asked for more responsibility."

Teachers accustomed to working within their own classroom walls may find extraneous noise distracting. Also some children may become over-stimulated by this hum and activity and therefore will need quieter spaces which should be provided. But in the open plan a hum of conversation is hardly avoidable and is a part of its environment.
Thermal Comfort

"Adequate 'climatic' conditions in classrooms are necessary to the child's health, to stimulate receptiveness and work, and to prevent the apread of contagious diseases." Different thermal conditions are needed in different parts of a school building, and at different times, to take account of varied activities. The heating and cooling systems have to be capable of responding quickly to changes in the weather and be able to provide a range of conditions as desired by the multi-use of space. In practice this is difficult to achieve, especially with the conditions normally used in schools. For example, if an assembly space is to be heated or cooled to provide a temperature suitable for active games then, for the children who may be working quietly in "private study" corners of the space, this will not be suitable, unless some additional provision is made. But a lot depends on children's reactions to their thermal environment, and in many cases they seem much less sensitive than adults. "They rarely complain of thermal discom­fort." 118

Most people are aware that thermal comfort is not entirely dependent upon the level of the thermometer, and that other factors such as radiation, temperature gradient, air movement, and relative humidity are also involved. But no combined thermal comfort index using all of these factors is really applied to schools. The conventional measure of thermal conditions within classroom is still air temperature.

Few schools are heated mainly by radiant systems but all will experience radiant heat entering through the windows. This should be a
helpful boost to heating costs during the winter, but in the spring and summer these gains will not continue to be beneficial. Providing schools are not overglazed there will probably be only a few days when the build-up of heat in the classroom becomes intolerable.

"Too much glass is a mistake; in summer we ripen like tomatoes in a greenhouse." Sheila, Age 14

This comfort can only be achieved by a proper design of the heating, cooling, and ventilation systems.

A possibility exists that on cold winter days children working near windows could suffer thermal discomfort from loss of heat by radiation to the outside. "There is, though little evidence that this is any serious problem." Usually discomfort is attributed to the unpredictable nature of the weather at the beginning and of "official" heating seasons. "A measure of flexibility in operation, and the facility to switch on or off at reasonable short notice, seems to be a very desirable requirement of a school heating installation." 

**Thermal Environment Design**

Although he usually delegates the task of designing the heating and cooling system to engineers, the architect still must retain a major responsibility for the thermal environment within the school and its design and thermal properties. Most schools employ forced-air convectors. Usually one heater/cooling unit is provided in each classroom. With such systems there are high rates of air movement and wide variations in thermal comfort conditions within a classroom. The single unit is often positioned near the classroom door or by the blackboard, its location probably being decided on the basis of minimum pipe runs. A more beneficial system in terms of the users would be a central unit heating and cooling distribution system using vents to
deliver a determined amount of air to various points in a classroom. This system would be more effective, but also more expensive.

Proper air ventilation is an equally important factor in thermal design. Invariably, natural ventilation and air freshness are controlled by opening and closing windows. This is possible in school rooms with windows in two opposite walls. This type of classroom may be the best solution in terms of lighting and ventilation. With glass in one wall only, possibilities of ventilation are limited. The proper use of clerestory windows and the stack effect can be used to aid in natural ventilation and air movement.

It is also important that the inner surfaces of classrooms be finished with thermal insulating materials.

"The school would be a large spacious building, with underfloor central heating so that people who enjoyed going without their shoes could do so, if they wished, in comfort. The interior of the building would be decorated by the pupils of the school, as it is they who have to live in it." Angela, Age 14

Carpet not only provides aesthetic, acoustical, and low maintenance qualities, but also thermal qualities of benefit.

Although a great deal of research has been done into the thermal design of buildings through engineering of equipment and installation, little has been done into people's thermal requirements. This is particular true in schools. What seems to be needed for the thermal comfort of classrooms is a close look of how spaces and activities will relate to heating, cooling, and natural ventilation.
"The increasing costs of educational services and the growing demands by the community on educational resources are leading educators and administrators to examine whether better use cannot be made of social and educational facilities."

Frequency of Use

At present, most primary school buildings are in full-time use for nine months of the year and out of use for the remaining three months while the school population is on holiday. During this nine-month period of full-time use the buildings are occupied usually for seven or eight hours a day, five days a week. Equally important the community in most cases is divorced from the school. Traditionally schools have been planned and built in locations of the community where few of its other activities occur such as shopping, business, and religious oriented activities. Schools are such vitally important elements in the development of children and should carefully be planned in relationship to a community's development.

"Community education, which began in the 1930's, has demonstrated that when a school opens its doors to the community, the school, the community, and society in general come out ahead; but the winner is probably the school. When a school is open twelve or more hours a day and has programs for all the members of a community, liability insurance may go up, but the cost of vandalism goes down dramatically, bond issues pass more readily, and school districts find that federal monies from a variety of agencies are available for community projects." Community involvement has come through the PTA (Parent Teachers Association).
Volunteer parents going into schools and giving their time to help teachers and children, and joint use of the school's recreational facilities. One reason for lack of community involvement the author feels has been a result of lack of planning concerning the location of the school and its relationship to other activities in the community.

Possibilities of Change

There seems to be a need for the re-examination of the relationship of the school to the community. It seems as though a school should become part of the physical center and natural focus of a neighborhood.

"Youth clubs, dances, shows, societies, dramatic clubs, cinemas, etc. in the school, held frequently, could turn it into a place of friendship and happiness, rather than dread." Lietta, Age 12

"I know one thing that I would make a rule, it's to have all the teachers meet our mothers at school, only if it's once a term it would be the best thing which ever happened." Keith, Age 12

"The concept of the community school, reaching out into the surrounding area imaginatively and sympathetically containing facilities for adult groups, young people and children, is one of tremendous possibilities." Lietta, Age 12

The change required would be a radical one. Social re-orientation in thinking and planning to meet the requirement of such a concept would be considerable. If this change does begin to come about in the next ten, twenty, or thirty years, then schools built might include additional services rather than just educational. A future primary school then might support social, medical, and teaching services. The effects of an integration of these services are not easy to forecast, however the author feels that realizing a future change might occur is important in planning the location of a new primary school.
CONCLUSION

The built environment for schools today involves an understanding of its external, spatial, visual, acoustical, and thermal components and their relationship to children and teachers, and the emerging strategies in education today.

The built environment for schools today must also be able to effectively respond to future changes in education. As the education of children continues to develop and change, the school's built environment must be able to adapt and accommodate these changes.

There must also be an understanding of the built environment and its physical and emotional links to its community and children. There seems to be a need for the re-examination of the relationship of the school to the community. It seems as though a school should become part of the physical center and natural focus of a neighborhood. Schools are such vitally important elements in the development of children and should be carefully planned in relationship to a community's development.

Key Points

1. The problem of adaptability to changing needs has become a major factor in planning the built environment for schools today.

2. A neglected aspect of school building economics is the value of the building as it is actually used. What is the rating of a school building in terms of educational value-for-money?

3. "Physical settings must satisfy the need for a sense of identity." Human scale is an important aspect in developing a sense of identity.

4. Through play children develop the physical, intellectual, emotional, and social aspects of their personality.

5. Open plan schools have developed because the teacher can no
longer be the sole source of information, because of the need of varying group sizes, because children learn from each other and in a variety of ways, and because the time of teachers can be more effectively used.

6. A view is one of the major features of an internal environment. It may even be that the ability to see something through a window is of greater importance than obtaining sunlight through it.

7. The basic acoustical conditions of a school stem from its timetable and teaching methods in conjunction with the social environment that has been created.

8. Different thermal conditions are needed in different parts of a school building, and at different times to take account of varied activities.

9. Traditionally schools have been planned and built in locations of the community where few of its other activities occur such as shopping, business, and religious oriented activities.
CASE STUDIES
INTRODUCTION

As a part of planning an elementary school system and facility on Skidaway Island, the author believes it is necessary to observe some existing nearby schools.

Two nearby schools in South Carolina were recommended for study: Ninety-Six Elementary School in Ninety-Six, South Carolina and Pelham Road Elementary School in Greenville, South Carolina. The two schools in Savannah that Skidaway Island's children presently attend were also observed: Hesse Elementary School and Savannah Country Day School.

Following the case studies will be a chart the author has compiled rating the four schools in terms of their external environment, spatial environment, visual environment, acoustical environment, thermal environment, educational/social environment, and their relationship with the community they serve.
Ninety-Six Elementary School was built in 1936 with the intention of serving its community as a school with grades 1-12. In the 1950's a new high school was built in the area and the school was then converted completely into an elementary school. In 1966 additional classrooms were provided. Today the school has about 600 students in grades k-4.

**External Environment**

Ninety-Six Elementary School is located in a residential community about 3/4 of a mile south of the downtown area of Ninety-Six. Because it serves primarily a rural population, transportation to the school is primarily by bus, with only a few children walking and riding bicycles. The school is composed of 5 buildings with load bearing brick walls, and both hip roofs and flat roofs. See figure 2.

There is a minimum amount of vegetation around the school. What does exist are shrubs planted against the building and grassed areas between and around the buildings.

Since the school was originally designed for high school students, the scale is not in character with small children. Building masses are broken apart, but the entry ways, connecting outside covered walks, and interior corridors are not at a child's scale.

External teaching spaces do not exist. External space is used only for limited outdoor circulation to recreational areas. Recreation is primarily a large open field of dirt in which children may play a variety of team games. A few metal play structures exist for individual play.
Spatial Environment

The administrative space occurs at one end of the school with the gymnasium and cafeteria occurring at the other end, with classrooms in the middle. Children travel during the day to the cafeteria and gym primarily by use of the indoor corridors. People traveling along the road in front of the school view masses of buildings and nothing else. Recreational areas are located behind the school and are not visible to the public.

Classrooms are open plan for kindergarten, with self-contained classrooms for first, second, third, and fourth grades. This is not by choice, but by the inflexibility that the buildings dictate.

Within each classroom the teacher does have the liberty to arrange the desks and decorate the room as she feels is best. Therefore there is a variety in each classroom with some teachers maintaining an orderly series of rows of desks, and some breaking the desks up into small clusters.

Furniture is primary large, heavy wooden desks for each child, except in the kindergarten where new, colorful, light furniture has been provided. Storage is provided for in each classroom, but is inadequate.

The Visual Environment

Each classroom contains two large windows curtained with blinds. Teachers generally keep the blinds closed because there is no particular focus of the view out of these windows. Views are confined to the classroom.

Flourescent lighting fixtures are used throughout the school and are the primary means by which the classrooms are lite. Natural lighting was designed to be a part of the classroom, but is used no longer.

The schools interior colors are primary light green in the older parts of the school and beige in the newer parts. Surfaces in the classrooms are decorated with children's work, but the interior corridors are bare.
Furniture is left its natural wood color and does little to enhance the impression of the classroom.

Acoustical Environment

Because of the nature of self-contained classroom, few acoustical problems occur. Walls between classrooms are of concrete block providing an acoustical barrier between classrooms. Recreation and automotive traffic occur far enough away from classrooms that no acoustical problems arise.

Thermal Environment

In 1966 when a new classroom wing was added, the entire school also received central air and heating. Large sheet metal ducts run into each room and temperatures are controlled at one point. In the past natural ventilation was achieved by opening the windows, but since air-conditioning was provided, the windows have remained closed. Ventilation is now artificially controlled by the heating and cooling system.

Educational/Social Environment

The principal of Ninety-Six Elementary School is a progressive young man who understands and believes many of the newer trends the author has earlier discussed, but because of the physical design of the school, few of these trends are adaptable. An art room has been created in the administrative unit in which each class is allowed to freely use.

In the first and second grades each teacher teaches all subjects to her class. They remain in the classroom the entire day with the exception of traveling to art, recreation, or lunch.

In the third and fourth grades children change teachers and classes for language arts, math, social studies, and science. By changing classes these children do come in contact with other teachers and students during the day.
In kindergarten the children are in a true open plan environment because the building construction permits. Two groups of 60 children per group attend for 3 hours per day. Problems have occurred when children move from this open environment to the more rigid environment of the other grades.

Community Use

At present their is very little community involvement with the Ninety-Six Elementary School. The principal is now trying to organize a PTA which hopefully may lead to parents coming into the school. The playfields and gymnasium are used by organized recreation leagues after school hours.
Pelham Road Elementary School was recently designed and built in a middle-upper class residential community in Greenville, South Carolina. It has about 600 students in grades k-5.

External Environment

Pelham Road Elementary School is near a residential community. Children travel to the school by walking, riding bicycles, and by bus. The school is one large, massive structure with its main entrance used by visitors and teachers. Children enter their classrooms directly from the outside. Its structure is load bearing brick walls with a flat roof.

The classrooms surround a central core which is composed of an art, music room, and resource center (library). At one end of this core is the administration office and at the other end is the cafeteria. See figure 3.

There is very little vegetation on the site. Shrubbery and small trees have been planted adjacent to the building. Nearby are natural woods, but these are not a part of the school's environment.

Even though the building was designed for children, it is scaled for adults. Its main entry is imposing as are the bare individual entrances into each classroom. Inside ceiling heights are scaled for adults.

There are two outside classrooms for teaching which are not easily accessible to the indoor class and therefore are not used.

Recreation is composed of a large open field with different activities occurring. There is one wooden play structure which children may use.
PELHAM ROAD ELEMENTARY

CLASSROOMS
ADMINISTRATION
MUSIC
ART
LIBRARY
CAFETERIA
Spatial Environment

Pelham Road School was designed with the concept of placing classrooms around the common services of art, music, and the library. Children travel in a complete indoor environment all day with the exception of going out to play once a day. Recreation occurs on land to the side of the school and bears no relationship to the school whatsoever.

Classrooms are designed for open plan education and team teaching. They are designed in units to contain four classes and are connected to each other and the common services by a spartious interior corridor.

Within each classroom children move freely about with clusters of tables and chairs throughout the room. Walls are decorated primarily by children in a variety of ways.

Furniture is brightly colored, lightweight, and easily moved. The floors are carpet and are used for sitting by many children. Storage is in the middle of the room in a small glassed in area which is also used by teachers when quiet instruction is necessary. Partitions to separate classes are used when the teachers wish to close their classroom.

The Visual Environment

Each classroom contains one glass door which opens to the outside. They are positioned in a far corner of each classroom and provide little view to the outside. Views are confined to the classroom and the open corridor along which other children and teachers travel.

Fluorescent lighting fixtures are used throughout the school and are the primary means by which the classrooms are lit. Natural lighting was not designed as a part of the classroom.

The interior colors of the school are primarily white providing a background for the bright colors of the furniture, children's clothes,
and decorations.

Acoustical Environment

The open classrooms are all carpeted with partitions dividing spaces when necessary. Acoustical levels seem completely tolerable with an occasional outburst. Automotive and recreational areas are separated far enough from the classroom so as not to interfere with classroom instruction.

Thermal Environment

Pelham Road School utilizes a central heating and air-conditioning system with vents going to each room. The school maintains a constant comfortable temperature throughout. There is no natural ventilation. Artificial ventilation is controlled by the heating and cooling system.

Educational/Social Environment

A form of team teaching is used with an emphasis on informality and varying group sizes. This is possible because of the design of the classrooms. Children move freely about the room going to different teachers for different subjects, but remaining primarily in their four-class unit. Children come into frequent contact with students of all ages during the day. Special teachers for art, music, and physical education are provided.

There is very little relationship of the school to the natural environment. Children are often seen playing near the edge of the woods, but no relationship with nature has been established.

Community Use

Pelham Road School has an active PTA which has led to much community involvement. An average of 90 parents per week volunteer their time to aid teachers in instructing their children. Each Friday a school newspaper is printed and sent to the families of students. During the evenings
occasional community banquets are held in the school's cafeteria. There is very little use of the school's recreational resources because they are inadequate.
Hesse Elementary School was built in the early 1960's as a result of the growth of Savannah in the southwestern portion of the city. It is located in the heart of a large residential middle-upper class community. Hesse School has about 550 students in grades 1-6.

External Environment

Hesse Elementary School is located in the middle of a residential community. Children walk, ride bikes, and ride buses to school. The school is composed of three buildings with load bearing brick walls and flat roofs. Its concept was that of traditional schools: two wings of classrooms with corridors down the middle, with a cafeteria. See figure 4.

The school is located in a natural wooded area. Many of the trees were destroyed while building, but some do remain providing the school with a pleasant atmosphere. The planting of shrubbery has occurred adjacent to the building but is not a very interesting visual element. Much of the area between the wings is grassed, but children are not allowed in this area. The scale of the school is small and in character with children from the outside, but the interior corridors have been designed for adults.

External teaching spaces have not been designed, even though the school was built in a wooded area. External spaces are used only for recreation.

Recreation areas are broken down into areas for younger and older children. Larger children use the play fields to the side of the school, and younger children use the smaller area behind the school with a few
HESSE ELEMENTARY SCHOOL

1 CLASSROOMS
2 ADMINISTRATION
3 LIBRARY
4 CAFETERIA
Spatial Environment

Children travel through interior corridors and along outdoor covered walks in route to the cafeteria and library during the day. People traveling by the school see children moving along the outside walks and playing in the recreation areas.

Classrooms were designed to be self-contained units. For this reason, they are not adaptable to many of today's educational principles, but these are sound buildings and must be used.

Within each classroom the teacher has the freedom to arrange the room as she wishes. In some classrooms the desks and chairs have been grouped in small clusters, and in others the traditional rows have been maintained.

Furniture is primarily large, heavy wooden desks which are not easily movable. The floors are linoleum. Storage is provided in each classroom, but the teachers say much more is needed.

The Visual Environment

Each classroom contains a wall of glass from 3 feet above the floor to the ceiling. The glass is used primarily for natural light and ventilation. View out is possible but does not focus on anything of particular interest.

Incandescent lighting is used throughout the school. Classrooms are lit by a combination of incandescent lighting and natural lighting provided by the windows.

The school's interior colors are primarily white. Wall surfaces contain a limited amount of tackboard surface, therefore the fixed glass of the windows is often used to display children's work. The furniture is its natural wood color and does little to enhance the visual
environment of the classroom.

Acoustical Environment

Because the school was designed with self-contained classrooms and concrete block walls between classrooms, few acoustical problems arise. With desks grouped in clusters, children are actively moving and talking in the room, but this level of conversation was tolerable. Automotive traffic and recreation are separated from the classrooms and provide no acoustical distraction.

Thermal Environment

Classrooms contain forced-air convectors near the windows which supply the room with adequate heating, but from only one point in the room. There is no air-conditioning, and on warm days the windows are opened. Windows occur only on one wall therefore ventilation is not as good as it could be.

Educational/Social Environment

In an attempt to break up the self-contained classroom, learning centers have been established in each classroom for: listening, science, reading, art, writing, and social studies. Each classroom is self-contained with one teacher teaching all children during the day. Children leave the classroom only for lunch, recreation, and visits to the library. They are basically in contact with the same teacher and same students for the school year.

In talking with the principal, she feels that many of the new ideas concerning education and teaching are good, but feels the ideas can work only in a building that has been planned for them.

Community Use

Hesse Elementary School has an active PTA and through its parents volunteer some of their time to come into the school and help with teaching.
Community meeting and banquets are often held in the school's cafeteria at night. The school's recreational area is actively used by the community throughout the year. A church is adjacent to the recreational area and uses the school's play fields for softball games.
SAVANNAH COUNTRY DAY SCHOOL
SAVANNAH, GEORGIA

Savannah Country Day School is a private school located in the middle of a residential community in the southern part of the city. It was built in the 1950's and serves grades K-12 with an enrollment of 700 students.

External Environment

Savannah Country Day School is located in the middle of a middle-upper class residential community, but is surrounded by a high fence which encloses its complete campus. Transportation to the school is primarily by private bus and private automobile as its children live throughout the city. Its campus was once a wooded area and its buildings are surrounded by mature trees. All structures are brick with load bearing walls and flat or gradually sloping roofs. See figure 5.

There are many mature trees, shrubbery, and grass around the buildings. Children are often seen playing in these areas even though there are other areas specifically for play.

The school is broken up into individual buildings for upper, middle, and lower grades with a separate administrative unit, cafeteria, library, and gymnasium. By physically separating the buildings, the scale becomes more appropriate for children, but there are many spaces which have primarily been designed for older children.

External teaching spaces have not been designed, but occasionally teachers do take their classes outside under the trees for class.

Recreation is provided for three age levels: one area for kindergarten; one area for the lower school; and one area for the middle and upper school. The area for the kindergarten contains old tires, sand,
SAVANNAH COUNTRY DAY SCHOOL

1. CLASSROOMS
2. LIBRARY
3. ADMIN
4. CAFETERIA
4. GYMNASIUM
and a few metal play structures. The area for the lower school contains a few metal play structures and an open grassed field. The middle and upper school's recreational area consists of playing fields for team and individual games.

**Spatial Environment**

Children move from their classrooms to the cafeteria, gymnasium, or library by way of covered outdoor walks. While moving along these walks there is a close feeling of nature with the trees surrounding and throughout the campus. People driving by the school often see children in route to other buildings or playing, but they must view this through a fence.

Classrooms in the lower school were originally self-contained, but two years ago interior walls were taken down leaving only necessary supports. The open classroom with team teaching is now in operation.

Within each classroom, children are seen steadily moving throughout the room. The lower school contains two buildings with 4 classes per building. Desks are both old and new with some being relatively stationary and some being easily moved.

**The Visual Environment**

Each classroom contains large windows used for both natural light and ventilation. Views through the windows are into open areas of the campus and are generally pleasant.

Fluorescent lighting is used throughout the school. Lighting of the classrooms is by both electric light and natural light.

The school's interior colors are light orange and yellow providing a clash with many of the natural colors of the school. There is very little tackboard space, and often much of the windows are covered up with children's decorations. The furniture, being old and new, is
natural wood in some cases and bright colored plastic in others.

**Acoustical Environment**

The floors are carpeted providing an acoustical aid as well as a comfortable place for children to sit. Folding partitions exist and can be pulled between classes when necessary. There seems to be no acoustical problems. Automotive traffic and recreation are separated from the classrooms enough that no acoustical problems arise.

**Thermal Environment**

Each building unit contains its own heating and cooling system centrally located and vented into the rooms by ducts. Windows are open allowing natural ventilation whenever possible.

**Educational/Social Environment**

Two years ago before Country Day's lower school went to open plan, several teachers spent the summer in England observing their open plan and team teaching methods. They came back and implemented a program in the lower school. This program involves children moving to different parts of the room and being taught by different teachers during the day. All educational activities, including art, take place in this four-class room unit. Group sizes range from individual instruction to class meetings of as many as 60 children. Children are in non-graded groups and are moved up according to their progress. Meetings with parents are mandatory as no grade cards, only progress reports, are given.

All children are constantly around both younger and older children as well as different teachers daily. Special teachers for music and physical education are provided.

**Community Use**

Teachers generally share an informative relationship with parents, but parents rarely come into the school and volunteer time to help with
non-instructional activities. School banquets are held in the cafeteria, but these are school oriented. There is no relationship with the surrounding community at all, not even a sharing of recreational services.
CONCLUSION

In conclusion to these case studies, the author feels that the primary error committed in most cases has been the neglect for the future changes in education. In most cases the principals of the schools realized the value of many of the newer emerging strategies in the field of education, but the existings schools are so physically limiting that these changes cannot be properly implemented.

The area of most neglect which can be corrected now is the failure to properly design play areas for children. It cannot be stressed enough that play is indeed an important aspect in the development of children's physical, intellectual, emotional, and social personalities. Through play children learn that there is a need to give and take, to adhere to rules, and to cooperate with others. How many adults today have learned this?

Figure 6 is a chart the author has compiled rating the schools visited against what he considers as optimum criteria discussed earlier in this paper in "The Function of Education" and "The Built Environment." The number "1" represents a good response to these criteria, "2" represents a fair response to these criteria, and "3" represents a poor response to these criteria.
### Figure 6

<table>
<thead>
<tr>
<th></th>
<th>Ninety-Six School</th>
<th>Pelham Road School</th>
<th>Hesse School</th>
<th>Savannah Country Day</th>
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<tbody>
<tr>
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<td>Site</td>
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<td>2</td>
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<tr>
<td>Space</td>
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<td>Flexibility</td>
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<td>Classroom</td>
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<td>1</td>
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<td>3</td>
<td>1</td>
<td>3</td>
<td>2</td>
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<td>View</td>
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<td>3</td>
<td>3</td>
<td>2</td>
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<tr>
<td>Electric Lighting</td>
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<td>1</td>
<td>1</td>
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<td>2</td>
<td>1</td>
<td>1</td>
<td>3</td>
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<td>Surface and Finish</td>
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<td>2</td>
<td>2</td>
<td>2</td>
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<tr>
<td>Furniture and Equipment</td>
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<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Use of Interior</td>
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<td>2</td>
<td>2</td>
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<td>Site</td>
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<td>1</td>
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<td>Materials</td>
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<td>1</td>
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<tr>
<td>Teacher's View</td>
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<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Ninety-Six School</td>
<td>Pelham Road School</td>
<td>Hesse School</td>
<td>Savannah Country Day</td>
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<tr>
<td><strong>Thermal Environment</strong></td>
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<tr>
<td>Thermal Comfort</td>
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<td>1</td>
<td>3</td>
<td>1</td>
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<tr>
<td>Natural Ventilation</td>
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<td>3</td>
<td>2</td>
<td>2</td>
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<tr>
<td>Artificial Ventilation</td>
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<td>1</td>
<td></td>
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<td><strong>Educational/Social Environment</strong></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teaching Methods</td>
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<td>2</td>
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<td>Classroom Design</td>
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<tr>
<td>Relationship With Others</td>
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<td>1</td>
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<tr>
<td>Adaptability</td>
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<td>2</td>
<td>3</td>
<td>1</td>
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</table>
FEASIBILITY
INTRODUCTION

In this chapter the author will examine the following categories in an effort to determine the feasibility of an educational facility for Skidaway Island:

A. System Analysis: An examination of Savannah's Public Educational System as it was conceived, growth of Skidaway Island and the southwestern part of the city, and how the system might expand to accommodate this growth

B. Island Analysis: An examination of its physical features, ownership, concept for development, site location options for a school, and concept of the Island's accessibility to the school

C. Community Analysis: An examination of its types of housing, concept of integration of residential areas with the golf course, existing automotive routes and distances traveled, and proposed pedestrian and bicycle paths through the community

A conclusion will follow the chapter and also a listing of key points of the categories examined.
Before educators, architects, and the school boards can even begin to consider a spatial program or any other architectural aspects of a new building, there must first be established a need.

In developing an educational system for Skidaway Island, the author feels the necessity to first examine Savannah's Public Educational System. See figure 7. As conceptually designed, elementary schools between 200 and 600 students feed into junior high schools with between 650 and 1600 students. Junior high schools then feed into high schools with enrollments between 1000 and 3000 students.

The next step will be to analyze the existing upper school system. Three high schools, Windsor Forest High, Jenkins High, and Johnson High, serve the southwestern portion of Savannah as well as Burnside Island, Skidaway Island, Dutch Island, Wilmington Island, and Whitemarsh Island. See figure 8. Students of these areas presently travel the following distances to school:

- Shipyard Bluff: 7.8 miles
- Isle of Hope: 4.2 miles
- Burnside Island: 9.0 miles
- Skidaway Island: 10.5 miles
- Dutch Island: 6.5 miles
- Wilmington Island: 8.0 miles
- Whitemarsh Island: 3.4 miles

The three high schools serving the area are at present operating near capacity. Population growth in Savannah at present is occurring in the southwestern portion of the city. See figure 9. Primarily the growth of new residential communities is occurring on Skidaway Island, Shipyard Bluff, Isle of Hope, Dutch Island, and Whitemarsh Island. With the growth of families the need will arise to provide another high school
in this area. In looking at where existing densities of population occur
and where growth is occurring, from an accessibility point-of-view the
best location for a future high school would be at the point shown in
figure 10. By locating an upper school at this point, students in these
areas will travel the following distances to high school:

<table>
<thead>
<tr>
<th>Location</th>
<th>Distance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shipyard Bluff</td>
<td>2.6 miles</td>
</tr>
<tr>
<td>Isle of Hope</td>
<td>2.5 miles</td>
</tr>
<tr>
<td>Burnside Island</td>
<td>3.4 miles</td>
</tr>
<tr>
<td>Skidaway Island</td>
<td>5.3 miles</td>
</tr>
<tr>
<td>Green Island</td>
<td>7.2 miles</td>
</tr>
<tr>
<td>Dutch Island</td>
<td>4.9 miles</td>
</tr>
</tbody>
</table>

Students living on Whitemarsh Island and Wilmington Island will continue
to attend Johnson High School.

The next step will be to analyze the existing middle school system.
Three middle schools, Windsor Forest Junior High, Wilder Junior High,
and Myers Junior High serve this same population. See figure 11.

Students of these areas travel the following distances:

<table>
<thead>
<tr>
<th>Location</th>
<th>Distance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coffee Bluff</td>
<td>5.0 miles</td>
</tr>
<tr>
<td>Shipyard Bluff</td>
<td>4.7 miles</td>
</tr>
<tr>
<td>Isle of Hope</td>
<td>4.0 miles</td>
</tr>
<tr>
<td>Burnside Island</td>
<td>6.0 miles</td>
</tr>
<tr>
<td>Skidaway Island</td>
<td>9.0 miles</td>
</tr>
<tr>
<td>Dutch Island</td>
<td>6.5 miles</td>
</tr>
<tr>
<td>Wilmington Island</td>
<td>8.5 miles</td>
</tr>
<tr>
<td>Whitemarsh Island</td>
<td>3.9 miles</td>
</tr>
</tbody>
</table>

The three middle schools serving these areas are also operating at
near capacity. In looking at population growth in the area, the need will
arise for an additional junior high school. The best place for its
location would be in conjunction with the future high school for a
sharing of services. See figure 12. By locating a middle school in
this area, students will travel the following distances to Junior High School:

<table>
<thead>
<tr>
<th>Location</th>
<th>Distance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shipyard Bluff</td>
<td>2.6 miles</td>
</tr>
<tr>
<td>Isle of Hope</td>
<td>2.5 miles</td>
</tr>
<tr>
<td>Burnside Island</td>
<td>3.4 miles</td>
</tr>
</tbody>
</table>
Students living on Coffee Bluff will continue to use Windsor Forest Junior High, and students living on Whitemarsh Island and Wilmington Island will continue to use Myers Junior High School.

The third step in analyzing the existing system is to look at the elementary school system. Currently there are five elementary schools serving the area: Windsor Forest Elementary School, Hesse Elementary School, Isle of Hope Elementary School, Thunderbolt Elementary School, and May Howard Elementary School. See figure 13. Currently children of these areas travel the following distances to lower school:

- Coffee Bluff: 1.8 miles
- Shipyard Bluff: 3.7 miles
- Isle of Hope: 0.5 miles
- Burnside Island: 5.0 miles
- Skidaway Island: 8.3 miles
- Dutch Island: 3.0 miles
- Wilmington Island: 2.0 miles
- Whitemarsh Island: 3.0 miles

Of these five elementary schools, the only one which will not be able to accommodate growth in its area is Hesse Elementary School. The growth of Skidaway Island and Green Island will necessitate the development of an elementary school for these two islands. See figure 14. The development of this school will occur on Skidaway Island because of the size of its development, but will also serve Green Island.

The development of an educational system for Skidaway Island and growth in the southwestern part of Savannah must be coordinated with and become an integral part of Savannah's Public Educational System. See figure 15. Utilizing the same concept, the new elementary school and its existing neighboring schools feed into a new junior high school which then feeds into a new high school. This addition to the overall system will be necessary to accommodate growth which cannot be handled with existing facilities.
The next step after determining the need for an elementary school on Skidaway Island is an analysis to determine the best possible location of the island for its site. This step must involve an in-depth look at the island and its development concept.

Skidaway Island contains two major ridges running north to south the length of the island. See figure 16. Buildable land for residential development is from 10 feet above sea level and up. Ownership of the island is primarily held by the Braniger Company. See figure 17. The P. L. Lewis Company owns a portion of the island as does the State Department of Parks, the U. S. Government, and the University of Georgia. The Braniger Company and P. L. Lewis Company are owners of all land for residential development. The concept for the development of Skidaway's residential communities is to divide the two ridges into four phased communities, each with a golf course and a private security system with one point of controlled automotive access. See figure 18. Land located in the middle of the four quadrants has been zoned for commercial, business, religious, and educational use in order to create a central hub of activity for the island.

Residential development of Skidaway Island will take place in 3 phases. Phase one, "The Landings," is currently being developed by the Braniger Company. This phase of development comprises 880 acres with a maximum of about 800 families living in this phase. See figure 19. Development of the island's first phase also includes the land owned by P. L. Lewis Company. This residential community, "The Skidaway Plantation," comprises 1225 acres with a maximum of about 1150 families in the community.
Phase two will be a residential development owned by the Braniger Company comprising 750 acres with a maximum of about 700 families.

Phase three in Skidaway's growth will be a residential community owned by the Braniger Company comprising 880 acres with a maximum of about 800 families.

With the three phases of residential development completed, Skidaway could comprise as many as 3,000 families with the capability of fully supporting a public elementary school.

After the development of the third phase of Skidaway Island, the residential development of Green Island, owned by a citizen of Savannah, will probably follow utilizing the same security system as phase three of Skidaway Island. Green Island comprises 280 acres with a maximum of about 400 families.

After realizing the need for a public elementary school on Skidaway Island, the next step is to determine the best possible site location for this school. Because of the security system of each residential community on Skidaway, it will not be possible to locate the school inside either of the four communities. It will be necessary to locate it on a public site. There are three choices.

Option one is the location of the school off of a main access road of the Island and adjacent to the Skidaway Island State Park. See figure 20. From both communities of phase one, children would have to travel between 4.6 miles and 6.2 miles to the school. Children of phase two would have to travel between 5.4 and 5.8 miles. Children in phase three would have to travel between 4.2 and 5.0 miles. Green Island children would have to travel 8.0 miles to the school.

Option two is the location of the school off of a main access road of the island and adjacent to the future commercial, business, and religious
facilities which will serve the Island. See figure 21. From both communities of phase one, children would have to travel between 4.2 and 2.6 miles to the school. Children living in phase two would have to travel between 3.4 and 3.8 miles to school. Children living in phase three would have to travel between 2.2 and 3.0 miles to school. Green Island children would have to travel 6.0 miles to the school.

Option three is the location of the school off a main access of the Island and adjacent to the Ocean Science Center. See figure 22. From both communities of phase one children would have to travel between 8.4 and 10.2 miles to the school. Children living in phase two would have to travel between 7.4 and 7.8 miles to school. Children living in phase three would have to travel between 9.2 and 10 miles to school. Children living on Green Island would have to travel about 12 miles to school.

From an accessibility point of view, which is a major determinant for the success and community involvement in an elementary school, option two is the best location.

After determining that the elementary school should be located in the island's central hub along with the island's other community activities of shopping, business, and religious facilities, it is then necessary to take a very close look at the problem of how children will travel to the school. An important aspect of how the children travel to the school will be the physical and emotional relationship of the school and the home. "As close a connection as possible, both practically and emotionally, should be sought between the school and the home." The younger the child, the shorter, simpler, and cozier his way to school should be planned. "This approach to the problem will, on the one hand safeguard the child's emotional links with home and parents and, on the other hand, enable these ties to be loosened one after another as the
child grows up." The next step is then to take a close look at the community in which these children will be living in order to carefully determine the best means of travel to the school.
Figure 23 shows the development of "The Landings," part of the Island's first phase of growth. There will be three kinds of family living units: typical, single family island homes; smaller, transient, golf patio villas; and transient four-family townhouses. Residential areas are planned around the golf course which winds naturally throughout the community. See figure 24. The golf clubhouse, tennis, and swimming are located in the heart of the community. An island lagoon system runs throughout providing drainage, an aesthetic quality to the island, and a challenge on various holes to golfers.

Figure 25 shows the automotive access to residential areas and the number of people that could live in these areas. All automotive travel passes by a controlled security point at the entrance to the community. Off of a main spine occurs small culs-de-sacs which are used as access to the homes.

Figure 26 shows the distance traveled from residential areas to the security point. By using the existing road system to reach the school, the children would have to travel between .4 and 2.0 miles to reach the security point, and then an additional 1.5 miles to school. The State of Georgia is required by law to provide transportation to all children living 1.5 miles or further from school. By using the existing system to reach schools, all students would require busing or private transportation. There is an alternative to this method. In carefully looking at the development of the community in figure 24, one sees the natural, winding of the golf course and the island lagoon system moving throughout the community with its residential areas wrapping around and in between the
fairways and lagoon. The possibility arises of using these two systems as the primary means of children traveling to school.

Figure 27 shows that by using the community's golf course system and lagoon system a great majority of children could reach school by walking or riding a bicycle less than 1.5 miles. By using this system children could use the community's major elements for a pleasant and safe walk or bike ride to the school. In doing so a strong and healthy relationship of school, home, and nature could be developed.

By locating the school in the island's hub and developing it as a strong part of the communities activities, one realizes that this system of using the golf courses and lagoon as a means of pedestrian access could then become a major development in the relationship of the four residential communities to the Island's hub. Figure 28 shows the concept of the using the golf courses and lagoons of the four residential communities to provide pedestrian, bicycle, and golf cart accessibility to the Island's hub.
CONCLUSION

Through an analysis of the system, island, and community, there will in the future need to be a new elementary school to serve Skidaway Island and Green Island. There will also be an additional need to develop a junior high school and high school to serve the southeastern portion of Savannah.

Key Points:

1. The additional elementary school should be built on Skidaway Island. It should be located in the Island's hub adjacent to commercial, business, and religious facilities.

2. Through the development of pedestrian links utilizing the golf courses and the Island's lagoon system, most of Skidaway's children could safely and conveniently walk or ride bicycles to school.

3. The additional junior high school and high school would be best located on the mainland together for a sharing of services and should be centrally located to provide the best accessibility to all communities served.
CONCEPTUAL DESIGN SOLUTION
INTRODUCTION

In this chapter the author will examine the following categories in "The Conceptual Design Solution:"

A. Site Analysis: An indepth study of the site selected

B. Hub Analysis: A study of the relationship of the activities of the Island's hub and the movement of pedestrians and vehicles

C. Activity Programming: A study of the activities and the spaces in which these activities occur

D. Facility Development: Concepts which must be established in order to develop a facility

A conclusion will follow the chapter and also a listing of key points of the categories examined.
After analyzing the system, island, and community relationship of an educational facility for Skidaway Island, it was determined that the facility's best site location would be in the Island's central hub adjacent to commercial, business, and religious facilities. The next step will be to examine characteristics of this site.

Figure 29 shows the topography of the site. The site is located between the two ridges of the island and gently slopes forming a valley in the middle. Land slopes from a high point of 10 feet above sea level to a low point of 7 feet above sea level.

Figure 30 illustrates the drainage characteristics of the site and land adjacent to it. Drainage occurs from the ridges collecting in the valley and then feeding into the Island's lagoon system at one side and Delegal Creek on the other side. The drainage characteristics make it possible to extend either the lagoon or creek further into the site, or possibly connect them if desired.

The buildable acreage of the site is shown in figure 31. Of the existing 80 acres, the lower areas near the lagoon and creek comprise 8 acres and are the only areas of the site that are not buildable.

The site contains two main types of trees: hardwoods and softwoods. See figure 32. The valley of the site contains a majority of hardwood trees such as oak, hickory, and cherry, and are valuable elements for shade and the external environment. Along the perimeter of the site the majority of the trees are softwoods such as pine and are not as valuable for shade purposes.

Figure 33 shows the existing on-site and public off-site views.
Open spaces occur within the site with views into hardwood trees, into the lagoon as it enters the site, and into Delegal Creek and marshes. Important off-site views occur along the roads bordering the site and along pedestrian paths into the site.

Figure 34 illustrates the prevailing winds, sun conditions, and necessary buffer zones along the roads. Day winds primarily blow from the ocean into the site and evening winds blow primarily from the mainland into the site.

Figure 35 shows the possible points at which access can occur into the site. Automotive access could occur at any point along the two roads bordering the site. Pedestrian access from the four residential communities using the golf course and lagoon as paths of travel could occur at three major points: one point providing access for a potential of 1600 families of residential phases one and two to be developed by The Braniger Company; one point providing access for a potential of 1150 families from phase one to be developed by the P. L. Lewis Company; and also one point providing access for a potential of 800 families from phase three to be developed by the Braniger Company and bicycle access to the potential 400 families of Green Island.
HUB ANALYSIS

After analyzing the physical features of the site and realizing the site is the prime location for the Island's commercial, business, and school activities, it is now necessary to develop a circulation system for automotive and pedestrian movement to and inside of this island "hub."

Figure 36 illustrates three options for this system. A peripheral system could be established with an external automotive perimeter road and an internal pedestrian precinct encircling the activities. A radial system could be established with an external automotive perimeter road and a central internal pedestrian precinct off of which occur the activities. The third option would be the development of a linear system with an external automotive perimeter road and a pedestrian precinct occurring inside and having decentralized green spaces.

Of the three options, the radial system is the best system because of its advantage to produce a high level of social interaction in its centralized pedestrian precinct. This social interaction within the island's hub is a key necessary in the relationship of the island's four residential communities and the activities which occur in the hub.

The next step will be to examine how this radial system can be developed. Figure 37 illustrates the concept of keeping automotive movement on the perimeter and using the interior of the site for a pedestrian precinct. The lagoon is enlarged letting it become an element of this pedestrian precinct, but not its central focus.

Figure 38 illustrates the connecting of the lagoon and Delegal Creek to form a body of water in the center of the site. This body of water then becomes the central focus of all activities.

Figure 39 illustrates the extending of the lagoon and creating a
focal point for the commercial and business activities. The school is a part of the pedestrian precinct, but is not physically adjacent to the water.

The best option for the development of this radial system is option one. The pedestrian precinct is shared by the three activities and is the major collection point for pedestrians using the activities. The lagoon is an element of this precinct and is carefully separated from the school.
In the beginning development of a facility, the author used research previously gathered and began to categorize this information into topics, activities, design requirements, and users.

Outdoor activities are a major element in the development of a child's personality. Figure 40 shows necessary requirements such as a pre-entry space, outdoor shelter, outdoor play, construction, climbing, sand, and swinging.

The classroom unit itself is a very important element of the school. See figure 41. Its components include an entry space, areas for reading, writing, science, math, manipulative play, listening, large group instruction, clothes storage, supply lockers, classroom wash, and toilet.

One of the major generators of the school will be its central resource center. See figure 42. Activities that occur in this area include library study, visual aids, art, a staff lounge, an area for large group instruction, and toilets.

Another of the school's generators would be the dining area. See figure 43. Activities that occur in this area in addition to the kitchen and dining could be dramatic activities, music, and use by the parent community.

Another of the school's generators would be the administration unit. See figure 44. Its activities include an entry, director's office, infirmary, secretarial spaces, and toilets.

The school's gymnasium is a generator with activities of indoor play, shower, dressing, and toilet areas, and use by the parent community.
The last step will be to apply all of the criteria utilized throughout the study and develop the conceptual design of the facility. Figure 46 shows its location in the hub with pedestrian access from the communities through the heart of the hub and automotive and service activities off of the perimeter road. The concept of the school's development emphasizes the use of generators as elements requiring children to move from classroom units through the school to its components.

Figure 47 shows the educational philosophy of the school's concept. The central generator is the resource center with dining and drama occurring at one end of the linear system and the gymnasium occurring at the other end. The administration unit occurs near the automotive entry. Within each classroom the four main subjects of reading, social studies, math, and science occur. A small library is located in each unit with a loft above acting as a child's space. The classrooms are eight units- a four unit cluster for K-2 grades and a four unit cluster for 3-5 grades. In moving to generators children move through open spaces of recreation.

The relationship of active and passive spaces both within the classroom and outdoor areas are important. Active interior spaces should view into active outdoor spaces and passive, quiet indoor learning spaces should view into passive outdoor spaces as shown in figure 48.

The concept of social interaction must be realized. Through moving from classroom generators through play spaces, social interaction is given the opportunity to occur. See figure 49. Other spaces where this
interaction would occur are in outdoor teaching spaces.

Figure 50 illustrates how the four unit cluster might be adaptable to future changes in education. If the education of children does become more specialized, then each of the units could then become a specific functioning element: a unit for reading, math, science, and social studies. With change, the school still maintains its original educational philosophy.

Figure 51 shows the concept for the functioning of the classroom unit. There is a need to create active and passive spaces within each classroom unit. Support services such as the teacher planning center and toilets must be included as shown. Team teaching operates with one teacher teaching each of the main subjects in a quadrant of the room. Social interaction occurs in the heart of the room with a library and independent study space that all children use. By keeping the majority of the unit free of immovable interior partitions various group sizes can be attained. There are times in the classroom when separation needs to occur. This activity can be accommodated by flexible separation allowing four self-contained classes in each unit. The structural concept utilizes wood trusses and load bearing walls. By using the exposed trusses inside a feeling of height and space can be achieved.

Figures 52 through 58 are of a model study of how these concepts may be translated into physical building forms.
CONCLUSION

Through an analysis of the site, the Island's hub, and activity programming, the conceptual design of the facility evolved.

Key Points:

1. Topography, drainage, buildable acreage, vegetation, views, wind and sun influences, automotive and pedestrian entry points
2. The development of a radial system for Skidaway's Island's hub
3. The creation of a pedestrian precinct inside the hub
4. The development of generators as elements of the school
5. The development of an educational philosophy concept
6. The concept of active and passive space relationships
7. The concept for spaces encouraging social interaction
8. The concept of adaptability for future change in education
9. The concept of the four class unit and its relationship to team teaching, social interaction, variable group sizes, and flexible separation
FOOTNOTES


3. Ibid.

4. Ibid., P. 3


9. Ibid.

10. Ibid.


20. Ibid. P. 12.

21. Ibid.

22. Ibid. P. 13.

23. Ibid. P. 14

24. Ibid.

25. Ibid.


32. Ibid.

33. Ibid.

34. Ibid.


36. Ibid.


47. Ibid.
48. Ibid.
50. Ibid. P. 38
52. R. H. Johnson and J. R. Hunt, Prescription For Team Teaching, Minneapolis, Minn.: Burgess Company, 1968), P. 2
55. Ibid.
61. Ibid. P. 24.


70. Ibid.


72. Ibid. P. 21.


77. Ibid.

78. Ibid.

79. Ibid.

80. Ibid.

81. Ibid.

82. Ibid.

83. Ibid.
84. Ibid.
85. Ibid.
86. Ibid.
87. Ibid.
88. Ibid. P. 32.
92. Ibid.
94. Ibid. P. 40.
95. Ibid. P. 43.
96. Ibid. P. 44.
98. Educational Facilities Laboratory, *Places and Things For Experimental Schools*, (New York: Educational Facilities Laboratory, 1972), P. 44.
104. Ibid.
105. Ibid. P. 42.

106. Ibid. P. 43.

107. Ibid. P. 45.


109. Ibid. P. 55.


111. Ibid. P. 53.


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115. Ibid.


126. Ibid. P. 140


129. Ibid.
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APPENDIX A
State educational standards, as listed in Standards 1975 For Public Schools of Georgia, are divided into two sections. Section one contains criteria applicable at the school system level and section two contains criteria applicable at the individual school level. Each section contains three priority levels of criteria:

(1) Required criteria designated by "R"
(2) Essential criteria designated by "E"
(3) Desirable criteria designated by "D"

To be a standard school or system it is necessary that all R criteria be met as well as a minimum number of E criteria. Schools should strive to meet as many D items as possible.

SECTION ONE
School Systems Standards

Criteria Based Upon State Law:
Standard 1

R 1. All official meetings of the board of education are open to the public.

R 3. The superintendent has the responsibility for administering and enforcing the policies, rules, and regulations of the board of education.

Criteria Based Upon State Board Policy:
Standard 2

R 16. The system board of education, under the leadership of the superintendent and his staff, develops written policies for the school system related to:

(1) administration
(2) professional ethics
(3) program of education
(4) fiscal matters
(5) school plants and grounds
(6) school food services
(7) transportation
(8) student activities
(9) section, procurement and utilization of instructional materials and equipment
The Board of Education

Standard 3

The board of education of a school district shall be composed of a representative group of local citizens, appointed or elected in keeping with the applicable provisions of law. The board of education is responsible for the management and control of the public schools in the school district.

R 27. A written statement of philosophy and purposes which takes into consideration the elements of cultural, health, occupational and recreational opportunities of the local community and state gives direction to the educational program.

The Superintendent

Standard 4

The superintendent is selected as provided by law and is responsible for the successful functioning of the school system. He delegates responsibility; communicates effectively with community leaders and staff; analyses with the assistance of the professional staff the needs of all students, and develops a program to meet those needs.

R 35. The superintendent makes recommendations for action by the board of education on all policy matters related to the operation of the schools.

Specialized Services

Standard 5

The school system provides those specialized supporting services which are vital to the most successful fulfillment of the administrative and instructional goals of the school district.

R 41. The system has a written plan for the selection, procurement and utilization of instructional media including the following:

(A) Local board policies relating to the selection, procurement and utilization of instructional materials and equipment to the educational goals of the system.

(B) Procedures for procuring and maintaining adequate access to instructional media and the technology necessary for its use, e.g. print materials, ETV, films, audio and video cassettes, slides, tape players, T.V. receivers, projectors, etc.
47. The system has a program for public information.

58. The system has the services of a school psychologist in ratio of 1 to 7,500 student enrollment.

59. The school system provides a program of adult general and vocational education based on the needs and interests of the people in the local community served.

School Maintenance and Operation
Standard 6

The school system shall have a planned program of maintenance and custodial care for all school plants including buildings and grounds.

66. The number of custodians assigned to each school is determined on the basis of one custodian for each 8 teachers.

71. All school grounds are properly landscaped.

Pupil Transportation
Standard 7

The transportation system shall be operated in compliance with requirements of law and state board policies, and shall be adequate for the needs of the pupil population to be served.

73. Surveys of transportation needs are made at intervals which do not exceed three years.

76. Bus routes are established to provide efficiency, economy and safety.

Fiscal Policies
Standard 8

The school system board of education shall establish and maintain sound fiscal policies governing practices in the central office and in each local school.

82. The board of education uses its maintenance and operations levy for operation of schools only. All funds used for capital outlay purposes are derived from local bond funds or special allocations of state or federal funds.

School Food Service
Standard 9

The school system shall have a school food service program which is nutritionally adequate, educationally effective and financially sound.

87. A system policy provides that only those foods and beverages which promote desirable food habits and which meet the child's school day nutrition needs may be obtained during the school lunch serving hours.
Each school system shall make provisions for the education of all exceptional children.

R 96. The system has a current comprehensive plan, approved by the department of education to provide services to all exceptional children by 1976:

E 93. Educable Mentally Retarded
E 99. Trainable Mentally Retarded
E 100. Behaviorally Disordered
E 101. Gifted
E 102. Multi-Handicapped
E 103. Visually Handicapped
E 104. Impaired Hearing
E 105. Hospital/Homebound
E 106. Speech and Language Impaired
E 107. Specific Learning Disabilities
E 108. Appropriate transportation is provided for all children in the programs listed above.
SECTION TWO
Standards For Public Schools

Criteria Based Upon State Law:
Standard 11

R 200. Buildings and/or classrooms constructed since 1952 conformed to all state laws, met applicable standards of the State Board of Education and plans were approved by the Georgia Department of Education as required by state law.

R 203. Every student in kindergarten through grade eight is enrolled in health and physical education for a minimum of 30 minutes daily.

Criteria Based Upon State Board Policy:
Standard 12

R 212. The elementary school teaches annually courses in the following subject matter areas:
   (A) Language Arts
   (B) Mathematics
   (C) Science
   (D) Social Science
   (E) Health and Physical Education
   (F) Music
   (G) Art
Note: Art and music must be taught on a regular, continuing basis and must be a scheduled and planned activity.

R 214. Health education included annual instruction in the potential hazards of tobacco, alcohol, and drug use, misuse, and abuse. This instruction must be given in grade five and each subsequent grade or it may be begun on a lower grade level at the discretion of local school officials.

Organization
Standard 13

The school organization makes possible effective administration and supervision of a comprehensive program of education.

R 216. The length of the school day for students in grades one through three is at least four and one-half, and in grades four through twelve at least six hours, exclusive of recesses and lunch periods.

E 221. The school is administered by a certificated, full-time supervising principal.

E 227. The auxiliary personnel are utilized by the local school according to the policies of the State Board of Education.
D 233. Pupil enrollment in every class in grades one and two is 22 or less, 28 or less in grades two through seven.

D 236. There is a minimum of three teachers in each grade in the school.

Administration

Standard 14

The school has a certified principal appointed by the board of education upon nomination of the superintendent. He provides leadership for the development of the educational program; interprets the school to the community; maintains desirable public relations; and delegates responsibility as required.

E 240. The principal evaluates programs, personnel, and services in terms of achieving desired objectives for students and initiates improvement activities necessary for meeting the identified student needs.

D 244. The principal devotes at least 50% of his time to supervision of instruction, including classroom visitation.

Teaching Staff

Standard 15

The school is staffed by certified teachers capable of meeting the varied educational needs of the students. Quality in the instructional program is made possible by teachers who apply the principles of child growth and development and demonstrate creative approaches to teaching; stimulate interests in learning; and have interest in and respect for children.

D 250. At least 30% of the school's professional personnel hold the five-year professional certificate.

D 252. Preparation and teaching in two general subject matter areas is the maximum required of any individual teacher. Not applicable for elementary schools which are not departmentalized.

Resource Staff

Standard 16

System-wide administrative and instructional supporting services are available to and used by the school.

E 254. The school has initiated curriculum activities based upon local and state wide testing results and other available data.

E 255. Adequate office space is available for confidential counseling both individually and in small groups.

School Plant

Standard 17
The school plant is adequate for the program offered and the enrollment housed. It has the necessary classrooms, laboratories, library facilities, space for physical education and food service facilities, and the site is landscaped to enhance aesthetic values.

F 281. The building is equipped with the necessary outlets to make educational television available to all indoor instructional areas.

F 286. Instructional areas are designed or equipped to permit adequate use of projection and other audio visual equipment.

E 287. The playground has been developed and equipped to provide safe, protected play areas free from all hazardous objects.

E 289. All classrooms are equipped with storage facilities and a minimum of 16 feet of chalk-board and 16 feet of tackboard space.

D 291. The cooling plant is adequate in design and capacity to meet the maximum design conditions of the facility served.

D 292. At least one music room is provided for instrumental and choral music.

D 293. An art-service room is available to each teacher and is maintained and supervised.

D 294. Display space for both two-and three-dimensional art work is located throughout the school areas.

D 295. A telephone jack is included in all classrooms for instructions of hospitalized or home-bound children.

D 300. The student assembly room will comfortably accommodate a minimum of 50% of the student body at one sitting.

Media Center
Standard 19

The school shall have a media center containing the quality, quantity and variety of print and non-print material to support the curricular offerings and to challenge individual pupils at their level of development.

R 306. All school owned print and non-print media, except basic textbooks, are organized and made available for use through the media center to individuals and to classrooms for varied lengths of time.

E 308. The school has a full-time, paid media specialist who devotes full time to media center duties and additional aides for each 500 students or major fraction thereof.

D 318. Individual study stations are provided in the media center and some are electronically equipped for viewing and listening.

D 323. The school has a well-planned media center containing reading areas of not less than 35 square feet times 15 percent of the
first 500 students plus 35 square feet times 10 percent of
the ada (average daily attendance) in excess of 500 students.
The reading area must contain at least one conference room.

School Food Service
Standard 20

The school shall have a food service program that meets school day
nutritional needs of pupils.

E 330. The school provides a minimum of 30 minutes for lunch. This
includes time to wash hands and insures that no student is
required to stand in line more than 5 minutes to be served.

E 332. A nutritionally adequate lunch is available to all pupils
regardless of their ability to pay.

D 335. The lunch serving period begins at 11 A.M. or later, and all
pupils are served by 1 P.M.

Interscholastic Activities
Standard 21

School activities of an interscholastic nature shall complement and
supplement the instructional program of the school. Note: The State
Board of Education recommends that all elementary schools be prohibited
from participation in interscholastic activities, and that a strong
intramural program be provided for all students.

E 348. Students who participate in the instruction of and competition
in intramural or interscholastic activities are provided by the
school with standard equipment that is kept in good repair.

D 349. Opportunities are provided either through inter-scholastic
or intramural activities for all students who desire to
participate in athletic or other extra curricular activities.

Curriculm
Standard 22

R 351. The amount and arrangement of space facilities are adequate for
the program in each instructional area. (The building reflected
the current thinking relative to space requirements and flex-
ibility when constructed. The amount and arrangement of space
facilities are subject to and compatible with recommendations
of the Georgia Department of Education.)

R 353. A written plan for organized use of community resources is
developed and implemented annually.

E 359. Experiences are provided in the motor skills of walking,
running, jumping, climbing, bending, stretching, and the more
complex variations of the basic movements, rhythms, group
activities, games and self-testing activities.
E 366. A program of career awareness has been integrated into the existing elementary school curriculum.

E 375. Concepts of man's wise utilization of the out-of-doors as a recreational endeavor are introduced at all grade levels.

E 379. There is a corrective mathematics program for all students who are achieving at least one and one-half years below grade level on national norms.

E 380. There is a corrective reading program for all students who are reading approximately one and one-half years below grade level on national norms.

E 381. There are individualized and specialized programs (other than corrective programs or special education classes supported with appropriate instructional materials) for students with special needs.

E 386. Each local curriculum guide makes suggestions for independent, small group and total instruction within the class. Identical assignments for all students are used a minimum of the time.

E 390. The content of each subject matter area is planned, varied and organized on the basis of students abilities, needs and interests within each classroom.

D 407. The school system makes provisions by which school credit can be earned by students of this school under school provision, through community learning experiences.

D 408. The elementary school employs one full-time special music teacher for elementary school music for every 500 pupils or major fraction thereof.

D 410. The school is trying innovations which appear promising.

D 411. More than 40% of the time devoted to science is used for students to investigate experiences in the laboratory or in the field.

D 425. Pupil progress reporting includes specifically scheduled parent-teacher conferences for the parents of every child.

D 430. The audio-lingual approach is used for foreign language instruction.

Standards and Criteria Proposed For Adoption in 1976-1977

Proposed Standard 24
Educational Personnel Qualification

One significant way to improve student learning is by upgrading the preparation level of educational personnel. There is evidence that the higher the average preparation level of teachers in a school, the more impressive is student performance. There is further evidence that upgrading the degree status of principals has an even greater percentile
point gain in student achievement.

D At least 50% of the educational personnel in the school hold a fifth-year certificate or higher.

D At least 50% of the principals of the system hold a sixth-year certificate or higher.
PROPOSED FUTURE EDUCATIONAL SYSTEM FOR THE COASTAL AREA OF SAVANNAH