This program is presented to the graduate committee in partial fulfillment for the degree Master of Architecture, April 10, 1977, by Lester Love.

Graduate Committee

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INTRODUCTION
In recent years educational critics have made it clear that traditional authoritarian educational practices have often had a devastating effect on the minds and spirits of our children. In the suburbs as well as in the ghettos this system of public education has been found to lead to suppression in the name of discipline, irrelevance in the form of fixed and mandatory curricula, passivity instead of independence, conformity instead of creativity, and a limited and grudging ability to learn by rote rather than a desire and ability to learn how to learn throughout life.

The image that emerged by the end of the last decade was that of an institutional environment in which all the participants seemed to be unwillingly locked into roles that not only inhibited learning but also limited their freedom and ability to change the situation. It had become clear that any alternative to existing conditions would have to involve fundamental changes in the aims, content, and process of education.

Fortunately, we now seem to be in the midst of a period of change in our basic attitudes about the process of education and the ways in which children develop and grow. It seems that the once radical critique of the public schools has now become common wisdom. Charles Silberman has described this as a "change in atmosphere" toward more humaneness and understanding and a "change in learning style" away from the teacher as the source of all knowledge to the teacher as facilitator of learning, away from the traditional class orientation to more concern with individualized learning.

However, the rate of acceptance of such new educational attitudes and ideals has been 25 to 50 years. Two or three generations of students complete school before a new method is put into operation in a significant number of local school systems. The need has arisen for a school facility in which educators can immediately put into practice innovative teaching programs and techniques. The facility thus becomes not only the testing grounds for tomorrows teaching
procedures, but a learning place for student and teacher alike. The answer to such a need is the university lab school, for if we fear change and innovations in our schools, the products of our schools cannot help but fear change and innovations in their lives.
NEED

The University of Arizona has no 'in house' facility where students can fulfill student teaching requirements. At present these prospective teachers are being forced into the field, into another teacher's classroom and domain where they are exposed to established teaching techniques and traditions, often dampening the original enthusiasm and drive of their college experience. A lab school facility will provide the students of the College of Education with a student body from the community to instruct and to learn from. It will also enable student teachers to maintain close working ties with the College of Education faculty. Other lab schools, such as those on the UCLA campus and the University of Illinois facility, have proven that the availability of such a resource fosters creative thinking and provides a place in which such new ideas can blossom into reality.
GOAL AND OBJECTIVES

To expand the capacity of the College of Education to meet the present and anticipated needs of their student teachers.

To provide the university community with an alternative to the traditional public school system.

To begin an exploration of environmental or 'awareness' education.

To create an aesthetic and psychological environment based on the nature and learning needs of the individual child, with sufficient space for organic educational processes to achieve optimal performance.

To provide the University of Arizona with a needed resource on a par with accepted and current practice representing the latest thinking for facilities of this type.
PHILOSOPHY

The educational philosophy to be used by the lab school is environmental education, or perhaps better termed as 'awareness' education. Such an awareness education embodies all the principals of open education and has the potential to provide a distinct working focus for open education by its unique teaching goals. These goals are summarized as follows:

To learn from life as well as about life. The concrete problems of the child's everyday environment provide an immediate and relevant focus for learning by doing.

To provide learning opportunities that allow the child to see the world as whole and interrelated rather than fragmented into disciplines.

To develop an awareness of how the natural and man-made environment affects and is affected by human values, activities, and decisions.

To foster an active orientation to collective environmental problems and to provide the skills necessary for their solution now, and later as aware, concerned and competent adults.
LOCATION

The proposed site for the new lab school facility is the southwest corner of the intersection of Second Street and Cherry Avenue, beside the College of Education, on the campus of the University of Arizona. The site is presently occupied by the department of Home Economics' pre-school facility, a small one-story structure of 3,600 square feet. The lab school will maintain pre-school operations in addition to its elementary level student body.
STUDENT POPULATION

It is intended that the student population of the lab school be made up of children from the University area. However, the lab school facility will have the flexibility to accommodate children from neighboring schools in collaboration with other research programs.

Acceptance into the lab school will be on a limited enrollment basis. A highly selective screening process will be used to achieve the proper heterogeneous population necessary for valid research results. Screening will be done on the basis of age, sex, ethnic and economic background, and previous educational environments.

Enrollment will be strictly limited to 300 students in elementary education, 50 students in kindergarten, and 50 students in the collaborative research program, in accordance with the availability and need of student teachers.
project schedule

jan. 77
feb.
march
april
may
june
july
aug.
sept.
oct.
nov.
dec.
jan. 78
feb.
march
april
may
june
july
aug.
sept.
oct.

programming

design

construction documents

bid

negotiation & contracts

construction

project completion
Los Angeles

Phoenix

Flagstaff

Denver

Albuquerque

Tucson

Yuma County

Maricopa County

Pima County

Puerto Penasco

Nogales

Mexico

El Paso

Graham County

Cochise County

Santa Cruz County

(CU ST SCHOOLS)

17
university of arizona
soil throughout is a clayey sand composition of medium relative density. Soil moisture is generally low to medium.

natural water runoff follows the slope of the site in the southeast direction. Present parking lot drainage is controlled by street collectors in cherry ave.

soil and water

second st. traffic

ownership

view from sorority houses second st.

views to site

noise

view from offices

cherry ave. traffic

cherry ave.

view from observatory

view from offices
temperature (1000 degree days)

solar radiation (b.t.u. per day)
**Relative Humidity (29% Yearly Average)**

- Average Monthly

**Precipitation (10.63 Yearly Average)**

- Average Monthly
sunpath and angles in summer (June)

sunpath and angles in winter (December)
## SPACE NEEDS

### KINDERGARTEN DEPARTMENT
- Learning Centers: $2 \times 1200 = 2400$
- Storage, Wardrobe, TLCs: $2 \times 300 = 600$
- **Total**: 3000

### ELEMENTARY EDUCATION DEPARTMENT
- Learning Centers: $6 \times 1000 = 6000$
- **Library Resources**
  - Library: 1000
- **Elementary Ed. Research Department**
  - Learning Center: 1000
- **Cafeteria**
  - Dining: 4000
  - Kitchen: 600
  - Food Storage: 200
  - Serving: 320
  - **Total**: 5120
- **Total Lab School Square Footage**: 22,840

### HEALTH DEPARTMENT
- Health Room: 500

### ADMINISTRATION DEPARTMENT
- Coordinators Office: 200
- Research Office: 120
- Secretary Personnel: 200
- Files: 100
- Conference: 240
- **Total**: 860

### TEACHER PLANNING
- Teachers Workroom: 600
- Private Teacher Workspace: 200
- Teachers Lounge: 200
- **Total**: 1000

### OBSERVATION
- Observation Rooms: $9 \times 200 = 1800$

### MECHANICAL
- Mechanical Room: 500

### CUSTODIAL
- Custodial Room: 500

### STORAGE
- Outdoor: 300
- Central: 300
- **Total**: 600

### TOILETS
- Student: $4 \times 160 = 640$
- Faculty: $2 \times 160 = 320$
- **Total**: 960

### OUTDOOR PLAY AREA
- Outdoor Play: 3000
FUNCTIONAL ISSUES

teaching staff

admin.

college of education

lab school coordinator

secretary personnel

files

research office

public

central storage

conference

parking
observation
learning centers
admin.
coll. of educat.
staff toilets

Teaching staff

Teachers work rm.

priv. wk. rm.

lounge

priv. wk. rm.
allow free student flow between learning centers
elementary education
students upstairs

kindergarten & research
students downstairs

outdoor play area surveillance is required
kinesthetic spatial set

service spatial set

cognitive spatial set

sensory spatial set
Based on proximity and compatibility, the inter-relationships between student activities and the scale of interaction can be visualized as follows:

- Art
- Visual aids
- Listening
- Water
- Manipulative
- Music
- Drama
- Reading
- Concept form
- Science
- Math
- Indoor active
- Construction
- Cubby
- Lockers
- Eating
- Cooking
- Toilet
- Washing
- Entry

The scale ranges from low (L) to medium (M) to high (H) based on the interaction levels indicated by the symbols (I) in the diagram.
The child perceives his environment through all his senses. This perception helps him acquire knowledge and grow intelligently. The richer the environment, the more he will perceive.

- Indoor classroom.
- Outdoor learning.

The playground should not be thought of as an exercise yard, but as an extension of the classroom.

Fluid traffic patterns in a classroom provide a means for better communication.
- Avoid long flights of stairs.
- Avoid teacher centered rooms.
- Avoid rigid fixed seats.
- Provide wall space for display purposes.
prefer task lighting to luminesce ceiling

avoid prison type exterior fencing

utilize movable storage units to serve as space dividers and permit the modification of spaces

provide laundry area for student accidents
- Differentiate the more static and controlled adult storage from child storage

- Provide natural light without visual distractions

- Provide a teachers lounge

- Need community involvement room
- Provide protected play space for rainy days.
- Provide sinks, exhaust fans, and floor drains with clay traps in art area.
- Provide one-way mirror, dimmer controls, and audio-visual monitoring system for observation areas.
- Avoid crowded areas at exits.
provide facilities for treating and isolating sick children until they can be taken home for treatment. The health room can easily serve a secondary function as a setting for training students in techniques of health and first aid.

prefer evaporative cooling to air conditioning.

provide parking for three school transportation vehicles.
measurement, fractions, art, language development, and social development can all be brought out in a cooking environment.

all entrances and exits should be easily identifiable.

provide a quiet napping area for the kindergarten children.

we talk to children about ecology, but they need experience with it to understand its meaning.
much learning can take place in a sandbox—additive and subtractive sculpture to notions of positive and negative space.

the floor must be thought of as more than a walking surface, but as furniture in itself.

observation needs audio/visual taping control room.

animals can be integrated into the child's world so he can glean knowledge, understanding, and appreciation of living things.
College of ed. add'tl. manpower requirements.

7 persons

Lab school additional manpower requirements.

6 persons

13 persons

Additional manpower requirements
The new lab school facility will require removal of existing preschool.

The lab school should be designed so as to capture prevailing breezes.

Lab school should relate to the college of education both physically and visually.

Optimum regional orientation is 25° east of south, optimum building shape is 1:1.3.
ARCHITECTURE is the articulation of abstract concepts. It therefore becomes the designer's first task to recognize and extract such concepts from the design program. This program includes time and culture, site conditions and context, the history of the building type, functional zoning, as well as a multitude of other design considerations.

In the case of the lab school, certain contextual issues become apparent upon examination of the site. Most of the recent classroom structures on campus manifest themselves in massive, overpowering, primary forms. This is especially true of the Colleges of Education, Modern Languages, Psychology, Business and Administration as viewed from Second Street. The extensive and unbroken use of running bond in these brick structures reinforces each planar surface, all of which constitute the primary mass (Figure 1).

However, as one turns south onto Cherry Avenue, this strict preoccupation with basic form begins to dissolve. This is immediately recognized by the direct vista to the upward reaching East Stadium addition to Arizona Stadium. Other factors, such as the curving Flandrau Planetarium, the more humanly scaled Health Center and A.U.R.A. offices, and the appearance of domes housing telescopes reinforce the disintegration of extensive primary form. The final breakdown is accomplished by Steward Observatory. The Steward office building and telescope represents the only attempt to date on campus to break away from ninety degree site planning. The telescope itself is a rich creation. This polished stone monument stands alone with dignity, unintimidated by the red brick towers surrounding it (Figure 1).
Thus the tension created by these two philosophies of form, and the need for resolution, is obvious. My first attempts toward resolution let the lab school respond directly to each of these forces in order to create a gradual transition and sense of unity. In other words, I acted as if a mound of clay had been placed on the site and allowed to respond to and be moulded by each of the forces around it. Unfortunately, the results were not quite so poetic. This approach, although making an appropriate transition between the two forces, left the building divided and an incomplete whole. What's more, it became eclectic, incorporating all the latest cliches. In my case, this was a most useful exercise, because, like most designers, I brought some dangerous preconceptions into the problem with me. Expounding them simply served as an exploratory and cleansing exercise (Figure 2).

The critical error of this first approach was that it represented a low level of conceptual abstraction. Relating so directly and frontally to each contextual element is at best a piece-meal procedure and is the exact reason my first attempts at unifying the site resulted in an incomplete and unfulfilled building. Realizing this, the step to a much higher and more appropriate realm of abstraction was to let the building respond as a whole to both of the formal influences. To accomplish this, I have utilized a vocabulary of primary forms, but in a manner sensitive to the richer, more highly articulated development on Cherry Avenue. In doing so, the primary forms themselves become abstracted. The towering primary masses are replaced by new primary forms, such as the triangle and circle. Each primary element is arranged in such a way as to respect the powerful massing exhibited on Second Street, but with the same freedom
and dynamic qualities as is expressed in the structures on Cherry. Thus, the lab school facility begins to respond to the contextual issues as a whole, and at the same time retains an imagery of its own (Figure 3).

The triangular forms were generated from two factors. First, from an implied diagonal across the site from the Steward telescope to the corner of Cherry and Second, which happens to be the original northeast boundary of campus. This diagonal divides the two competing camps of form. Secondly, the triangle serves as an abstracted primary form in that it is precisely one half of the most basic form, the square.

The imagery of a school is of paramount importance in determining the child's attitudes toward education. This point takes on a special meaning when one recalls the threatening pseudo-monumental styles of architecture which were used up until the 60's and are still in use but in disguise as other things. The image portrayed by the lab school is one of free circulation, in keeping with the goals of open education. This is obviously stated in the ramps to the rooftop play areas, but is more subtly pursued in the arrangement of the primary elements. This arrangement of basic forms is analogous to oversized toy building blocks. These familiar, non-threatening forms invite playful participation from the lab school students (Figure 3).

An added degree of excitement is accomplished by approaching the lab facility design in terms of created spatial tensions and resolutions. For example, the indoor active pod makes a downward gesture to the original corner of campus, and is resolved by the upward motioning of the cafeteria ventilation system. The cafeteria also sets up a tension by boldly enfronting
Cherry Avenue. This pedestrian squeeze is resolved by the immediate opening of a direct view to the Steward telescope. Even the use of triangular building forms, which imply other exterior spaces, creates a tension in the lab school facility as a whole. The result is that a passerby experiences the building with a sense of curiosity. However, the resolution is not to be found outside, but in the interior of the school. This resolution is in the occurrence of another primary form, which is formed by the diagonals of the classroom, entry, and kindergarten pods. This new form is expressed in the second and third floors and in the spatial volumes which open two and three stories. Here the building block analogy finds its true fulfillment in that the classroom space becomes a real jungle jim of learning activities (Figure 4).

Just as each building block, or functional zone, stands alone as an element unto itself, so does this same elemental theory find expression inside the school. The appropriateness of elemental theory in an elementary school goes far beyond semantic play. The major thrust of open education was based on exactly the same elemental theory, emphasis toward the individual student and self-expression. The architectural consequences of this theory are that each activity area and building component becomes a curiosity unto itself, reinforcing the notion of a school as a place for exploratory learning. In the lab school, the vertical circulation, the solarium, the structural components, the mechanical apparatus, the restroom and storage facilities, as well as each activity area become elemental devices creating a sense of excitement and eliciting exploratory responses from the students (Figure 5).
figure four
figure five
This brings us to a discussion of the functional issues. One of the major objectives of the lab school, as stated in the program, is to begin an exploration of environmental education. At a time when there are almost as many educational theories as there are teachers, this theory was chosen because I believe it can have the most beneficial effects on educational practice. The term "environmental" has been grossly misunderstood when applied to education. These misinterpretations range from a "Paul Bunyan" sensory interaction with the environment, a field trip and outdoors approach, to political involvement and a current events orientation. Environmental education is actually a theory within open education. It provides a chance to operationalize open education through its focus on awareness in all subject coverage. The major goals of open education and environmental education are very similar, basically, learning by doing and an emphasis on self-responsibility and self-direction. Environmental education is probably where open education would have logically progressed had it not suffered the setbacks that have occurred by relating it with the "open plan" school. These setbacks were caused partially by architects' misconception of flexibility as movable partitions, and partially by administrators taking advantage of an inexpensive building type to get more schools built.

The preceding program documents in a very objectifiable manner the functional issues which have gone into this lab school for environmental education. However, if one compares the program to the final drawings, certain noticeable changes have been made. These changes were not a failure to meet the programmed objectives, but opportunities discovered during the design
phase to enrich the program. Here lies the danger of many programs. The program deals only
with objectifiable issues such as function, organization, population, and space needs. Charles
Moore, in his book Dimensions, further explains the dangers of programming. In discussing
the functional diagrams for the Whitney Road Residential Development in Perrinton, New York, by
Gwathmey and Seigel Architects, Moore says,

Gwathmey and Seigel's diagrams seem conspicuously reasonable. They embody
a set of analytical assumptions that, once made, seem to march inexorably
toward an architectural solution. For this reason (and because so many
architects have been taught to design in just this way) these diagrams
provide an instructive example of the way an overly exclusive analysis
can not only falsify the problem at times, but can also seem so incisive
and so compelling that it gets mistaken for a solution. The diagnosis,
that is, can beguilingly wind up as the cure.

The program can serve the useful purpose of a preliminary organizational device. However,
the program must be open ended to allow for the intuitive, subconsciously reasoned decisions
that require a more intense analysis than most programs allow for. The lab school program was
done in this open ended manner, and I will now proceed to discuss the changes that occurred.

Proceeding in order as appears in the program, the category of space needs was the first
programming issue to be revised. The classroom spaces were originally organized around learning
centers of 1200 square feet. The term "learning center" was borrowed from open educational

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planning and deals with large, open spaces to accommodate flexibility. As my own notions of flexibility matured to a realization that the ability to divide a space by an accordion wall has nothing to do with the quality of education, the learning center concept was abandoned. It has been replaced by activity areas, each with its own square footage requirements. Here the traditional idea of flexibility retires to the concept of fluid circulation.

Another category revised under space needs was observation. In the sense that a lab school is a place for students and teachers alike to learn, the teachers, just as the students, learn best from doing, not from watching. The observation rooms were therefore omitted, and each activity area grew to accommodate participating student teachers. This point of view was encouraged by Dr. Evelyn Carswell.

The next program enrichment comes under the heading of functional issues. The zoning used in the program was a spatial division of kinesthetic, cognitive, sensory, and service activities. This evolved from the proximity and compatibility matrix which is based on traditional notions of sound transmission. I soon found that a zoning based on concept formation learning activities was much more in tune with the objectives of the school. Art activities therefore take on a major importance in the organization of the school. The ground floor of the classroom pod is devoted to pottery, painting, weaving, cooking, growing of plants, and science. The third floor is devoted entirely to dramatic play. The library resource center takes a central location on the second floor, with a Plato computer terminal replacing the earlier programmed visual aids area.
The major functional zones, mentioned earlier as building blocks, also represent a deviation from the original program. Originally conceived as one unit, each zone began to take on an identity of its own. The indoor active area was replaced by a gymnastics and modern dance studio to separate this highly active area from the classroom space. The cafeteria is also separated to isolate the distracting food odors. The research and kindergarten areas are separated because of the nature of the activities that occur here and to allow for the different time schedule these activities operate on. Administration becomes an element unto itself to accommodate its non-student users and business activities. Even the major entry becomes a separate element. Entrances are formed at the joining of each pod, but the triangular major entry which leads to the administrative offices becomes a cue for adults. This entry cue is reinforced by a niche which contains a single entry door.

Fred Hechinger, in the March 19, 1977 issue of Saturday Review\(^2\) has proposed a disturbing educational theory, which states that the only determinate of a good education is a good teacher. There is certainly a great amount of truth in this, but the disturbing aspect is that it implies that architecture does not play an influencing role in education. I hope that I have proven this theory wrong in the design of the lab school. Exciting spaces do elicit active responses. A child perceives such a space and his mind begins to soar. He does not

think, "Now there is an interesting space, what can I do with it?" His mind jumps past that and begins to create scenarios of action, play, and make-believe. This notion extends beyond the school environment to every building.

In closing, I would like to say that design may be viewed as a series of frustrations. Frustrations posed by a multitude of problems which must be dealt with and synthesized into a final product. However, architecture is not problem solving, for with each problem "solved," several more are inevitably created. Each designer in his own way learn to cope effectively with certain levels of this frustration. The failing of many designers is that they become satisfied with operating at a comfortable level of frustration. But for a designer to grow he must consistently push to reach and master new levels. This project evaluation documents the levels that I have pursued.

I would like to close with a quote from the Flowden Report. While striking a blow at a long held misconception, it provides a valuable insight for educators and architects alike.

Some people, while conceding that children are happier under the modern regime and perhaps more versatile, question whether they are being fitted to grapple with the world which they will enter when they leave school. This view is worth examining because it is quite widely held, but we think it rests on a misconception. It isolates the long term objective, that of living in and serving society, and regards education as being at all stages recognizably and specifically a preparation for this. It fails to understand that THE BEST PREPARATION FOR BEING A HAPPY AND USEFUL MAN OR WOMAN IS TO LIVE FULLY AS A CHILD.

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LB2154 Love, Lester
T8 Lab school facility,
L6 University of Arizona.

LB2154 Love, Lester
T8 Lab school facility, University of Arizona.