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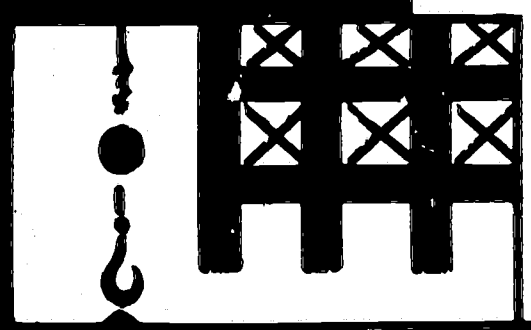
ABSTRACT

Seven papers from the symposium on schoolhouse planning held in 1969 by the Fresno County Regional Planning and Evaluation Center are presented in this book. The papers discuss the changes in educational philosophy and technology which have brought about a change in the spaces needed for education. Educational finance, educational specifications, and innovative programs are discussed as they effect the ways in which a schoolhouse is designed and built. The various authors relate their experiences with middle schools and open schools. The possibilities for innovative planning under the state aid formula are described. Appended to the collection of papers is an evaluation summary of the symposium and a list of participants. (JY)

# "BUILDINGS for Tomorrow's Educational Programs"



a symposium



EDICT

REGIONAL PLANNING AND EVALUATION CENTER
FRESNO COUNTY DEPARTMENT OF EDUCATION



# ILDINGS for Tomorrow's Educational Programs"

**Roosevelt High School Auditorium**
**May 26, 1969**

**Hacienda Motel, Fresno**
**May 27, 1969**

EDICT
Regional Planning and Evaluation Center

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# "Schoolhouse In Transition"

**DR. HAROLD B. GORES**

Dr. Harold B. Gores, President
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I am very glad to be here for a number of reasons. First of all, to support the notion of EDICT which grew out of the Education Task Force in 1964 and drew the attention of this nation to the need in education. Title III is the only ventured capital in the education titles. Title I is really more money in the sense for welfare, Title II is for libraries. They are good things. But the only ventured capital is Title III; so it is good to see that EDICT is functioning as an innovator as it was intended.

I am glad to be here because I make it a point, as I go around the country, to find out who the 'movers' and the 'shakers' are. I seek their presence in order to learn. Here today are a half dozen of the 'movers' and 'shakers' out on the growing edge of the school house. Educational Facilities Laboratories (EFL) put out a book which we didn't think had much of a future. The title of the book was **Schools Without Walls.** Within thirty days we had two reprints. In fact, the reception was such that we knew we would be able to get the schoolhouse out of the way.

I have ten things I would like to say. First, for the layman, taxpayer, and non-professionals in the audience, I would like to put the school building in perspective. Always at this point, when you talk about the schoolhouse, someone is bound to stand up and say , "but don't you thing the teacher is more important than the schoolhouse?" A school or college is first of all a student body and secondly, a faculty and third, a curriculum, only last is the place. I would rather have my children taught by a frightened teacher in a tent than a stupid one in the Taj Majal.

Let us say though that, nevertheless, the environment makes the difference. I think we can generalize from what Dr. Johnson of the Life Extension Institute has shown that the quality of environment makes about a 15% increase in the productivity of office workers. Similar studies indicate even more difference due to environmental factors. Even if it is only 15%, it is still three times as much as your friendly banker is giving you for interest. So it is worth going after.

Consider too, the voter, taxpayer, or layman is beset with increasing taxes from all levels. Most of these he cannot influence so he takes out his frustrations locally as the only place where he feels his vote makes a difference.

The typical taxpayer assumes that the building of a school is an immense financial crisis and problem. But when you build a million dollar high school, it takes a budget of a million dollars to run it three years. Over a period of sixty years, the initial cost is only about five or six percent of the total cost of that school. When we cheapen the schoolhouse by 3%, it is 3% of 6%, not 3% of 100% that we are saving. In effect, the building cost is chicken feed in relation to the total cost.

It's people that cost money not bricks. Many school boards will spend the time to discuss the addition of two teachers to the staff, however, they will spend the rest of the night arguing about the hardware on the addition to the local elementary school. In New York, for example, two teachers at an average salary generate the same financial consequences over thirty years as building one million dollars worth of schools.

Let me now tell you some of the things that I see around the country; some of which may not be relevant to Fresno, others might have application in some part of your County system, and still others may be totally relevant.

I see now more and more schools in the central city taking new art forms. Instead of the school on its island site—square or rectangular—I see more schools now whose site is amoeba shaped or where the school tends to run fingers down through the neighborhoods. The idea being that if a school is a good neighbor you are to maximize the possibilities of the schools being neighborly. The old formula, where we used to compact the site, is giving way now to the opposite, which is to increase the places the school (if it's a good neighbor) can touch the community.

A new high school in Pittsburgh is an instance where an extension of that site puts antennas and feelers into the community so that it is hard to tell when you have left the school and entered the community. In Hartford, Connecticut they have something called an "everywhere school", allotted spaces for education without building a total school. They have inserted it into other forms of existing housing, for example, a commercial high school with office space above.

In Philadelphia they have something they call a "nowhere school". This is an experimental group of high school youngsters who are going to move from museum to electronics laboratory, to this and to that, and get their experience out in the community, using Philadelphia as its schoolhouse. They do have a place to gather (a great loft space) so they do have a base, but it is a kind of "nowhere school". In fact, in some of our inner cities now, our school systems are becoming what you might call "nomadic". That high quality space goes out and follows the people wherever they go. Whatever the deer trails are, the school system is flexible enough to follow.

One of the most exciting places I know is New York City. It has more schools than Sears-Roebuck has stores in the United States, which gives one an idea of the size of the place. The best spot I know, in terms of its environment and indeed its feeling, is the Harlem Prep. It is a school for drop-outs in Harlem which is set up in a converted supermarket. It is air conditioned, carpeted and it has furniture that raises the spirit and nourishes the soul not with slippery, plastic, maintenance-type furniture, so much admired by municipalities. This is a school designed around trust!

We never design around trust in schools. We design around defensive maintenance. How schools generally in this country love glazed tile. Let any errant scholar unsheath his jack knife and try to leave any evidence that he ever passed through the place. Schools which are antiseptic and indestructible tend to be preferred by municipalities. It is a strange thing; we will do anything individually for children but collectively, as governments, we really don't like them very much. We tend to put them in ceramic or other indestructible containers. This is what we do as groups, but individually we would do anything for the kid except give him a humane environment for him and his teacher.

Another thing I have observed, and I am sure this is relevant to Fresno, when you are building close to the inner city, make sure you have given all other agencies an opportunity to participate. The superintendent of schools of Pontiac, Michigan, came in my office some time ago and said, "The center of Pontiac is dying, people don't have cause to go there anymore and we have to bring that dead heart back. I want to put a school and some other facilities in the center". Before they were through in Pontiac, they had nine partners.

They had three partners out of Housing and Urban Development (HUD) in Washington and, also, they had the Neighborhood Development Corporation which has money and this is the first time I have heard that beautification money ever got near a schoolhouse. HUD declared that the gymnasium was to be a 75% public facility so they paid for three quarters of the gym. They got the county and the local community college in on the act. They had, of course, their own board of education money, and they put together a 5.6 million dollar school. Thirty percent of the money came from other than schoolboard sources. So, do your best to give everybody else an opportunity to participate with you in the financing, where the school is not just a school for children but a school for people and increasingly now this must be so.

I was in a school the other day where by five minutes to one the children have all gone through the cafeteria. At one o'clock any lonely, aged person, who is living in a single room in that community, comes in and gets the same meal the children got earlier in the day for fifty cents. They also have a social program for half an hour and this goes on each day, so successfully that they have just filed a bill in the legislature to reimburse school systems if they will do the same thing for people in the evening. Even the welfare department has declared that if the person is indigent and on welfare, in

inclement weather he may charge the taxi fare to get to the school. So, the schoolhouse is going to be feeding everybody in many of these districts.

We are coming, in the future, into great zones of space. The library is going to be the biggest space. We may call it an "Instructional Materials Center"; I hope not. "Library" is a good honest word. They will have all the carriers of information in it—tapes, tubes, and so on. Whereas, if you call it an "Instructional Materials Center", then educators will start abbreviating it to "IMC" and it will be confused with missiles or something else. It sounds expensive, it sounds bizarre. The voters will support a library because a vote against it is to vote against a book. Nobody wants to vote against a book, but against an "IMC"! In other words, educators, watch your language.

Let us acknowledge change in basic psychology. Until a very few years ago, all our schools were run on stimulus-response, what McLuhan would call linear psychology. The teacher bats a question down, it comes back, and she bats another one down, much like she would hit a tennis ball against a blank wall. Now we're moving toward more organismic psychology—psychology of the whole. We talk more about the "whole child", the "whole group", the "whole school", the "whole society", etc. When you do this, you tend to make gestures. Our buildings can start to look like gestures. Where we are viewing with wholes, the space is whole.

The problem in the schoolhouse is cooling, it isn't heating. The children of today are gaining a new right. From the earliest days the child had the right not to be cold. So we designed schools to make sure he was not cold. He is now earning a new right; it isn't on the books yet but it is coming—the right not to be hot. Do you realize that a first grader, confronted with an arithmetic problem, can run a temperature up to 102 degrees in a flash. There is no research, that I am aware of, indicating that a child learns the multiplication tables better while scratching his heat rash.

I will just make a brief comment about the schoolhouse being quieted. In 1956 the total sale of carpeting to education, schools and colleges was about $50,000. In 1966, the last year for which I have figures, it was $99,000,000. From $50,000 to $99,000,000 in ten years! It's a miracle that 21,000 school-boards in this country, many of them rediscovering the wheel together and separately, could make a decision such as this. Schools have pushed hotels, motels and theatres out of second place in the consumption of carpeting. I am not entirely sure that it is true, as Chet Huntley said, that in a few years you will recover the cost of carpeting from the reduced maintenance. But, you don't have to make the case on economy, you make it on humanity. The teachers don't get tired, the children hear better, it's safer, and it does something for the human spirit, and it is quite a site. We know that outdoor plumbing is cheaper than indoor plumbing, but we never make the dicision on that basis. So whether a slippery, hard, waxed floor is cheaper or not is irrelevant. The question is "What is best for the people there?"

I would like to say something about physical education now. I know in this benign climate here, probably not until you get in Junior High do you build these basketball boxes and gym, and I imagine every high school has a multiple basketball box. In 1893, the hit of the World's Fair in Chicago were the German and Scandinavian gymnasts. They ultimately started the American High School toward their physical development. A pretty good start was made until the game of basketball routed gymnastics as this game of such charm took over. More communities are now saying, as are their student bodies, "Why aren't we doing more with life-time sports?" The president of the student body at Georgia Tech stated to me, "We are re-evaluating priorities at this institute and one of the things that is going to be re-evaluated is the stadium that we can't fill even five times in the autumn while our gladiators go out there and make spectators of the rest of us. Now, the students are going to raise the money and we want to build a facility for life-time sports, the kinds of things that both sexes can play throughout their lives."

I would like to say a word about the structure of technology. It is becoming clearer that at long last the teacher will be freed from the transmission of information mostly by jawbone. We, up until very recently, have had these black boxes that could talk, however, they did not have anything to say. Now, we are getting some boxes that have something to say.

Another thing which has been developed that is making a difference is the copy machine. Sometime ago, we had a number of college librarians for a day in the office just to get caught up. I asked what has made the biggest change in the college library in the last ten years. The answer is that the Xerox Company has made the largest innovation. Now we have machines coming that will copy tapes. I saw one the other day that will

copy tapes twenty-four times, quick and inexpensively. Two months ago the Japanese introduced, to an Audio Visual Convention, a copying machine for video tapes that will copy a one hour tape in two minutes. We are three or five years away from inexpensively copying film at this same rate.

When we get these copying machines, we can saturate the environment in which the child is learning. In private, he can get the sounds of our culture. Very soon there will be cartridge loaded individual, sound, motion picture machines. There is one coming out soon called the "Private Eye". It will sell for less than $50. It will single-out concepts, by using five minutes of sound, colored motion pictures. They will come out of a kit or "do-it-yourself" so that the head of a science department or a particular student who wants to communicate using that medium can use it. The school can own a $200 camera and be in the business of movie making. For small groups, they are going to have a machine called "The Informer" which will cost $80. These are going to be out where the students can get their hands on them.

I would like to say one more thing on instructional teaching. I don't know if anyone is doing it yet, but I think it is inevitable that very soon school systems will start renting the service for instructional technology rather than buying it. They will stop buying the machines because the machine is obsolete so fast. The way to avoid obsolesence then is to buy the service, whoever owns the machines has to then face this problem.

We are going to be buying many services that we never have bought before. The feeding of children in our schools will be done by the private sector. People who know how to feed other people attractively will bid for the privilege and the profit of feeding youngsters. More and more, I think, we are going to find that the school system will commission out to the private sector the services that the school itself has previously rendered.

If there is any particular message in this whole business of instructional technology, I would say that this is clearly the direction in which education is going. Increasingly, the facts will come from the inanimate object rather than from the teacher. We have the boxes that can talk and have something to say which will be worth listening to. A student will get information from things, programmed by experts, and his values from his teachers and other persons.

Now only these things can be gotten from teachers. The teacher who worries about technology leading to unemployment is worrying about the wrong thing. The technology will free the teacher and the teacher may then return to his ancient trade—philosophy. The meaning of it all. You cannot get that from machines. So, the machines, too, just as knocking down the walls increases the teacher's freedom, so does the instructional technology increase the options. The teacher has to serve at a higher professional level than to be locked in that box as a general practitioner being all things to all children all year.

The schoolhouse of the future, in many communities, is going to be a great big library-like place in which the instruments and carriers of data are present. On the fringe are going to be meeting places. I hate to call them classrooms because if you call them classrooms, someone will design them like kitchens—kitchen floor, kitchen furniture, kitchen lights and so on. You can't call them living rooms because it sounds too expensive. It is the arena, the classroom. It is the gathering place where the teacher and children, having gathered the basic information, can then "hammer out" among themselves the meaning of it all. What is true and what is false? What part of it is most likely to change? Where does it lead us? What good is it?

All of a sudden, in many communities at least, we have gotten over this cultural guilt about a child being comfortable. It is now possible in many areas to provide a comfortable environment. A comfortable chair, a destructable chair, the design evolving around trust. The funny thing is that students rise to your expectations of them. The best way to cut down grafitti on the wall of the boys lavatory is to put in a mirror. The mirror reduces the portrait that you otherwise may get, to the loss maybe of American letters but the janitors sure like it. They will rise to our expectations of them and you can safely design around trust.

Everybody wants progress, nobody wants change. The difficulty is to bring them about. We all agree we want progress and it is the same as how individually we love children. It is only collectively we somehow treat them as though we despised them. I sense in our contemporary culture a change, a permission to design in a humane way at public expense and this is something relatively new. The chill wind of austerity is blowing less upon us today than it used to. We will rise to the challenge issued by Katherine Lee Bates, in "America the Beautiful," "Thine alabaster cities gleam undimmed by human tears."

# "Space For Learning"

MR. JOHN A. SHAVER

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Most of the speakers have talked about change so I will not dwell on this subject at any length but to say that this change of technology comes quite readily. Dr. Gores has discussed the many changes taking place in technology. Unfortunately, our sociological changes do not keep pace and that is the area where we need to work even harder. People seem to resist the constraints of living and of doing different things than they were used to doing in the past. But the fact is that change is coming and we must realize that it is inevitable.

In North Philadelphia, the so-called "largest ghetto area in the country", we worked on a design study recently. It is a heavily populated area with industry along the railroads. Instead of going to urban renewal, they took a look at the air rights over the railroad to find spaces for new educational and community facilities. Instead of moving everyone out, displacing people and causing and creating even greater problems, the idea was to keep the people where they were and try to improve their environment as they now have it without disturbing either living units or industry.

Our society in the big city, looking at it from up above, from the point of view of an office worker, is a mass of rubble and certainly not considered a very great beauty spot. This indicates how badly we have organized our physical environment in the country. I think we can go from talking about the negative here and talk about something more positive.

We have had little or no change in school design for over a hundred years. A classroom back before the turn of the century differed little from those now in use. The teacher was the transmitter of all knowledge, the desks were screwed to the floor and the students were lined up in rows and everything was very regimented. Now we have outgrown this view of the teacher's role but schools still continue to look like the old Quincy pattern started in 1849.

A picture taken in 1950 shows that we still had the bad condition of the sunlight coming through the window uncontrolled, the room became hot and stuffy, and there was a glare on the students working in the space —there was little learning coming about in this space. It is really disgraceful to think that we have these conditions existing in our society.

By 1955, a big innovation had taken place. They had unscrewed the desks from the floor. Still the desks were lined up in rows in a very regimented fashion. We haven't really changed very much, except helping the janitor a little bit in being able to sweep out the room. We still had the sunlight casting a glare on the chalkboard, making it very difficult for the students to see what they are supposed to see. A picture taken at the back of the room, at the eye level of the student, would show the heads of other students in the way of the child trying to see what is up on the chalkboard. These and other similarly undesirable conditions can and should be avoided in contemporary schools.

What is the present state of the art in school building design? We are trying to, as Harold Gores so aptly put, "enclose an acre or two of June", to create a better environment; one that produces better performance on the part of the students. This would involve then the use of color and light, testure, form, and temperature control to create a total physical environment; one that motivates, one that stays out of the way of the educational program, one that instead of impeding learning actually facilitates it.

Each teaching station or classroom has a nerve center panel that houses all of the existing items--the clock, the speaker, the termperature control, light switches, control lights, communication headsets, and all the

other new devices for television controls, audio controls, etc. This is resembling more and more the panel on the Boeing 707 Jet. Education must develop an attitude of continuing change; we must accept this if we are going to keep pace and do what we should in the field of education.

Looking a little ahead, in fact even now they talk about computer instruction where the computer is used for both tutorial and drill and practice instruction. This is coming in to a limited degree across the country and will be coming more and more as economics permit.

Eventually, we will have little Telstar satellites scattered across the country like we have radio stations now. In every small community we will have the capability of receiving these signals. Students' desks will be lightweight. The audio-visual equipment will be miniaturized. Students can carry their desks with the built in audio and video equipment home with them after school, if they wish, or they can transport it around through the school. It makes the student more mobile all the time and will place all his facilities close at hand.

The physical environment—What is the physical environment? It is what one hears, sees, smells, tastes and touches. Anything that we use the five sensing devices at our command to do, must be among the basic elements taken into consideration when designing a school. How do students learn? They learn one way by working by themselves, on their own. We often fail to realize how much students can learn in this manner. I heard someone say that individual instructions or individual learning happens when the teacher stops talking. I think that is a little over-simplified but it is something to think about.

Students learn from others through interacting with them. Having the freedom to do so is a very stimulating learning experience. They learn in seminar groups with the assistance of the teacher as the catalyst.

Students also learn through dexterity exercises, working with their hands in different ways. They also learn by exploration into different endeavors, art, science or other types of work requiring the use of their hands. They learn by the use of technology; for example, electronic teaching devices like magnetic tapes enable a youngster to work individually. I walked into a room one day and two little boys were listening to a stock market report. It really shook me up. I wondered how I was going to keep up at home.

What is this matter of flexibility? We talk about how children can learn better if we keep the building out of the way of the program, so we ought to take a look at flexibility. One way to say it is space. Space permits things to happen instead of prohibiting them from happening. We want space that will permit activity. Creativity can be fostered only if you have space that is non-inhibiting.

Houserman developed a series of components, another way to eliminate the inhibiting factors of space. Components can be put together to make up a teaching wall, i.e., a chalkboard can be moved to the students, you no longer need to move the students to the chalkboard. Permanent walls can be taken out of the spaces and the components can be used to set up a teacher's office. Who is gifted enough to know that a teacher's office ought to be in one specific location for the next four years? In such a building a series of components will permit you to set up different locations and arrangements for the teaching offices and other learning spaces.

Space that forgives is another feature that we think is important. Why do we have to worry about making mistakes? Let us use the best information available to study our educational needs and functions in order to develop the program to the highest degree. We can, but let us not worry about making a mistake and having to change in the future. We want a building that will change readily; that will forgive any errors or miscalculations that we may have made. To do this, we put things on wheels so that all the furniture is moveable. Teachers can set up any size group of students that they wish in any type of learning situation conceivable.

Space that motivates—this is another essential in design. Children react readily to their surroundings and they can react either in a negative way or in a positive way. So space and the environment should be inviting and friendly, rather than antiseptic and sterile. We have been doing violence to our students. We can overcome this problem by using a space that is soft and pliable and which will yield to the needs and desires of the people using the space. Saginaw, Michigan recently completed an elementary school. The school was arranged as a series of pentagons that looked like star fish in structure. Mother nature happens to be the best engineer that ever came along. Looking down on top of this building you would have five pentagonal units with a dome structure covering the play shelter. An elementary school in St. Louis County is shaped

like a spiral form of shell. Again, this was designed with the idea of structural economy. We design around the program and this was an organic answer.

Looking at the interior space of the elementary school, we find that children react to the chance to be informal. This business of formal furniture in elementary schools is a thing that we ought to be getting away from. Just putting carpeting on the floors not only improves the acoustics but actually is the same thing as adding furniture to the space, because the students gravitate to the floor just as they do at home.

Children, on the carpet, can be busily engaged and interested in what they are doing. You may walk through a building without distracting the students. They don't pay attention to visitors and they may have many visitors. Yet walk down any conventional building corridor and open up a classroom and all the heads look up to see who has opened the door.

Another example of how space is utilized is through a step-down floor. It would probably cost no more than two hundred dollars more to set the floor down in the center of an otherwise large open area. It can, however, serve many different purposes. The formal learning spaces are around the perimeter of the space. This has been used in a special education center, for instance, where students do all kinds of physical exercises and activities.

A children's theatre can be designed in very simple space with an acting platform and terraces, and may be used for dramatics, music and also large group instruction. It is simple enough that the children can design their own scenery. An office administration area used in this elementary school is opened up to the rest of the school. One very forbidding thing, I think, in most schools is the sort of administrative unit that has the word "principal" or "office" on the door. However, if you open up the office administrative space to the rest of the school, it creates a different atmosphere, different psychological effect, and it is remarkable what happens to the communication.

The Middle School is the next step on the educational ladder and here new designs are also being used. We opened up an entrance plaza coming off the street level. Leading straight back from the plaza are all the common use elements: auditorium, library, science, homemaking, arts and crafts, etc. The academic classrooms are in a three story bank along either side of the plaza. They were designed around both an educational program and a site.

In London, in a middle-elementary school combination, we had 2.4 acres of ground to house fifteen hundred students. We had to figure out how to negotiate the second oldest tennis club in London out of their space. One part of the structure had to be designed and built over an underground railroad. We had other problems besides educational ones in this case. We like to provide inviting interiors and attractive, upholstered furniture. One of the best things that can happen is that the students walk in and do not think the place looks like a school, at least a school that they remember. It must look like it was designed for them.

As we go up the ladder of education, we go into a little more formalized space in high school. Still there is a great need for informality. In high school, as in others, the educational program, the climate and the site all influence the shape of the design.

In Tennessee we designed a high school on what we think is a very beautiful site. When we first viewed the site of one hundred acres, it had a natural lake, a wooded area, and it became very apparent that we should locate the building at the edge of the lake. Instead of bringing in a bulldozer and leveling out a plateau, we built the school up the hillside in levels. We brought three of the dome structures right out over the water so that the lake would come under a portion of the building. The site was then developed for nature trails, a fish hatchery to be developed in the lake, an experimental farm growing area, and place for wildlife. It will serve not only one area but a whole region in Tennessee.

Another high school built in Indiana has the academic area on two levels. The main lower level is for class, library and academic spaces. Along three large prong-shaped areas are an administrative balcony and teachers spaces. There are three football shaped modules and units at either end of the plant for teachers' offices and planning spaces. They can go directly out of these spaces into the classroom space. The upper level balcony is for all administration. Teacher and student traffic flows below the balcony.

To move to the interior of the high school, we always try to place the audio-visual screens in such a way that the bottom of them is at least six feet above the floor. Another feature is that they all have portable food

service. The portable cafeteria is wheeled in, food served, and then all the equipment is moved back out of the way after the meal is over. The space converts back to educational use. In this same school, a two story aviary and growing area are all glassed in, right in the heart of the science department.

The science laboratory, for formalized lab instruction, is designed so that both lecture and lab functions can be performed without moving the students. They don't need to duplicate space as we often do in our science departments where we have separate spaces for each activity.

The administrative area in the high school, again, opens up to the rest of the building, to the student commons so that you don't have that forbidding wall and doorway to cross through. The theatre is so designed that the stage and the audience area is all in one space chamber without the conventional arch dividing the audience and stage. Acoustically, the overall space performs better because sound gets out to the entire audience more effectively. The third advantage is the larger stage area to work with. In this calipers were brought out on the stage on either side that connect right around the back of the audience. So it does permit for a lot more flexibility and pageantry for operettas and other types of activities that require larger stage areas.

To meet the need for formalized lecture spaces in the high school, you may seat 125 students in terraced semi-circled rows so they have good sight lines down to the front. In addition, the seating is swiveled. The student can turn around to the back row and have "eyeball contact" with every student in the space for a seminar type of discussion. The homemaking department again does not have to look antiseptic or institutional; it can look like a home kitchen.

The gym, even though it is a monument to "king basketball", can be flexible. Use of this space can serve other purposes besides the spectator sports where you get such a small percentage of student participating. In this case, for example, a walkway up and around, at the top of the seating, serves as an access to reach the top and also as a running track in the P.E. program.

The swimming pool is another much used space. It is something the taxpayers frown on in many cases, but if they really put the pencil to it, they could justify this space as well as any space in the building.

The structure is not merely an envelope to enclose the teaching machine. I think we ought to look at the building as a teaching machine. Like a computer, it is not complete unless it has all of the component parts; all of the things that make this learning process really work.

There is nothing worse than a school building turned over to a district without the proper equipment, or most importantly, without the proper planning for the program. Maybe the package approach that Dr. Gores has talked about is the way; maybe we should provide the package complete with the educational approach spelled out.

There are different types of structures coming on the scene. One, first used at Expo '67 in Montreal, was used in a small elementary school in Michigan. Aluminum tubing was employed to form a dome structure. Standard tubing is pinched at the end, fitted into a connector unit with dry joints, driven together with a sledge hammer and tightened with a wrench. This goes up very rapidly. It can be put up without any shoring and most of the way up, they do not even need a scaffold. They work up to the apex of the dome, finally reaching the top. A building of 8,000 square feet was put up in three days.

Another structure built on the sand beach at Fort Lauderdale, Florida, as an experiment, was a very small structure where a form is inflated and foam is sprayed upon the form. This provides a rigid dome structure from which they cut out, with a skill saw, the doors and windows. This was completed in one day. These are some of the things that are coming and are what we can look forward to in our technology and building which will permit us to do a lot of different things today, things that we are not taking advantage of.

For a low cost one acre college structure in Iowa, we had the advantage of research money from Educational Facilities Laboratory (EFL). When you go to a larger structure with longer spans, you increase the cost. In order to reduce costs, we did a number of things. We have practically no walls, almost all roof. This was accomplished by taking the reinforced foundation that you normally have under buildings and extending it up ten feet above the floor line. From that point, three steel arches hooked on to the hinge arches that attach to the concrete wall. Over the arches are steel cables draping two directions and tying down to the concrete wall all around.

The building is shaped like an eight lap running track which happens to determine both the size and shape of the space. Inside, you have a series of folds of cables. Over these cables were applied layers of foam and plastic coating. It was like taking canvas and stretching it over tent poles. By using, structurally, a very light substance, and by stretching and draping it, we can get the maximum mileage out of the material. This concave shape also helps acoustically.

We can use this shape to advantage and we have height varying from forty feet to seventy feet so they can even kick a football in it. They can also use this in many other ways. The entire space is covered with tarp and turf so they can use track cleats, football cleats or rubber sole shoes. By marking it different ways, they can carry on all different types of activities.

Portable seating can be moved on air cushions according to their needs. Further, by making the material in the floor translucent and putting lights under it, we can light up the basketball court, the running track, or the tennis court separately. They are making ice now out of plastic so that you do not have to freeze ice for hockey and ice skating. They can simply lay out sheets of plywood with this plastic ice on it and set up a temporary hockey or ice skating rink over the tarp and turf floor. So this will add another degree of flexibility.

They are getting away from only spectator sports and going to life-time sports—to better serve more of the students. This space, incidentally, is already being used by the joggers in the morning and evenings, plus the weekends, in addition to serving the college Physical Education program.

Finally, we are taking a look at modular construction on our do-it-yourself program. We have a series of nine hundred square foot triangular modules of precast, pre-stressed concrete, which can be filled on the site or remote from it. They can be put together horizontally or vertically. The problems of developing a system that will permit stacking vertically as well as horizontally have been reduced with this design. The vertical height of the structure can be varied as some types of spaces require more height than others. Columns on the corners of the triangles are hollow so that they can serve as pipe cases and ventilation shafts. These elements will be self-contained with all essential electrical, mechanical and plumbing fixtures. When students move out of an area, the modules can be moved to another site.

## "Candlelight Education In Satellite World"

**DR. JAMES MacCONNELL**

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There are a lot of interesting things going on in education and those of us who travel around the country become more aware of it all the time. When I was a kid we had the cow jumping over the moon which, when you realize what is involved, is really quite a feat. Yet today, we are actually going up there and coming back. It is very difficult for us to do many of the things that we all are interested in doing. We find that everybody wants to be a part of what is going on, yet few of us really want to pay for it. We don't mind wasting people's time, but we don't want to waste money. However, when we are wasting time we are wasting money. Still, we all want to be part of the future.

We keep vacillating; a few years ago we were afraid of the atomic bomb. At Milpitas they were going to build all the schools underground to save everybody from the atomic bomb. When they found out how much it cost, and they discovered it was quite expensive, they decided to build just one school underground. Then they found out what this would cost, it was fantastic, so they agreed to build one classroom underground—the sixth grade classroom. Later this was vetoed be-

cause everybody else in California would be dead and the State would be run by a bunch of sixth graders from Milpitas. In education we have these sorts of decisions to make and I think that we also have them to make in this valley.

Many of the things I see disturb me. I get worried about Federal control so I go to a board meeting and then, in some communities, I become worried about local control. I had heard that the science department, in this particular school, wasn't very good. At the meeting they were discussing a new building. The President of the Board said that the old building had a lot of learning left in it. If I could show him how to get this out, he would go for my program. I said, "How about your science department?" He said, "We have enough chemicals in the science lab to blow up this whole town." I went over and took a look and they had some sulphuric acid and a bag of lime and that is all.

This bothered me quite a bit because some boys and girls are "alleged high school graduates" and others are high school graduates in fact. They are people who have gone to school for four years, have been confined and kept in line, and taught by a group of teachers who had majored in subjects other than those they were teaching.

I taught music for a year in a two room country school with no previous training. I had a science major. The teacher in the next room, who was teaching science, was a music major. This practice is neither uncommon nor infrequent.

We must critically examine the things we are doing today. What are we doing in these school districts? I went to a Board meeting the other night and many of the things the Board was doing were primarily the job of the business manager. For example, they were buying a sweeper for the corridors. They rode two sweepers up and down the corridor from seven o'clock until ten forty-five. This is how they spend much of their time. We had a proposal to present and we spent a million dollars a minute for the next twenty minutes. When we finished I told them I could hardly wait until they picked out the toilets for the new high school. Why do we do this with other people's time, with students' time?

We are doing some things in education that we should take a look at. First, I think that what has happened in this community is very good, i.e., community participation. Communication is a difficult problem. One of the problems that we have with civic communication, or participation, is that people hardly know what to do. I know of a community now where forty citizens are drawing the plans for a new school. This is going to be an interesting school when it is done. They could make a tremendous contribution if they only knew what should be done. One answer is to have people get out and see what is being done in other areas. They are doing many interesting things in other parts of the country today and we are handicapped if we don't take advantage of the endeavors of others.

Everybody today has gone to school or they know someone that went to school, or they taught during the depression. So everyone knows everything about education. Or perhaps they bought something or built something, for nothing, that fell down, but they were proud of it while it stood. As a result the architect is having a bad time. Everybody knows what their kids should learn in school. We had a meeting a while ago where people were criticizing the schools. It was the Rotary Club. This progressive group of young men, who were saying that the students did not know anything about geography, were given a sixth grade geography test and we didn't publish the results. They rated 40 on the examination.

One major notion that we are talking about is ungraded areas. This is one of the great contributions that I think our State has made. Now the Federal Government is talking about nongrading the students.

Today, we have hundreds of thousands of people in a few small rural communities that are going to be forced to leave. When I was a kid, 26% of us were farming. Today, it is 5%, going to 4%. 80% of us are now living in twenty urban centers in the United States. We've never had large cities before. Now we have Los Angeles, New York and we hardly know how to cope with problems confronting urban areas. Fresno will probably be the third largest city in the State. First, Los Angeles, Palo Alto, then Fresno. How does one plan for twenty-five or fifty years hence in the light of these circumstances? You have a bond issue for $29,000,000. Everyone is upset, yet, it probably should have been for $129,000,000 if one is to prepare for what is happening.

Now we are starting to deal with these problems and you must realize that they are also school problems. And we are trying to smooth talk about people being

created equal, having equal opportunities, equal potential and so on. However, none of this is true. We don't have equal opportunities, we don't have equal potential. Our job in the field of education is trying to reduce these gaps as much as possible. That is all one can do. It does mean that we are going to have to do a lot of work with individuals. Currently, we take care of it in groups of thirty-five if you are poor, or twenty-eight, if you are rich. This is the way we handle individual differences.

Now we are learning or finding out that you can learn before you are five years old. And this was not known before. We also found, following World War II, that a child can be poor and learn. Do you realize people could go to college and not be rich? This is new. Now, everybody is going to school.

We also have inflation. They talk about how much things are. Wait awhile. If you can, buy your land tomorrow morning for a school site, better still, leave right now, if you have a chance to buy some. It is going to go right on up. I was in a community, as superintendent of schools, right after the war and told people, "Don't buy now, things are going to get cheaper!" I never go back there. They have got the County Sheriff waiting for me. I don't know what I cost those people. I guess that it cost them about one thousand times my salary for the advice I gave them. At present we are doing some buildings in Alaska at $72.00 per square foot. We were building for $4.00 a square foot and the government was putting half, when I was back home, and people weren't too interested in building. They thought things were going to get cheaper because I told them they would.

Harold Gores has talked about the air conditioning and various types of things. I think we are coming to the time when we will be going into the term lease operation, where we will not only lease air conditioners but even the school is going to be leased. This is because we will have difficulties in getting large quantities of money at an early date. Even now we are running into this and it is going to cost more and more.

We are also beginning to recognize that learning is not a group process. If we were running our homes like we are running the schools, at present, we would get twenty-nine or thirty people together in the evening and turn on the television! You learn alone. I was in a corridor the other day and a youngster was sitting there with a device in his ear. I asked, "What are you doing out here?" He replied, "I missed a class yesterday." He was picking it up on a device which was used to record and play back the lesson at a later time.

A group is working on a project at Stanford now that is an electric carpet. This will mean a new day as far as communications are concerned. They had four color television sets on the same piece of carpet, on different channels, coming right out of the carpet. These are things that people should know about and this is why we have to get around and see what goes on in other places.

I think the time will come when the sixth grade will take their French, many of them, in France. It is predicted now, that in eight years, we will be able to go to France for $35, $70 round trip. There isn't anyone here with a sixth grader who wouldn't send him to France for $35. And we will bring the French kids back here. It will serve both parents. We will simply switch them around. This is the way many of the courses will be conducted. This is how geography will be learned.

I think that the school is going to be a much different place than it has been up to now. That is why in spending 29 or 30 million dollars, I would want to take a pretty good look to see how it is handled. There were some problems about open areas in Michigan a while back. The partitions had not arrived yet and the teachers stated that if the partitions didn't come, they were going to strike. The Board got down on its knees, the superintendent marched back and forth in front of the teachers, pleading with them not to strike. "We'll put them in at Thanksgiving because they will be here by that time." At Thanksgiving the partitions were there. The teachers stated, "put them in there and we will strike." They put them in—the teachers struck. The partitions were removed at Christmas.

The whole curriculum is changing. I taught biology for three years, at that it was the study of death. We pickled everything we caught. I thought frogs were born in alcohol. I had no idea how they got that big. However, now it is the study of life. We finished a building two or three years ago. In doing the educational specifications for this building, we stated that you have to have an area where one hundred students can observe live animals. The youngsters can be divided into four groups of twenty-five. This is the way you study biology. You don't kill something and then start to study it. You watch it when it is alive.

We see art changing. Art objects are much larger than they once were. If the Russians hadn't "crossed us up", we would have had money for art. If they had sent an artist and a piano player up in one of those satellites, we would have had all the money we want for art and music. Unfortunately, they stopped after the science program. By building auditoriums, like in Clark County, Nevada, I think the EFL found a way to save the arts.

We are building a new school in Rio now. We are helping with but we were told not to critize the school site because they had already bought it. This is not an uncommon practice. That is, we buy the site first, then hire the architect. I went down and looked at the site; it consisted of four acres of flatland, and seven acres on the side of a 7,000 foot mountain. Two large streams or falls were coming from the mountain and across the flatland. What do you say? I first complimented them on the drainage. A Brazilian architect had laid the building out on the flatland, of course. We said, "Where is the program?" They didn't have a program. We wrote a program, with some financing from the Ford Foundation, by putting down what they were going to do. We worked on it for about a year. With some help from architects from the States, we have put the building on the side of the mountain and used the flatland for a play area. Now the water runs right through the school. Now, we will have fish in the kindergarten. And why not, this might be a kindergarten that actually works! Currently, we take the children from their home when they are small and put them in the largest room he'll ever be in; kindergarten. We must get the ratio about right if a good deal of money is not to be wasted.

We were in Australia a while back with a group of architects who wanted me to reveiw their plans. If anyone asks you to review plans, you are in trouble right off the bat unless you did them yourself. I looked at the science area, the physics, the chemistry and all of the sciences. There wasn't a subject that could be taught in the rooms planned for them. They had spent a million and a half on the plans already, without a program. As a result, we had to start all over again. We then did a total program and then the building.

Formerly, we asked the architect to the problem that he didn't have, and then kicked him for it after the building was done. Today, we are saying let us do a computerized program first. There should be a totally computerized educational specification program where you can pick out the things you want, put new things in, then start from there. Buildings must be designed to fit the program.

Our secondary schools will be much different. Our teachers today in many communities, are simply teaching subject matter. However, we have become a people country. We are more interested in people now. I was in the subject matter area. I can tell you every state in the union, the boundary of every state, and every state capitol. I have known these things for fifty years, yet, no one has ever asked me about them.

We are interested in people—what they are doing. I often pick up hitchhikers in our area, kids, and take them home to find out what young people or high school people are interested in today. I am amazed. They are concerned with doing many things that we know nothing about. We are finding a whole new area of interest. When I was a kid you could be a doctor, lawyer, or a nurse, or something of this sort. Now 80% of all the jobs fall between the top elite jobs and common labor. There is no unskilled labor in this technical area. Two hundred new jobs developed because of the last moon shot. I can't even pronounce the names and these are the things that our boys and girls want to do. These are the things that we are all very much interested in.

How do you get a kid ready? You must give him as broad an outlook as you can. Some students today refuse to go home when school is out. They want to stay! This is unlike the kid down in Florida, who came home and said to his mother, "I had a great day. The teacher had me take a note to the principal's office all alone. I could have excaped!" I think we have to feel differently if we are going to be doing many of these interesting things.

Somebody the other day asked, "Why do schools cost so much?" Everything costs more. In 1936, you could get a good Pontiac for $900. If you want a 1969 model, with the extras—wheels, engine, etc., this will cost $5,000 to $6,000. Costs are going up and they will continue to do so; not only for automobiles, but also for education and all that it entails. This includes the price of buildings, land and so on.

In essence, you may say that we, as architects and educators, are pretty poor salesmen. We can't sell anybody anything. Yet, we have the best products in the world. I went to a machinery show in New York this year.

They had on display, a robin's egg blue concrete mixer, with a sign on it for $10,000. The salesman came out and within twenty minutes I had never wanted anything so badly in my life. We didn't need one for our home! Why can't we do this?

There are things we are being asked to prove; to prove that we are right; to prove that open space is better than closed space. Unfortunately, we don't know yet what closed space can do. We know that people are going to have to enjoy schools, they're going to be staying in school longer. It is going to be more and more important for a person to be able to teach what he knows and is familiar with. If you aren't excited about a subject, don't try to teach it as you won't be able to do a good job. The time when the teacher could pick up the book and read it to the student has passed. The teacher today isn't a judge, rather he is a coordinator: one who goes along with the group. Instead of saying what things should be, he describes what they are.

A building today is a tool for learning and a tool for teaching, not just something to keep the rain and wind out. The outside will probably be pretty much as it was in former years; on the inside we are going to do all sorts of new and interesting things.

We now have hundreds of thousands of youngsters in rural areas that are going to be required to move to urban centers. This is where the "action" is going to be. As school people, you are going to see it here. This is going to be a fantastic city. You should be out buying hundreds of acres of land. I don't know how we are going to get the money—we might have to give up the third car or something like that—but we are going to have to do this in the long run. Probably the answer is leasing, but the school authorities today and the lay people have some responsibilities.

We are going to have another 100 million people in this country in the near future. All kinds of other problems are also developing, so I think the role we have is to look down the line and say, "What is it going to be like fifty years from now?" How are we going to live in a society that is so complex, so very difficult. We shall be required to take a whole new look at building. The architect will play a new role in the future.

So I think that as we look ahead and consider the future, it offers much, but it will offer a good deal more if we face it at least partially prepared.

# "The Middle Versus The Jr. High School"

**DR. ROBERT FINLEY**

Dr. Robert Finley, Superintendent
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We have had riots and other educational experiences and one gets a little tired of fighting the wind and trying to do something about the real problems we have today in education. I think it was John Gardner who said, "If education invented the Edsel, we still wouldn't know it didn't sell." And I think that in many ways he is right. I read John Holt's new book and he says that six percent of the people graduated from high school at the turn of the century. So we are now being run by a group of "dropouts". You stop and think about that for awhile. He may be right because of the mess we are in.

I want to talk this morning about the difference between the Junior High School and the Middle School. I will tell you at the beginning that I am a proponent

of the Middle School and I think that Junior High School is a thing of the past and that we ought to forget it. In Chicago, they talk about the John Hancock Building and they brag about how expensive it is. When we educators build a building, we brag about how cheap it is. I think maybe there is something wrong with this.

I am advocating that we build three types of buildings. One I call the 'bathtub' building, where you pull the plug and the whole damn thing goes down the drain. Secondly, you push a button and it goes up in the air. The third, and I think much more important, is one we can resell.

We built one in Illinois, and of course it had to be right downtown on the site of the old school where everyone went, so it could be resold. It would make a marvelous automobile center or a grocery store or something like that in the future. I think sometimes we have to keep in mind that because of transportation, population and so on, we have to take a look at the possibility of turning these buildings into something else and building more modern relevant school structures elsewhere as needed.

If we are talking about the Middle School, and that is what I would like to talk about, I would suggest that the Middle School is not a Junior High School nor is it a "watered-down" high school. It seems to me that the biggest problem with Middle Schools in this country today is the high schools, not the Middle Schools. We go about doing a real fine job of educating the kids in the Middle Schools and then the high schools kill them when they get there. We are still trying to fit these students into the pattern, into the shoe box, when they come into high school. These kids have been educated to be exploratory and to ask questions and to challenge. Then they get into high school and hear, "You don't challenge me, I'm God." Therefore, this is where the problem begins. However, we should not be preparing them for high school any more than we should be preparing them for college. Too much preparation results in merely fitting them into a pre-cast mold.

The Middle School is a new type of school. I am not claiming that a contemporary Junior High School building could not turn into a Middle School. But I have seen too many cases where they take down the sign on the front where it said "Roosevelt Junior High School" and they changed it to "Roosevelt Middle School" and nothing is changed on the inside. So we are not talking about that kind of Middle School; we are talking about a new dynamic type of education for what I call "Tween-age Kids". These are the toughest kids in the world to teach. "Tween-agers" are in between everything. Some days they are adults; some days they are little children; some days they like you; some days they don't even like themselves. They are growing faster in every way than any child we have in the school system. We are not taking advantage of this; we are not studying it; we are keeping the same "little ole" nine to three daily schedule and fitting them into this pattern.

The Middle School of which I am speaking fits in after a K to 4 basic school. This can be a time of exploration prior to the student's entering high school. The high school can be directional. This is fine. But first, let us let them make some mistakes. If you stop to think about it, school is the only place you are not allowed to make mistakes. This has to change. Edison made a few before the light went on. But not students and not teachers.

Now, since we are going to consider Middle Schools, we are going to have to have a philosophy of the Middle Schools. We have to talk about what we know about "Tween-age Kids". Then we have to have a knowledge of child development of these adolescents, all in order, to know something about them before we can build a program. You are not going to design a building unless you know what you are going to do with it. The important thing is what is the educational program for the kids you are going to put into that school. Don't worry about whether the five year olds will get along with the eight year olds and so on.

I have a school that opened in Barrington where we had all the kids come in a half hour before the teachers. We put them all in the so-called multi-purpose room and we told them that they could go into any room they wanted to. Anyone can go in any room! Now this is what you call a K-6 school. You can go to any room you want to but you can't have more than twenty-three kids in each room. What happened was very interesting. We had sixth grade children with Kindergarten children and vice versa. There was no room with all of one grade in it. Shortly after the principal had returned to the office, several teachers came in saying, "How do you expect me to teach these children when they aren't in the same grade?" Yet these very kids come home to my neighborhood and we also say to them, "You can't play with him because he is in fifth grade and you can't play with her because she is

in sixth grade and you are only in fourth grade"? Now that is "hogwash" and you know it and I know it, but we are conditioned to this stupid administrative convenience of grading children. Basically, it lets me know, lets the State Department know, how many children I have in second grade. It does not mean good education.

The middle school is not so much program as it is philosophy. It is true that anything that happens in Middle School could happen in Junior High School. But I think we need a change in attitude. We have to take the view that the curriculum goes up, not down. If I don't like something in the college, I give it to the high school. If I don't like algebra in the freshman year of high school, I give it to the junior high school and so on. It ought to be coming the other way. We should start by saying this is what children are learning now, when they get to you, find out what they have learned and then change your program to meet them.

We are starting next year, in our high school, what we call "Smorgasbord curriculum" — take what you want. One should, of course, know a little bit about what you should and should not take. But take it. We are doing this with the idea in mind that the child should not always be told what he must fit into or what he must take. This is not the business of the school. This is the concern of the child and his or her parents. If we permit a kid to fail—then she is going to learn that she is not so hot in Spanish or German, etc., but let her try it; let her commit herself to it.

The middle school is not a holding place. Some say "It is the place you hold certain kids so other kids can catch up to them." Catch up to whom? We have been chasing people all our life and we never catch up to a lot of them. I do not think that it is important that we catch up. This is the place where we want many programs, not only one. When we start talking about them, we develop a class structure in the school. This means that if you are a non-academic, you are going to be a "bum". And we are going to condition you to be a bum. Why? Because you are poor. Because we put you in this trap. Because you are a different color. This doesn't make sense.

The thing that I am asking that we do before we build a building, or build a program, is to examine what we are doing. You will get some of the most absurd answers you have ever heard of in your life. When you go to build a building, ask the teachers, "Why do you have doors on buildings or on rooms?" And the answer is that the principals tell them to close them at night and lock them "WHY?" "I don't know." "Aren't you supposed to put the money or anything of value in the safe?" "Yes." So burgular comes in, knocks the door off and it costs me $100 more to get the door back on and he didn't find anything anyway and then he gets mad and throws things all over the room. Why don't we take the doors off? We don't need them. They are open all day anyway. Why do you have a wooden floor on the basketball court? The answer is, "the basketball bounces one inch higher." Well, we had the smallest dribblers in Illinois because we saved $8,000 by not putting in a wooden floor.

When we ask questions about what we build and what we teach, we don't get very good answers. We frequently have little support for some widespread educational practices. And we cannot support some of the things we are doing. Take a look at what teachers are saying today, it's interesting. Basically, teachers are trying to tell us, "I don't have time to teach because of all the Micky Mouse jobs you have me do. I want smaller classes." What are they telling us here? They are telling us they really don't know that there is no definitive research on optimum class size. Naturally they want higher salary, but above all, I have found that most of them are seeking time for class preparation. Don't tell me you are going to prepare at 7:30 in the morning or at 4:00 in the afternoon. And you are certainly not going to do it after dinner.

Therefore, we have to build in time, preparation time —modular scheduling for teachers. In Barrington, I advocated that we have four days of school per week and that the fifth day be used in preparation for the next four days. By so doing, I am thoroughly convinced that we will have better education for children. We cannot do this, however, because the parents would then have the children an extra day on the weekend!

We have been operating on certain questionable premises in the Junior High Schools. One is that all subject areas are the same for all the students. This is clearly false. We have also erroneously claimed that all teachers can teach all subjects. This generates a "self-contaminated" classroom. It doesn't work! The third assumption is that equal time should be devoted to each subject: fifty minutes to English, fifty minutes to Industrial Arts, and so on. This doesn't work. We also assume that we should have the same type of space for all subjects.

We always put something into the curriculum but we never take anything out. I had the audacity to remark, in our community, that we should throw away foreign languages—remove them from the schools. Why? Basically, because they are the most expensive subjects we are teaching. From the people who start learning foreign language to those who have completed high school, the "drop-out" or "push-out" rate is fantastic. And how many of them can actually speak the language well? Yet put them in France for ten weeks, as we did, where they studied French seven days a week, never spoke any English and what happened? They came back fluent in French. I maintain it is cheaper to do this than what we are doing now. Of course, the foreign language people do not particularly agree with me on this point.

We have also assumed that teachers are the same. All the children are different but the teachers and all parents are the same. This is why we send the same report card home to five thousand kids. We found out this year that we had some people who do not speak English trying to read our report card. And yet we have the same needs for the forties and fifties as we do for the seventies and eighties. It does not work. We are subject-oriented, and we have a school bus curriculum. I have to ask people if I can let school out early. Can I get them there early? Can I get the kids home? The school bus runs my school system!

Are we getting down to the "nitty gritty" of what is going on? What are we doing about narcotics? I hired an ex-addict who almost "flipped" the community. However, the students would not listen to a medical doctor who knew all about narcotics but had never smoked marijuana or used any other narcotic, or a school nurse who we trained for two years, because the question was, "Have you ever used it?" Yet, we bring in a former drug addict; he got the reaction. There isn't a week goes by that I don't turn some marijuana over to the local police that has been turned in by the kids to the former addict.

So we are talking about communication. Are we teaching anything about the flag? You know when a kid says to me, "I don't want to salute the flag," being an old patriot and naturally through all the wars that we have been through, a chill goes up my back. He says, "I don't have to salute the flag, because we have free speech, and therefore, if I have free speech, I have the right to be silent." Try to answer some of those remarks!

Some of the problems the youngsters are bringing to my office I wish teachers would get in the classroom because these are the real problems. Are we talking about pregnancy, about divorce, about some of these things that really concern kids? No! Now the big deal on sex education is to get rid of it. Pledge of allegiance, freedom of the school newspaper—I don't know whether you have underground newspapers or not, but we do and they are beauties. We said, "Why don't we free our own newspapers, they can't be as bad as the underground newspapers." We let them write what they want to, but let them take responsibility for it.

When we discuss teachers that is something different. We have the "inexperienced", the "experienced", the "excited", the "calm", and the "cool". The "non-tenured", the "tenured" and "those who report". Then we have the "single", the "married-healthy", and the "married-unhealthy". There is a relationship here. We also find the "bad", the "mediocre" and the "good". If you are young, you are bad. If you are old, you are good. If you are middle, you are mediocre. We look at teachers this way. We can also look at the administrators the same way.

In summary, if you don't like what you are to teach, don't teach it. Don't try to fool these kids that you know something you don't really like. They are too sharp. You have got to be a team of pros, with different talents different desires and different personalities. The self-contaminated classroom is a dead duck and yet, we will not face up to it. Further, we have to have differentiated statuses. Believe it or not, we are going to have to have some sort of merit status because the public is going to revolt about what we are doing with money and salary. And you had better own up that we teachers and administrators can be subjectively evaluated.

We must have teacher aides and lay people to help you. Part-time people, yes, some in the morning and some in the afternoon, to provide for planning time. We have got to go to some type of modular schedule. Please let us do this in the school system. Let us create an atmosphere that will permit people to make mistakes. Let us put a team together of different teachers, desires and interests and let us do something with them. This school I am basically talking about is the Middle School, because we are talking about a school that is put together as a result of a program. Now look at it, it is not too much different from a lot of schools. It is what is inside that counts.

# "Open Space Planning"

**BLAIR ROWLAND**

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When our forefathers first decided to set up some kind of an education system in this country, what they obviously had in mind was learning. At first there were one-room schools, with everyone in the neighborhood from five to fifteen enrolled. This worked because we were mostly concerned with "readin", "ritin", and "rithmetic", with some history thrown in. "Miss Prim" could teach all four subjects at the same time, but she rarely had to take the time to teach the ABC's and multiplication tables to the beginners. The older students often handled that. It seemed that the younger ones picked things up quicker from the other students, anyway. "Dr. Smith's" 10 year old son and "Judge Samuel's" 13 year old daughter were so much help with young "Hans", whose mother and father had not yet learned to read or write, or to even speak English for that matter, that no one gave much thought to curricula.

But then things started becoming more congested. More people moved in and the neighborhood became smaller geographically, and larger demographically. So it was decided to build a larger school and organize it a bit further. But this larger school was really nothing more than a collection of one-room schools all under one roof. This was where the first grouping began and where first grade and second grade began. In the higher grades there was further grouping into math classes, English classes, etc. This probably resulted from "old Mr. Dixon's" fondness for arithmetic and "little Miss Sweeny's" greater interest in Romantic poetry.

This worked rather well for many years. Then our society began to become more complex; more technical skills became necessary to keep our industrial society operating. We began to require more from our educational system. The rate of change in our society accelerated. It became increasingly difficult for "Miss Prim," "Miss Sweeny" and M"Mr. Dixon" to keep up. Teacher time became the scarce resource. Teacher competence was barely considered at all. The learning experiences of the individual student received no consideration, and hence became a second scarcity.

As a result of these two scarcities, teacher time and concern for the individual, a variety of attempts were made to reorganize the schools. Teacher specialization, team-teaching, and large group-small group instruction, are results of these attempts. In each example the effort is to maximize learning opportunities while conserving teacher time.
Schoolhouse planning reflected these developments. Larger units of space which could be readily subdivided marked this stage of development.

But schools still were concentrating on teaching rather than learning. Concern over the failure to account for individual differences mounted steadily. Closely related was the concern over the effect on human individuality of mass treatment, of lock-step curricula. Experiments in nongrading appeared and this practice grew.

But it became steadily more evident that any genuine improvement must depend on an increase in the supply

of teacher time and talent. Taxpayers do not find it easy to pay for extra teachers.

One other possibility remains. Technology has succeeded in increasing production in other fields without increase in personnel. A similar development in education seems the only defensible possibility.

Science and engineering have been moving rapidly to provide electronic and mechanical means of extending the contributions of teachers. Television, films, filmstrips, audio and video recorders, storage and retrieval systems, and computers are some of the means now being employed for this purpose. The classroom teacher is becoming the "mediated" teacher. Teacher time no longer needs to be the scarce resource.

The result of these developments is a growing revolution in education. Learning and the individual are the central concern of the schoolhouse. Education never again will look the same. Neither will learning opportunities be limited and constrained.

But what about the schoolhouse? Is it still a collection of one-room schools? Or have its planners succeeded in creating an environment which suits and enhances the new education? Do the new buildings and those on the drawing boards have the capacity to flex and grow as the new look in learning and teaching appears? Let's look at some examples.

Take an elementary school in the Cypress-Fairbanks School District near Houston. Now in its third year of operation, it completes the cycle; it is a one-room schoolhouse. But with a vast difference. Its two floors provide the space for forty teaching stations.

However, teachers never lecture. They rarely speak to more than ten or twelve students at one time. The information presenting process has been eliminated from the teacher's time. Students obtain information from media, all kinds of media. The teacher's time, the scarce resource, may now be concentrated on the individual student. The teacher now has time to discuss, to answer questions, to diagnose and prescribe.

There is no longer need for classroom privacy. Students move through the building, unscheduled, not in lockstep with other students. Walls and doors which cost dollars to build and maintain are not needed. There is no need for containers and compartments which bind and restrict. Complete flexibility is achieved.

As a result, the Cypress-Fairbanks District opened another new elementary school in September 1968. Because the first school has served also to educate the educators, changed attitudes have reduced biases within the school district. The new school has become even more open in plan and program.

Under construction now is a new building for the College of Education, University of Houston. Its planning is the result of a commitment by the College and University, which recognizes the sweeping changes now taking place in education, a firm resolve to make a difference in education, and to make its teacher education programs among the recognized best in the nation. The college seeks to achieve this through innovative rather than conventional approaches.

Will the building assist in fulfilling this commitment? And will any of this be valid five years from now - or ten years from now - or even twenty? No one knows. But we can feel reasonably sure that the building will stay out of the way of its educational program, that the building's sole function of providing for body comfort and the social graces will be met, and that the functions within the building may change - and change - and change, with minimum interference to the educational process.

The educational facilities discussed above are, of course, what educators and architects have come to call "open plan schools". And, they are today being built in ever increasing numbers all across the nation, and in fact throughout the world. An occurrance which I am most delighted to see.

What disturbs me, however, is that we label them "open plan schools." After some five or six years of being involved in the planning of such school buildings, I have learned to proceed with caution whenever a school superintendent or college dean says that his people would like to consider an open plan building for their proposed new educational facility.

There is upon us a terrible requirement to label and to classify. Educators and architects are probably the worst among us in this habit. So, if we must label and classify, then I propose that we speak first of an "open ended educational system."

If we can then take this label, and define some objectives which we feel are apropos, we might discover that an open plan school would provide a proper environ-

ment for our percept of an **open ended educational system.**

What I am trying to say is that I feel that what happens within the building is the first consideration and I am sure that no one here will argue with that thought. But it is here we must start, and if I understand the purpose of these meetings, then what faces the people of Fresno County is an examination, an assessment and a restatement of the objectives of their own educational system with the resultant perception of the most appropriate means of attaining these objectives.

If this is done, then you may find that what you want to accomplish could be labeled an **open ended educational system,** and then you may decide to house these operations in open plan buildings. Program first, facility second.

About a year and a half ago my firm was commissioned to do a project for the Houston Independent School District. It was the most exciting prospect I have had in years. What they wanted to do was take an old elementary schoolhouse which is next door to their new central administration building, and convert it into an **"open plan laboratory school."** This building was fairly typical of great numbers of post World War II elementary schoolhouses.

They said, "You know more about open plan schools than we do, so get some schematics together and bring them back, and we will get some of our supervisors together, and go from there." Well, I was willing if they were. And then they said, "After we get it solidified a little, we'll set a budget."

Oh boy, this was keen. The sixth largest school district in the nation thinking in terms of new directions, new programs, and laboratory experiences in the elementary school. It was going to be more fun than a new domed stadium.

And it was, until the first time we got back with the district's chief librarian. "How can we control our nice new equipment if it's scattered all over the building?"

"Where can we lock up our projector and screen?" "There must be a dutch-door through which we can issue and sign-out equipment." And the elementary curriculum supervisor - "Where are our large group - small group areas, and the folding partitions?"

So it was back to the drawing boards.

The next time back we had a "media center," neatly labeled there in the exact center of a space over four times the size of the typical elementary book depository. With doors that locked, and containing a room complete with compartmented shelves to precisely fit each piece of equipment, and racks for film strips, and a dutch door.

Now we were getting somewhere.

What will it cost? $560,000 including air conditioning the entire building and carpeting the open spaces and the media center.

O.K., we'll run it upstairs and see what happens.

In due time the word came back. "This is the last money left in the last bond election and we only have $350,000. Oh, yes, that must include air conditioning and a covered platform for loading and unloading students from the parents' cars."

Back to the drawing boards.

The chief librarian said, "I think we should eliminate the storage room and the shelving. We need to keep the equipment where the children can get to it." She also said, "I think we should eliminate this wall between the teaching space and the media center." The curriculum supervisor said, "We don't need those space dividers, we won't be meeting in large groups. We must stop teachers from talking all the time."

Back again to the drawing boards. But this time it was with happiness, and a feeling of great satisfaction. Because it was easy to see that over the months these educators were undergoing a transformation. To their everlasting credit, they had considered and evaluated; they had opened their minds to the probability that there are new and better ways to conduct the processes of education.

It was easier for Allan Shepherd to make the first suborbital flight, because he was proceeding on pure theory. These educators knew the theory, but they had to also overcome the attitudes of many years of training and teaching.

For here is where the battle lies. You are faced with the necessity of examining each new idea and each new

concept, objectively, with an open mind. You must discard the security of the rear view mirror and look forward.

These children are a different breed of cats from those of twenty years ago. Their sophistication runs from "Candy" to Leonard Bernstein, from the ghetto to the country club. Their knowledge of world affairs from the assassination of a President to the solemn deliberations of the United Nations Security Council. The scope of their experience from live color coverage of the battlefields of Viet-Nam to the grand opera. Their universe from the neighborhood school to the moon.

I recently asked a teacher, who is mercifully only a couple years from retirement, how she found students today. She said, "Just terrible. They watch that damned box and they come to school and they know more than I do." Poor soul, she got the message; she just didn't read it.

I have one more story to tell. The Houston Laboratory School I have been telling you about is now under construction. Last Wednesday I went by for an inspection. It was just before noon and I was standing in the corridor outside the cafeteria. Out of the cafeteria there came a long slender line of students, 2nd graders I would guess, marching single file back to their classroom. The teacher led the line. They were bright-eyed and their lips were pursed in an effort to contain a giggle or a laugh. One dark-eyed little boy bent the line in order to pass closer to a potted plant against the wall. He paused a moment to touch a leaf. The pursed lips broke and there was laughter. The teacher's response was, "O.K., children, we are going to march back to the cafeteria, again and again, until we can march back to class without a disturbance."

About an hour later as I passed a classroom door I heard a teacher's voice exclaim, "Sam, don't you have any initiative?" I looked in, and it was the same little dark-eyed boy. The teacher's exclamation was for nought. He didn't hear her. He was looking with fascination at a cardinal on a catalpa tree just outside the window.

Will the open plan of this building help Sam? Of course not. But in the change to an open ended educational system we can hope that, as the chief librarian and the curriculum supervisor changed, so will the teacher.

The question is, will it be in time for Sam?

# "Open Minds Open Spaces"

**DR. EDWARD C. PINO**

Dr. Edward C. Pino, Superintendent
Cherry Creek Schools
Cherry Creek, Colorado

## RISING EXPECTATIONS

There are three conditions of which I expect you are all aware, but which you may not have focused upon as they relate to school buildings. To my mind these represent three conditions which are going to effect, dramatically, the learning environment of tomorrow and, as a result, I should like to categorize these

elements. They all involve rising expectations in education. The rising expectations of teachers, of students, and finally of the taxpayer. With respect to the teachers, they will one day win the just rewards they are now seeking. In so doing, they will also reap the fruits, as have many other people in our marketplace, who have also sought such rewards. My district includes the Gates Rubber Company in metropolitan Denver. The Gates Rubber Company now produces ten times the number of fan belts they did one decade ago, however, with five times fewer people. I predict the same rising expectations, not the rubber workers, but of the teachers who will one day win an increase in the hourly rate. The teachers will, at the same time, bring about dramatic changes in the staffing ratio. Whether or not the new ratios will be 1500 to 1 as they now are in the medical profession, I do not know. But the day of 25 to 1, which was never functional, is now gone. A new day is coming as a result of teacher militancy, whatever its justification. The day of the box, for this reason alone, is a time long since past.

**Teachers**

The working conditions of teachers is another problem in negotiations and is a justified one. It is just one more reason why they will demand, as they are in our school district, a private office, a private telephone and a special room for every special teacher such as art, P.E. and so forth. The point is that the rising expectations of teachers are going to dramatically re-shape tomorrow's learning environment.

**Students**

Changes in student expectations are manifested in student unrest. If you think that this unrest will not involve the high schools, you probably have another think coming. I would argue that the rising expectations of teachers are not unrelated to the rising expectations of students. One of the reasons why there are rising expectations among the student bodies of our country is the fact that today's school is basically an unreal environment. The kids view the school as irrelevant to what is happening in the world.

Why is it that we think we have to put a something on a fixed site--on the back forty next to a line fence that was drawn fifty years ago? Why is it that we think that we have to build "boxes" or "egg crates" in a very rigid and sterile way on this fixed site. This sort of learning environment confronts the youngsters in school only, yet they learn outside of the school.

The school buildings and sites are not the only things which are unreal. Fathers and mothers, Sunday school teachers, Boy Scout leaders and the rest, counsel the child to move at his own pace. Not so with the schools! We regiment the students, we lock him in, and we tell him to complete the work in June so that the next school year we can honor him by saying he is a sixth grader, whatever that is. Yet we all know that in every learning situation, other than in school, the child is self-paced. We are also aware that he learns in groups, not as an individual with a mother-hen hovering over him to make him feel secure, as we have done for hundreds of years in the American schoolhouse. He learns together with others, frequently, in the absence of the teacher. The teacher is neither a director, nor a transmitter of facts, nor a lecturer. He is a person who gently guides, soothes and reinforces the child and makes him feel successful. He is one who tells his son, "finish it tomorrow." Last week 120,000 kids walked out of the high schools in this country because they found it largely irrelevant. Unless we find the enemy, until we recognize that we are creating another thing in our image, not in the image of those who see it differently--the youth of our nation--these rising expectations may well be our downfalls.

**Taxpayers**

The third condition is the expectation of the taxpayer. There is no one that claims that school is not better than it was thirty years ago. The kids are learning more, they are more sophisticated, more mature, more ready to serve, more ready to study alternatives and more concerned about human beings than we were when we were five years older than they are.

However, the point is that the rising expectations of taxpayers are such that they are inconsistent with this progress. They recognize the pace of progress in every other segment of our society and are aware that the cost-reward ratio in the public education sector is not consistent. It is not that education hasn't taken a step forward, rather it is the fact that every other segment of our society has taken three steps forward. The cost of education has taken three steps forward--progress has not. The taxpayer's revolt then is probably justified. The question is what can be done about it.

**Summary**

In summary on my first of three points: we are living in an age of rising expectations within the field of education, the result of which will undoubtedly mean a

complete transformation of the American school, whether we want it or not. It will accomplish little good to argue about the inevitability of it all. Instead, we would do well to spend our time making the transition and discussing how this transition can be made in the most orderly manner.

## SCHOOL OF THE FUTURE

What should school involve, given these three major considerations? Since much I have said thus far concerns the program in an elementary school, I should like to outline what I think the destiny of the high school program should be, and how it will effect the learning environment. Our schoolhouse is a box. This black box contains everything that we now require a student to learn before he can graduate. Suppose the curriculum offered or graduation requirements could be cut in half. Assume that at least fifty per cent of what we are doing is duplication, that it is redundant or antiquated or obsolete or all of these combined. What then could we and should we do with the remaining time thus acquired.

I will mention some of the ideas we came up with, see if you would agree with us. What implication do they hold for the American schoolhouse? They said that if there is anything left to the American tradition of the democratic ethic of hard work, then every student should have a paid work experience before he graduates. The argument went as follows: All the kids can do to earn money nowadays is to deliver newspapers or to pack the bags at the grocery store. Therefore, if anything remains left of the Puritan Ethic, with regard to the dignity of work, the school has a role to play in this field. Of course, this view requires that learning be done outside of what we now call "the box" on a fixed site.

Secondly, it was recommended that every kid should have a non-paying service experience, whether it is working with the Indians in Cortez, the neighborhood action centers in Denver, dusting dinosaurs at the museum or doing relief work with the Red Cross during a flood. Every youngster should learn to be his brother's keeper. This innovation too will dramatically effect the location of learning. Thirdly, every kid should have an exchange experience whether it be with our sister school in Bangkok, where we now have some one hundred children, whether it be in Cortez, where we now have two hundred, whether it be in North Dakota, where we now have fifteen, or whether it be in the ghetto area in downtown Denver, where we now have seventy-six. Every child should have the experience of an exchange variety in an environment different from the one in which he grew up.

Finally, every pupil should be given the opportunity to aid in teaching, to learn the dignity of a profession that needs all the dignity it can now muster. Therefore, four hundred students this year are being given teaching experiences in our lower and middle schools.

These ideas are relevant to the notion that one should define a program before talking about the building. Thus, if you are talking about paid work, non-paid services, exchange experiences, and practice teaching experiences--all of which will take up 50% of the total kids' time in high school, then this order of priorities is crucial! We are transforming our whole notion of what a school building should be at the secondary level in our district. As a matter of fact, we are now thinking of the whole metropolitan Denver as the primary schoolhouse, and the whole of the nation--indeed the world--as a secondary place of learning for our youngsters. We realize now that only 50% of them will ever remain in Colorado and less than 5% will ever reside in the school district from which they graduate.

### Future Learning Environment

I should now like to estimate what the learning environment will consist of in 2000 A.D., and then I would like to return to the present, recognizing that there is fog between the present and future.

The first location of tomorrow's school will probably be in the shopping center. At least 25% of the child's learning will take place after the mother picks up the bread at the supermarket and moves next door to the learning center (probably an improved Westinghouse learning center prototype such as is now in operation in Albuquerque), a center that says to the mother that if the parents will buy ninety hours of self-instruction in mathematics and social science, then at the end of that time they will guarantee a full year's advancement in these two subject areas. All this for $150 or your money back! Can you imagine the impact franchising will have across the country? Imagine that as the teachers salaries climb, as a result of the first expectation I have discussed, that there will be jobs for many persons in

the future formerly referred to as "teachers" but now called "prescribers", "assessors" and "guiders".

The second center of learning will be in the home. This will evolve after everybody has a second color TV set. The new status symbol will be a new room called "the learning center". Here one will find a computer terminal, which is the next goal after television. At least another 25% of the child's learning will take place in this area.

The third location, mainly because of the experiences that need to be provided in the world itself, will probably be the community. By community, I mean community in its broadest sense. Half of the spaces provided may be warehouses. The other half could be an educational hospital. The warehouse portion will be not unlike that of Bekins. After all, if Bekins can have 80% of its inventory on the road every day, why can't the schools? Why can't the moving classroom be commonplace instead of a novelty? In order to serve this need, there will exist a moving classroom that will back up to dock for refueling and recharging, then they will be out on the town the remainder of the time.

Hospitals will be available for the person that really becomes ill "educationally"; that is, for the person who needs extra attention which may only be provided in such a community setting. It could include a remedial, plus an accelerated kind of program. This may take up most of the current "boxes" since here you can have educational wards similar to medical wards of a type that would service this particular need.

Therefore, as our needs for school buildings double in the next twenty years, we probably can meet them through the other processes that I have suggested, while retaining our present obsolete facilities for "educational hospitals". Some of you may not agree with these forecasts, agreement is not essential. This point is simply that in 2000 A.D. we are going to be far removed from what we now have.

**How Do We Proceed?**

How do we get from the present to what has been envisioned? How do we get to the moon? We put all of our energies together, the medical energy, the mathematical energy, etc.; every bit of energy this nation could muster was centered in Houston and Cape Kennedy. Why don't we do the same thing in education? I, therefore, would recommend that between now and the end of the century, we should build at least four to six "moon" schools so dramatically expensive, so dramatically different, so dramatically ahead of the times that they will capture the imagination of all.

This is where some of the EFL money should go. Not $5,000 or $10,000 grants scattered around the country but a massive effort at getting extensive federal funds in order to spend fifty million dollars each, on four of these schools. Then, in addition to that fifty million dollars a year, we might spend $20,000 per child. If we add it all together, between now and the end of the year it would cost approximately the same amount that we are spending in one week in Viet Nam. It is something very practical if you put it in those terms. Now the other half of the way we get there is to try to improve that which we already have and take some other steps forward. So what you need to do is build some local "moon" schools of less dramatic importance perhaps, but dramatic in terms of Fresno or Cherry Creek.

What should we do during this period of transition, those of us who have to work on schemes of less ambitious proportions than the ones that I have mentioned? What should we do? I don't think anyone knows for certain, but let us take a look at commerce and industry as a possible way of proceeding.

In any industrial development surrounding a community such as Fresno or the Denver Technological Center found in my area, you would see a large box divided by one wall. The office and rest rooms are in the front, the back portion is all open space. Should you ask the developer why he is building this kind of space, he would tell you very frankly that it is to meet the force of competition. The people who will be the leasors in that kind of setting know that they will have to change the insides many, many times in order to survive. This being the case, I would suggest that the only thing we can do is build educational barns so large, so flexible, so lacking in interior definition as to allow for maximum amounts of adjustment as we proceed. It will afford a more realistic environment.

Another feature the new buildings should have is community orientation. One of the first steps I took, after going to Colorado, was to take a 250 acre site on which we had a lower, middle and upper school, and turn it into a community education center.

So here we are, a full cycle from a one room school to a one room school. I am not so sure that we should call these "open spaces" because they are actually "self-contained rooms". If you look at the elementary school design on exhibit from afar, it resembles a double-loaded corridor with four classrooms. We call them "pods" and they house 150 students instead of 25, but are a one room box. It is simply a larger box. It might seem that the important question is whether or not we should have "self-containment" or "open spacing". I don't think this is the question at all. Rather, we should ask: "How big is big? How big should the box be? Should it be a whole school?" I don't think anyone knows the answer to these questions yet, therefore, I think we should experiment with varying sizes.

### Criteria

I think that for purposes of defining 'how big is big', we should set up criteria. The criteria I have set up are these: economy, efficiency, and effectiveness. In terms of economy, I can show that without a shadow of a doubt, it is much more economical to build in modules of other than 900 square feet. In terms of efficiency, I can show you that it is easier to move children into different size groupings in modules larger than twenty-five, particularly if the program is one of individualized instruction. Third, I believe that I can demonstrate the effectiveness of such buildings by pointing out that this is a professional setting where teachers can become better teachers. They exchange ideas, materials, criticisms, and the like, because they are literally forced into an environment that precludes the possibility of their locking themselves away from other teachers and students. Therefore, my criteria (as translated in terms of space) suggest an optimal number of 100 to 150 elementary school children.

## TOMORROW'S SCHOOLS TODAY

We have recently built some new one room schools and have renovated an existing school. In each case we have had three broad considerations to keep in mind: programs; renovation (how do you take an old building and "do something with it"); and, thirdly, the things that go inside. The crucial issue in the next ten years will not be open-space, open space is here. Thirty percent of the schools in America are now being designed as either partially or totally open-space schools. The issue that will be vital is what we put in that space. We have decided to throw away the furniture. We should evaluate what we have put in its place.

### Programs

A school completed in 1965 is today an old school. It is a school that has had rigor mortis for the last three years. The question is: What can the staff do to meet the students' needs more effectively, efficiently and economically? They have felt the school should provide an atmosphere in which the children progress at their own learning rate in each subject, a situation in which each child can experience success. Every student should go home every day happy that he has succeeded in something. Therefore, the child would accomplish the following: 1) a sense of responsibility toward himself and other, 2) he would adjust to a natural social environment, 3) the child would acquire specific skills in important areas, 4) the child would develop skills prerequisite for higher levels of study, and 5) the child will set training goals as often as necessary.

These conditions, the staff of this school felt, were important. They were in a school that would not allow it. These teachers wanted to do individual instruction, regardless of whether or not we supported them in their notion. Therefore, they told us that the school was in their way. What can we do to get it out of their way? They said we want to have an individual contract for every child. We want to teach the value of free enterprise. We believe in free enterprise for business, why not free enterprise for minds? Therefore, this staff must have a contract for every child, every day, in every subject. Consequently, the staff thought we should forget about the library, that the whole school should be a library. Resource materials should not be locked in a room, classified and declassified to the point where no one can get at them. Therefore, every student in this school has twenty books; he has a specific amount of time to use them and pass them on. He is the librarian. Since the school has become the library, the librarians and the rooms can get out of the way.

If the instruction was to be individualized, each student needed individual diagnosis. From this diagnosis an individualized prescription should be drawn and from the prescription a contract should be written, after which teaching takes place. After an appropriate period, an assessment is made. Notice that this is the part of the teaching act that is often forgotten. We have essentially the same task to perform in education as a doctor does. We diagnose, treat, and assess. The difference is that the doctor budgets from eighty to ninety percent of his time on prescription and assessment. On the other hand, we devote ninety percent of our time to

teaching, probably the most limited and unprofessional part of the teaching act. Diagnosis, prescription, program planning and evaluation are the things that truly make teaching professional. Thus, we must reconstruct our entire guide line to make them possible.

**Renovation**

Eastridge School was completed in 1965. Recently we were faced with the need for at least seven more rooms to keep this school from double session. The citizens committee said, "Let's put $150,000 in the budget for an Eastridge addition. That will build about six more classrooms on the basis of $25,000 per classroom, or $1,000 per child.

I told the staff after the bond issue passed 4 to 1 that they had the opportunity to take this money and do anything they wanted.

Therefore, they said, "OK, here is the $150,000 we have. We now have twelve classrooms. The $150,000 will buy six more; that's a total of eighteen classrooms. We now have 300 capacity, six more small rooms will give us 150 more, for a 450 total." That's what a traditional addition would buy. They said, "We don't want to do it that way. We want to take $30,000 and spend it for remodeling the twelve classrooms down to four larger ones, each handling up to 100 students. We want, secondly, to take $90,000 to build a new multi-purpose room. And, thirdly, $30,000 to remodel the present huge multi-purpose room into two more large instructional areas. So, $150,000 but doubling the capacity of the building from 300 to 600.

Thus, with the same amount of money, they did one of two things any way you want to interpret it. They either doubled the capacity or they saved the district $150,000 -- 150 times $1,000 per pupil.

**What Goes Inside**

We have not talked very much yet at this conference about the things you kick with your feet. We think that open space makes furniture largely obsolete. So, back to the drawing boards. We asked the teachers to brain storm and come up with alternatives because they said the rooms are too cluttered, there's too much furniture, too much desk space.

We invited representatives of Gates Rubber and the Samsonite Corporation (also in our school district) to attend the brain storming sessions. We started with the innertube, believe it or not. We went over to a garage and from a hundred-bus operation, we found about twenty old innertubes. We brought the innertubes over and this was the first thing that we used in place of a chair. Can you imagine a kid crawling inside of this innertube? Using one side as a back rest and putting his feet on the other and using a lap board to do whatever he wanted to do? Can you imagine this being his private office or his independent study station? Can you imagine this being the legs of a table that is over the top? Can you imagine them putting five high and crawling inside the place? Can you imagine putting two or three in a different arrangement and building a wall? They've done all of these things and many more. And so, that excited the teachers and they said, "Well, if we can do that with an innertube, what in the world can we do with other things?" And so we got people from Gates to design what is now called the pneumatic worm. An extended tube, an innertube that doesn't quit, that doesn't end. It can become a snake, a reading circle, a plaything, something to write on, something to straddle, just about anything you would like it to be. A standard basis of issue now for all of our big spaces is four innertubes and six pneumatic worms per 100 students.

Then we went to Samsonite, makers of LEGGO, and said, "What can you do for us?" And LEGGO said, "Let's bring in the kids and watch them build with our LEGGO's first." And so we invited six kids and asked them to build something with the LEGGO toys. They built for us the prototype of what is now the adult LEGGO. The LEGGO can be built in any size. These are one foot square in varying lengths; one, two, four, eight, and ten feet. They are walls, they are projection areas, they are a corner of a house, they are walls around the television set, they make a reading circle, etc. They make an excellent log, if you want to call it that. A 20th century teaching log. These are now in operation and we issue eight of them per 100 students. We formed a company, hired a cabinet maker, and he is now building these in conjunction with Samsonite.

The moving station provides a chalkboard on one side, a bulletin board on the other, and a very handy tool when you want some kind of visual screen. Drop leafs on each side can be lowered when not needed.

Probably the most popular and most versatile alternative that we have is the picnic basket. The picnic basket is the tote tray with cover and legs. We took conventional $2.00 tote trays, drilled holes in either side and put handles on them, which, when inverted, become legs. Every kid has a tote tray which replaces his desk. The removable lap board, which is the cover of the tote tray, is hardboard on one side, chalkboard on the other. The tote trays are stored in stacks in the corner of the room.

Stadium seats became an inexpensive alternate to chairs. The teachers aid they needed something for the students to sit on until the LEGGO's could be completed. It was fall and the football season was at it's height. Some parents said, "Why not use our stadium seats?" And so, the stadium seats are now standard issue.

To replace conventional classroom furniture, we developed a basis of issue for a unit size of 100-150 students. Six innertubes, four pneumatic worms, eight adult LEGGO's, three moving stations, twenty stadium seats, twenty-two cushions, one hundred-fifty picnic baskets, one tape recorder, and one shopping cart.

## CHALLENGE

We invite you to consider this then as the final point: During the past ten years we have spent most of our time talking about building open space, but really we have been re-defining the size of the self contained box. I say that for efficiency, economy and effectiveness, the box should house at least 100-150 kids instead of 25. Finally, I'm saying the hinterland of the next ten years will not be open space--that's here! The challenge for the next ten years will be what we put inside of it. Remembering always that we have restless, teacher, student and adult communities whose rising expectations are going to require a type of educational revolution that we can hardly imagine.

Thank you very much.

# "Innovative Planning Under State Aid Formula"

**WILLIAM J. WYNN**

Mr. William J. Wynn
Bureau of School Planning
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My work for the past ten years has been planning schools over a large section of California, extending northward from Sacramento to the Oregon border. Space has always been the first consideration of planners and, since I have been in this business, its conservation and allocation have been near the top of the list of the most critical decisions you have to make.

The conventional plans, with which you are acquainted, were the vogue at the time the State school program was originally conceived. There have been no modifications of the space allocations in the twenty years since, thus, people who like to build something resembling contemporary schools are still required to use space allocations made in 1947. About 20% of the schools in those days was devoted to circulation. A good deal more is now being done in exactly the same space through the application of considerably more advanced planning skills. One of the problems with this is, of course, the cost. The reason that buildings cost more is the educational space in a contemporary building is much more sophisticated. You have excellent lighting, more expensive ventilation equipment, improved cabinet work, and more functional floor and wall coverings to mention only a few of the better investments.

We feel that we can help secondary school planners validate the need for space in the school by surveys of classroom loadings and of the adequacies of existing space. We now have the instruments available. The rudimentary form looks backward at the kind of schools that you may have had in the past. Now we have at our disposal more sophisticated forms which might assist you in planning for emerging individualized programs or whatever schedules might be a part of your secondary program for the future.

If I were to go back ten years to when I was last superintendent and in planning situations such as this, with the information I now have available, I would not even build a one room addition to a school unless it had the elements of a "construction system" in it.

I would like to discuss new school buildings that are built utilizing "construction systems" and what this means. What is a system? To our office, a system means an integration of structure, lighting, heating, ventilating and the space partitioning and often a multiplicity of other known facilities. The integration is carried out in such a way as to make the building adaptable, with relative ease and economy, to any program. The changing spatial requirements will be dictated by varying educational programs and facilities.

One example of the systems approach is the Ferguson Elementary School in Southern California in a typical School District. It is a concrete system essentially, where all of the modules are established in the space divisions on the ceiling, and thereby carried into the other elements of the structure. It determines where the doors, the electrical outlets, the plumbing and the ventilation are to be situated. All of the interior walls are tied into the modules and offer a reasonable opportunity to be relocated without any major expenditure that would cripple the district economically. This was a concrete system built on the State Building Aid Program.

Another case in Gilroy had a very crude but effective steel system applied by an architect to meet their requirements. Systems vary, but each makes a particular contribution. Now, if I would not build a one room addition to a school without considering a systems approach, you owe it to yourself and to your community

to explore seriously this type of concept if you are going to spend something like 27 million or 30 million dollars for buildings in the Fresno area in the near future. I think you might well find that it would be a way to stretch those dollars.

Let us consider some of the human factors in schools. Very few people, with the exception of some anthropologists, recall the implications of squeezing man into too small a space. The allocations provided by the California School Building Aid Program of 55 feet for elementary school, 75 feet per child in middle school and 80 to 85 feet in the high school were the result of legislative compromises rather than devised to meet human needs. You will find that the opportunity for boys and girls in a school, such as the one that Dr. Pino talked about, to create their own personal spaces is missing. Some new buildings are seen as revolutionary concepts and, yet, the dominance on the part of the adult and the lack of student purposes remains evident.

Another scholar, the chairman of the Department of Psychology at the University of California at Davis, Bob Sommer, has written a fascinating book called "Personal Space". He tells you some things regarding why people behave the way they do in various spaces. The school is a world created by design on the part of the adult and leaves a great deal to be desired for the child. People like Dr. Sommer tell us that the kind of furniture used in such places is similar to that which we employ where we do not want people to sit too long to drink another cup of coffee. Is it any wonder that sometimes kids are a little reluctant to stay as long as we demand that they do?

We had the experience recently, on one of these weekend workshops, of going into a session on a Friday afternoon and trying to live in such a space as though we were children. There were definite limitations on space, from the standpoint of a child. There was not any space where you could pound a hammer, where you could get rid of sawdust; there were no pieces of clay, no paint mix. There was nothing in this series of classrooms that we visited except an almost obsessive refinement of space for the purposes of teaching.

In our desire to make these schools ultra-contemporary, we have sometimes forgotten their real purpose. Scholars often tell us about exciting schools springing up in the ghettos of perhaps Chicago or New York where people have taken over something like an old auto supply store. They brought in materials, lumber, and paint and created something that was extremely significant under difficult circumstances ... created something which got kids and adults excited about school. You have to have some program to keep kids enthusiastic about school. To accomplish this, it may frequently be necessary for you to change the lining of the school and throw it away because it no longer meets the program requirements. Let us design and plan the school so that we can. Let us take a look at this phenomena of over-sophistication--and the institutional characteristics of the school.

There area lot of things whichengineers,designers, and architects can contribute to schools that will make them function more effectively. One, which we have talked about, is air-conditioning. Another building has the roof designed to reflect the sun; in this way, heat can be kept down. Long overhangs on the side of the building to shelter the windows and walls will also contribute to the control of heat.

It is difficult to close when you have been as excited by some of the presentations given yesterday and today as I have been because I have some strong feelings that what we are doing now, what we are instructing our builders to do, only represents a very brief transitional period in the evolution of educational programs.

I read a recent description of a school that is somebody's dream for the year 2000. Students will go to parkway schools in futuristic buildings. They will wander freely about the lights and the consoles. They will require a quiet dome for meditation. In one of the many recreational areas they will exercise to keep fit. In the discovery tent, they explore science, history, outer-space or dream analysis on their own. Here is where the prognostications converge. Teachers are scarce, but environment is so fascinating and so fully augmented that between the ages of three and ten, children can teach themselves all the basic school subjects. They are led on by the feeling of discovery in an atmosphere free of prejudice or skepticism or schedule. This, someone has said, is what our schools will be like in California thirty years from now--in the year 2000.

Do you think that these buildings we have been looking at in the foyers of this workshop--that are now going through a preliminary, conceptual study stage will accomplish this kind of program for Fresno and Fresno County?

# EVALUATION SUMMARY

1. A total of 104 participants responded to the evaluation questionnaire.
2. Fifty per cent of the respondents thought that Ed Pino's presentation was the most helpful, followed by Robert Finley and James MacConnell. (Harold Gores was inadvertently omitted from the evaluation instrument).
3. Ninety-seven per cent of the respondents thought the symposium did measure up to their expectations.
4. Eighty per cent of the respondents thought that possible solutions to their educational problems were considered by the symposium.
5. Eighty-seven per cent of the respondents rejected the statement, "I didn't learn anything new."
6. Ninety-two per cent of the respondents felt that the material presented was valuable to them.
7. Ninety-two per cent of the respondents rejected the statement, "I could have learned as much by reading a book."
8. Ninety-five per cent of the respondents felt that the speakers knew their subjects well.
9. Ninety-one per cent of the respondents felt that they were stimulated to think objectively about the topics presented.
10. Fifty-nine per cent of the respondents felt that there was very little time for informal conversation.
11. Fifty-eight per cent of the respondents stated that they did not have the opportunity to express their ideas.
12. Ninety-nine per cent of the respondents felt that symposiums of this nature should be offered again.
13. Ninety-two per cent of the respondents rejected the notion that symposiums such as this contribute little change in education.
14. Ninety-four per cent of the respondents felt that the physical facilities at the symposium were adequate.
15. Fifty per cent of the respondents felt that the printed materials handed out at the symposium were adequate.

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