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Mr. W. Frank Blount
President
New American Schools
Development Corporation
1000 Wilson Blvd., Suite 2710
Arlington, VA 22204

Dear Mr. Blount:

The University of the World puts a high priority on the development of a new form of high-tech school for the 21st century. This rates near the top in a set of more than a dozen of such priorities for national and international education. Student learning stations are being developed in several countries and international and research networks are being developed to circle the globe. Though labeled a University, we are much involved in improving education at the K-12 levels as well higher education.

A team under the direction of Dr. Martin Chamberlain and Mr. John P. Reisman has spent much effort in developing this design and we believe it can have a major impact in improving quality and cutting costs of education not only in our country but in the rest of the world.

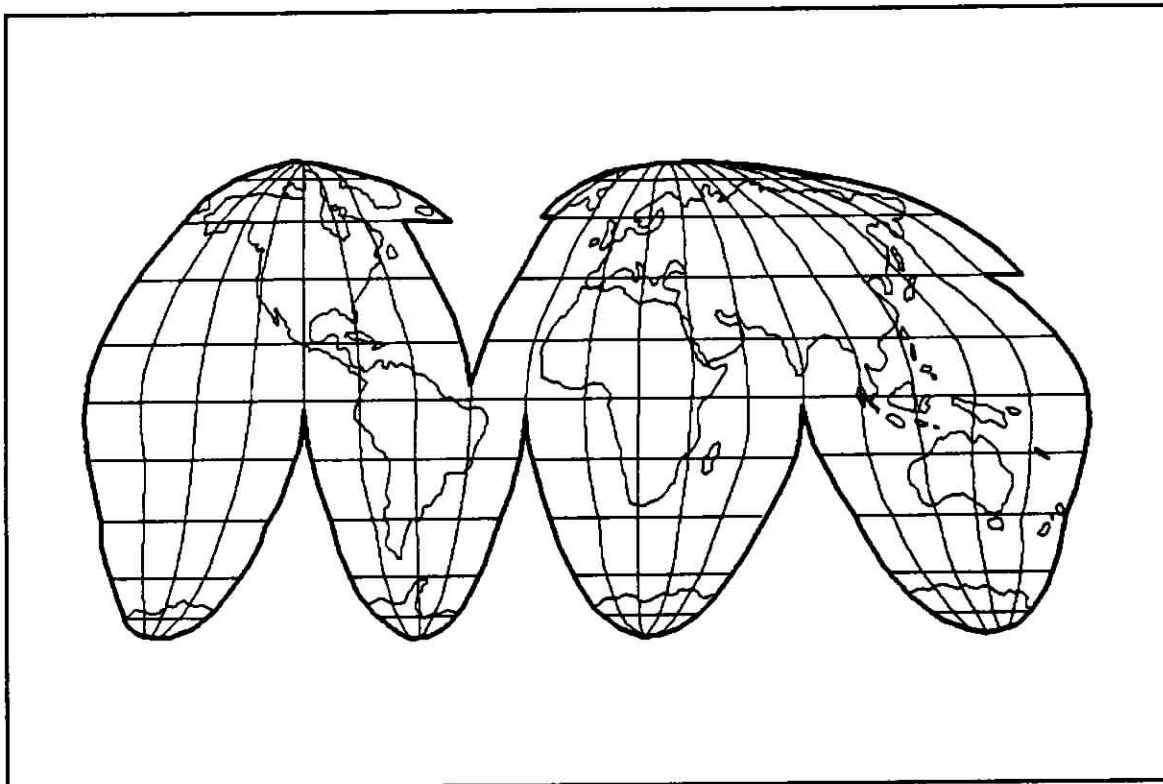
Cordially yours,

James Grier Miller
Chairman of the Board

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SCHOOL 2000
THE LEARNING CENTER



**A Project of the University of the World
developed by a team consisting of:**

**JOHN REISMAN
LOUISE SCHMIDT
AURELIA PROVVEDINI
and MARTIN CHAMBERLAIN**

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**SCHOOL 2000
ABSTRACT**

The School 2000 concept utilizes educational technology, principally computer and video courseware, as the principal means of instruction which enables students to enjoy self paced instruction and which guarantees that each subject will be mastered by all students. Teaching by lecture will be retained for some subject matter but generally the role of the teacher will change. Teachers at School 2000 for the most part will be mentors, facilitators, guides and counselors rather than presenters. The design team believes that these ideas will result in more highly motivated students who will enjoy their school participation more and produce better results.

Many classrooms will be restructured to provide learning stations to fully utilize the opportunity for independent or team learning that the use of technology allows. The administration of School 2000 is greatly improved through the use of a Program Master which controls much of the activity in the school and provides continuous data for use by teachers, administrators, parents and students. There is an effort at School 2000 to involve parents and the surrounding community in activities and decision making at the school.

School 2000 is a project of the University of the World. Its' design team functions as a volunteer group on the staff of the University. The University of the World is dedicated to improving education at all levels and in all parts of the world through networking and exchanges of information, resources and data. It has offices and representatives in 25 countries. It is a non-profit corporation with a 501(3)(c) status from the IRS.

The University of the World is located at: 1055 Torrey Pines Road, Suite 203, La Jolla, CA 92037, Tel: (619) 456-0103, Fax: (619) 456-0197. The agent, and design team member for this project is Martin N. Chamberlain, Ph.D., Executive Vice President. ,

**THE SCHOOL 2000 PROPOSAL
EXECUTIVE SUMMARY**

This proposal, from a project team of the University of the World, suggests that the use of educational technology, principally computer and video courseware, as a primary source of instruction rather than an administrative resource, will make a substantial improvement in the enjoyment, motivation and results for students at all school levels. There are a number of innovative ideas contained in the proposal involving and changing the role of teachers and administrators and re-designing the classrooms or creating complete new schools.

In this new setting students become much more involved in the planning of their own curricula and in the self-paced execution of these study programs. Students study individually or in teams, and for some subject matter, in normal classes. Teachers, parents and administrators are much advantaged by the flow of data about each student made available by the Program Master, the controlling element in the technology assisted school. Much of the world of learning becomes immediately available to the student seated at a learning station with instant communication available to teachers, team members, library material, and through networks, to other schools almost anywhere in the world.

Because the facilities at the school can be utilized 24 hours a day, if desired, they become available to members of the community on a continuing basis and provide opportunity for schools to become community centers where persons of all ages can be beneficially involved.

Administrators and teachers in School 2000 will be concerned with multi-disciplinary learning. While we stress competence in core subjects such as English, mathematics, science, history and geography, and place much emphasis on reading and writing skills, we strive to have these learnings take place in courses that interweave the subject matter. Indeed we hope that students will find the resulting courses sufficiently inviting that they may not realize that they are learning math concepts or geography.

The Program Master will try to make the teachers fully aware of developmental changes in their pupils so that they may be advanced at points of readiness. Classrooms will be full of activities of groups moving through subject matter at different levels. Teachers will have to orchestrate all of these different activities.

The role of most teachers will change from that of a presenter to one of being a mentor to individual students, a counselor, guide or tutor and facilitator. Teachers will have to supervise groups and teams rather than whole classes and be able to manage several things happening at the same time in classrooms or in different areas throughout the school. This will require some re-training of teachers which will be accomplished in several ways--summer workshops, video conferences and computer or video courses which can be undertaken at any time throughout the day or night when both the teachers and facilities are available.

The role of administrators will change also but probably not as drastically. The Program Master computer will provide much data on each student and teacher which will enable administrators to have access to information which had not been available in earlier school systems. Reports will be readily compiled and dispatched. There should be fewer student problems to cope with. Perhaps fewer administrators will be needed.

The source of administrative data is the Program Master, which consists of the main computer database and ancillary equipment. The Program Master serves many purposes but the principal purpose is to supply computer courses to student learning stations from its storage area. Secondary purposes include providing administrative and security data to those who need it. The Program Master can accumulate student records, monitor student progress, locate area video cameras. It can even perform such routine administrative chores as mailing, information processing or telephoning numbers of parents, teachers and students.

In the main computer database/server are stored the course materials for courses used at the school. The multiplicity of programs available in the database enables teachers and curriculum planners to develop course sequences tailored to the needs and interests of individual students. A distribution means for course materials is known as the cache system. Students and/or teachers can order a particular course or program to be made available to the learning station at a specific time. The Program Master, on receiving such a request, will access the main database and load that program into the cache system at a time which it designates. This arrangement can manage multiple orders for the same program.

The Program Master is a computer program utilizing databasing (and

eventually artificial intelligence) techniques to monitor all internal (within the school) and external digital data transference at the electronic school. It has the ability to analyze, sift and sort data, make decisions, delineate tasks and interact with data storage and retrieval systems.

By utilizing simple databasing technology and tracking student progress through time the Program Master can run a series of comparative analysis tests to determine student progress. If a student is noted to be performing out of his/her usual range or the expected range of comprehension and achievement, the computer will report this information to teachers and counselors. The Program Master can monitor and evaluate interaction between students and teachers. Should the computer determine that a particular student has been inadvertently neglected it can notify the teacher so that corrective steps can be taken. The Program Master also will be able to recognize changes in behavioral patterns of individual students and notify teachers and/or counselors of those changes.

For students or teachers the Program Master can be a source of reference material and resources contained in the system which could help in a particular subject area. Other databases could be connected to learning stations--such as the Community Learning Network. It can also provide access to host computers via Internet and similar resources.

The Local Area Network enables student, teacher and administrative communications with each individual having an assigned code and address carried in the Program Master file. The code will allow users to access the system. This access may be recorded in instances where community members use the system and ultimately will be billed for the time spent on the system. Communications outside the school can be restricted by blocking access at any local gateway. This arrangement will require students to obtain permission for example to make long-distance telephone calls.

All of this new technology will dramatically change many aspects of traditional schools. With computer-assisted or video studies students can move along at their own pace. Groupings of students in team projects and seminars will stem from their achievement levels in particular subject areas. But for such activities as physical education eating lunches, and on the playground, students will be involved with their own

age groups. Where possible, School 2000 designers would prefer to have all traditional grade levels (K-12) in one facility where from the onset students can be grouped by achievement. Thus at each level there would be students working at the next higher levels who could be grouped with students doing similar work. Slower learners would be able to receive more individual attention and encouragement so that all students would progress at a faster pace than is normal in the traditional class structure. Also there is an advantage in using older students to tutor and otherwise assist younger students. Learning from peers can be motivating.

There are many evidences in the US and other countries that elements of the School 2000 project are already being used effectively. There are in progress some exciting developments such as the Community Learning Network and the Consortium of School Networking which will dramatically increase the availability of electronic based resources to schools. School 2000 is designed to take full advantage of these developments.

Though the project team has not spent a great deal of time investigating research which deals with elements of our proposal, we have made searches of published research in areas pertinent to the School 2000 concept and cite the references for those concerned. We have been interested in evidences of successful application of our ideas and documentation of these successes.

The project team has strengths in many appropriate areas but none have been actively involved in public schools in this country. We consider this to be an advantage in our thinking and planning, neither of which has been fettered by limitations which a more involved role might bring forth. Yet we have been aware of the need to reality-test our ideas with teachers and administrators currently working in public schools and have altered our ideas as needed to satisfy their criticisms. The project team does have considerable skill in educational administration, research, technological considerations and facilities design.

The Budget is supplied in the requested detail for the first two phases of the NASDC design. The third phase details will emerge during the project's first three years and enable a more specific delineation of expenditures in plenty of time to meet NASDC needs.

The School 2000 project envisions Year I being spent in perfecting the project design, arranging for its' installation with representative school districts, designing a variety of models which school districts could use in modifying their facilities, writing publications encouraging teachers to use educational technology and designing teacher seminars and workshops to acquaint teachers with the new mode of teaching in School 2000 applications. During Year I an effort will be made to identify and judge the quality of educational technology resources presently available and creating a resource catalogue. Year I will be used to set the stage for intensive applications of the School 2000 concept in the following years. The Year I budget is \$351,083. A major expense is creating the software to operate the Program Master.

Year II will be the year in which the concept becomes reality. Initially the project will be developed in remodeled classrooms in a variety of schools with differing student bodies. Agreements to do this will have been negotiated during Year I so that implementation can proceed expeditiously--if Phase II funding is received. Year II budget is \$544,150 and a major element is for construction and renovation of school classrooms.

Year III will see a continuation of the concept in existing schools but will focus on the creation of a new school designed to provide full implementation to the School 2000 concept. Thus the major element of Year III's budget of \$2,375,639 is allocated to constructing and equipping a new school, built to showcase the concept from designs developed during the previous two years.

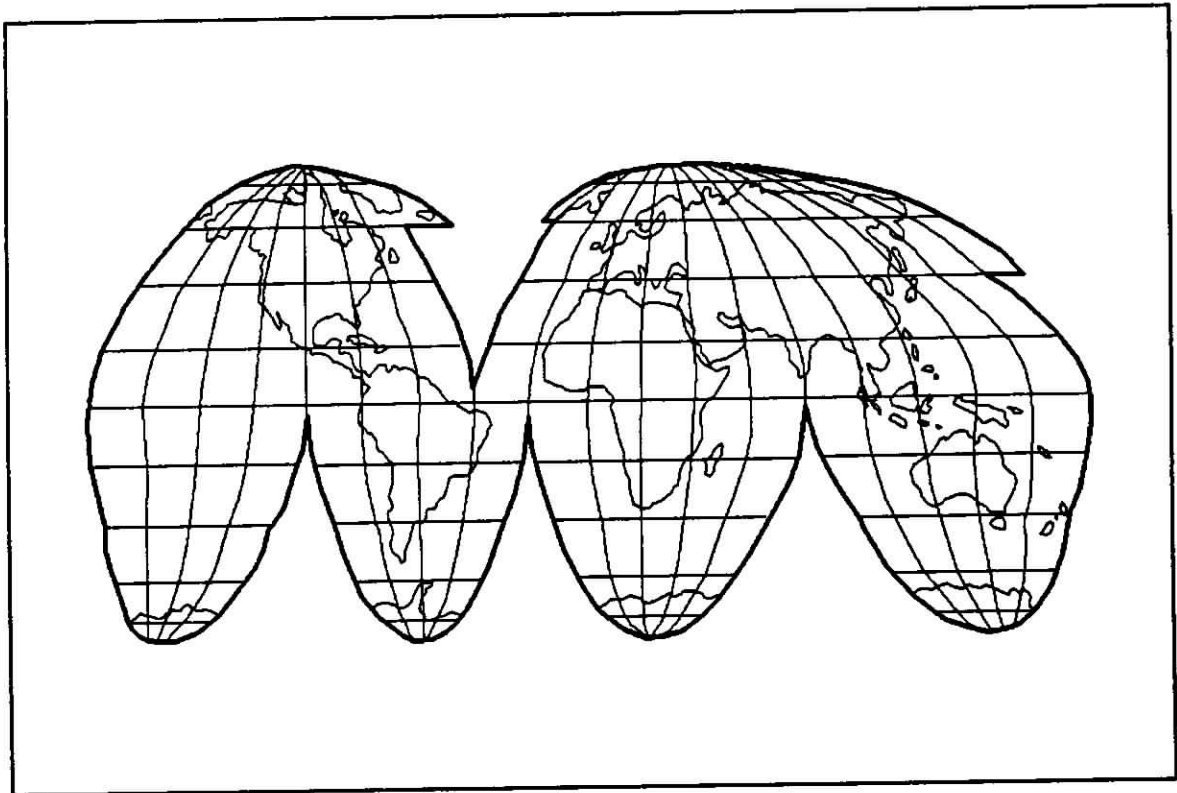
Years four and five will be devoted to publicizing the concept and developing ways of getting it widely implemented throughout the US and abroad. No detailed budget for this phase is provided here as it will evolve during phases I and II.

The contractor for the project is the University of the World, a non-profit corporation located at 1055 Torrey Pines Road, Suite 203 in La Jolla, California 92037, telephone (619) 456-0103, facsimile (619) 456-0197. The person responsible for the project implementation is Martin N. Chamberlain, Executive Vice President.

"Over a period of time, as values change, so will relationships, and, with them, institutions. The challenge that we presently face in adapting to the future is to allow new values to emerge and to modify institutions appropriately."

Jonas Salk

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interact with subject matter in a variety of ways. A learning station is a fully equipped cubicle which provides a student with the electronic hardware that will enable him/her to interact with course materials by computer, video tape or combinations of both. Computer courses, video courses, interactive compact discs will provide both teachers and students with many options in planning curricula and monitoring progress.

As an important bonus the learning stations will provide administrative data which will supply teachers, counselors and administrators with information that will enable them to note student progress and see changes taking place which need review. Problems can be identified and dealt with in incipient stages.

By using modular design in the School 2000, new developments in instructional technology can be incorporated without expensive alteration of learning stations or classrooms. Three dimensional viewing, described as "virtual reality" is seen as an ultimate connection between computers and people and a magnificent teaching tool. Though too expensive now—it ultimately will be adapted for use in electronic schools.

The purpose of the learning station is to enable the student to pursue the learning process independently and in teams which can be put together by criteria set by the teacher. It provides at fingertip all of the equipment needed to utilize a wide variety of available course materials. It also allows the student while at the learning station to communicate by telephone directly with a teacher or counselor and to have questions answered as they arise. Computerized voice-mail and E-mail systems make possible an efficient messaging system. The privacy of this exchange is a boon to students who have been timid about posing questions in a public forum which might cause embarrassment and discouragement.

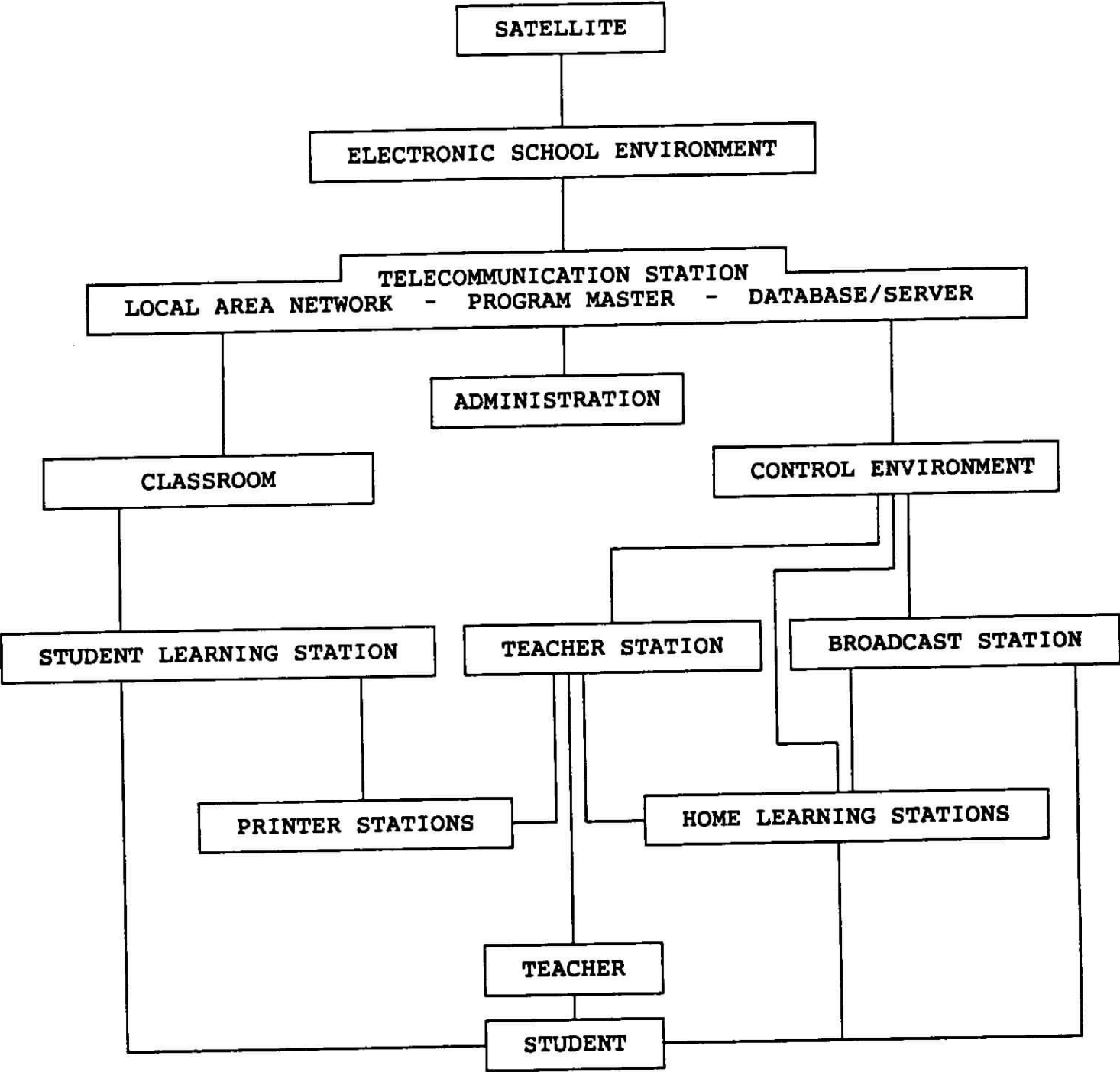
Learning stations can be operated on a twenty-four hour basis which greatly enhances the utility of The Learning Center. If learning at home is utilized along with attendance at an electronic

school, many more students can be served by a single school than is currently possible. All sectors of the population may learn at electronic schools and the endless variety of subject matter makes possible learning at all levels of education at the same location. Thus a grandfather may be in an adjacent learning station to his granddaughter—both pursuing courses appropriate to their stage of development, interest, and ability.

The School 2000 is feasible now. Nothing in the proposed system is currently unavailable. What is required is a School Board and administrators bold enough to see the advantages to the students and teachers, to be aware of the eventual savings in costs of construction, maintenance and operation, and the willingness to be innovative despite possible adverse reaction from parents, teachers, and administrators. The gains in a better educated society certainly outweigh any dislocations which will occur during transition from the outmoded to the state of the art in education.

Back in 1968 George Leonard created the notion of "free" learners. In his book Education and Ecstasy he describes a school not unlike the School 2000. He was ahead of technology when he posited what learning could be like. Perhaps now the first learning center should be called The George B. Leonard School—a school for free learners.

ORGANIZATION CHART OF THE SCHOOL 2000



DESCRIPTION OF THE SCHOOL

School 2000, The Learning Center, looks superficially like a traditional school. They have many areas in common such as classrooms, administrative areas, gymnasium, lunchrooms, library and laboratories. Where the electronic school differs is that it will contain areas filled with individual student cubicles called learning stations. These cubicles are the heart of the electronic school and the place where much of the learning takes place.

The School 2000 could be instituted in any of three ways: 1) it could be incorporated into an existing school; 2) it could be adopted for all schools within a school district or; 3) ideally, it could be erected as a new campus working in conjunction with the schools in the district.

If brought to an existing school or campus one of the buildings (or rooms within a building) would be remodeled or replaced so as to contain the electronic components and learning stations. If adopted by a school district, each school would have a building (or rooms) with electronic equipment and learning stations and the central components installed in one school which would be linked with the others.

The component areas which are unique to the Learning Center, each of which will be described shortly, are: (1) student learning stations, (2) the control environment, (3) the program master system, and (4) the telecommunication system. Other areas are more typical of traditional spaces, for example the gymnasias, may be designed in such a way as to allow the use of the structure to be utilized for a variety of purposes including sports, drama, and the arts i.e. choir, painting, and sculpting, as well as an auditorium for large formal and informal gatherings.

To fully achieve the potential for the Learning Center, however, this group believes that it should be a separate structure or campus of several structures providing educational services to students from K through 12, as presently organized.

Present ideas for the Learning Center design suggest a structure of one or two stories with wings projecting out from a central hub. Each of these wings would contain what in traditional concepts would be a separate school, namely kindergarten and elementary, junior and senior high schools.

The hub or central core of the system would contain administrative areas, teacher stations, broadcast stations, the program master system and communication center. The Learning Center cafeteria might be located on top of the building with landscaped areas attractive for outdoor eating and socializing.

Each wing would contain learning station areas, classrooms, laboratories, studios and a library. The library would provide both printed and electronic books. The gymnasias could be placed centrally or peripherally. A basement under the central core could contain a recycling center, a garage and maintenance facilities.

STUDENT LEARNING STATIONS

Learning station areas will contain a large number of individual cubicles containing the necessary equipment to enable the student assigned there to work productively. Such stations are designed to retain privacy while allowing visibility within the learning station areas. Each station will have a twelve inch partition surrounding the work space which will contain a video/computer monitor, keyboard, communications headset, and controlling device such as a "mouse". Other equipment might include a compact disc drive, a laser light pen, a graphics pad, electronic books and an intercom headset.

In the learning station area will be several large screen video monitors placed in ways that all students in their cubicles will be able to see at least one of these. These screens can contain administrative messages for all students, lectures of general interest, teleconferences and special events. Also, strategically placed in these areas are video cameras which provide teachers with the ability to visually link with the student allowing for a more personal interaction. The teacher will also have a camera so that the student will be able to see the teacher on screen.

Several areas in the large learning station space will be designated as Student Aid Stations where students can go for technical or academic counseling and administrative purposes. These areas will also contain computer printers, xerox machines and other aids for students and teachers.

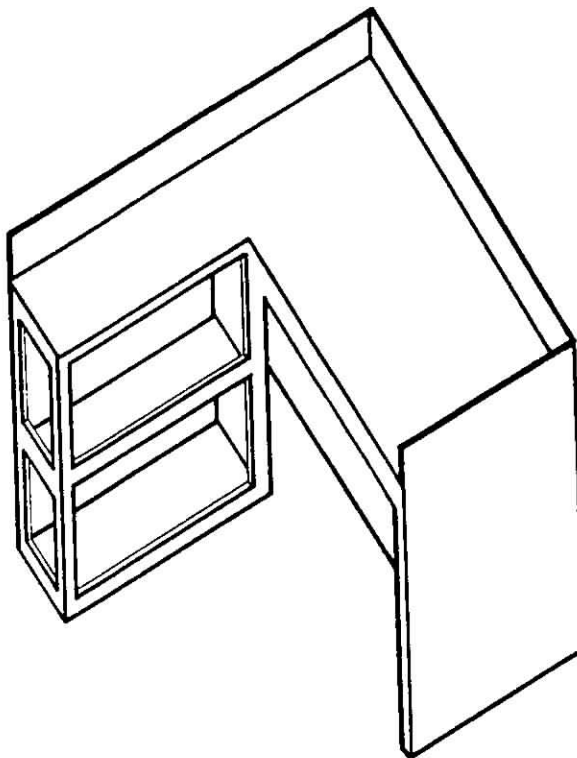
Students will be able to suspend current work and participate in a lecture or other activity intended for all or many students that comes over the computer monitor at a scheduled time. When finished, students will be able to resume their earlier work as they will have "stayed resident" on their computers.

A student with problems or questions can type a question to a teacher. If the teacher is immediately available his/her image can be made to appear on a video window on the student's screen. The student can talk directly with the teacher, otherwise the teacher can respond when convenient and the response will be stored in the student's computer or student file. The student at his/her option can also contact the teacher in the Student Aid Station.

By allowing the student a variety of choices with regard to how he or she interacts with a teacher and subject matter, the student may be more likely to feel in control of his/her own education. Also, by eliminating the pressure of having to raise one's hand in class, students will be more likely to interact with their teachers when questions arise.

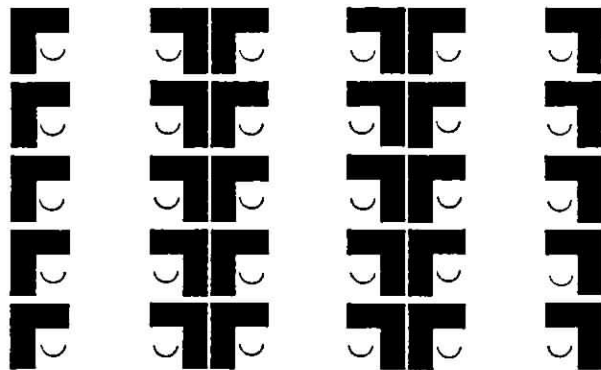
Students may log-on at any learning station. The Program Master provides each student with a file, stored on the Mainframe, which will have limited security. These files allow students to store their projects and work for later access. Student files could be limited by security devices such as passwords, numbers or fingerprint identification.

The ratio of students to learning stations might be one station for three students up to age 11 and two students per learning station beyond that age. For the younger students the dimensions of the stations would be smaller and the tables lower. Adjustable chairs would enable each student to be comfortable at each learning station.

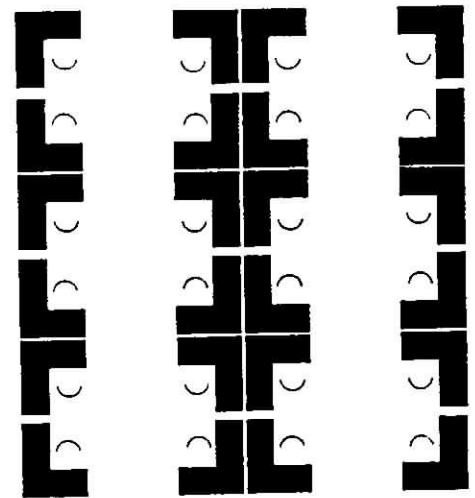


The learning stations are modular units. Each station has a generous working area which allows for the computer equipment as well as for the student's notes. On the side of the desk a smaller space allows for notebooks and tools. Two shelves enable the students to store their extra books, bags and personal items. Each station is finished with laminate of different colors, such as red,

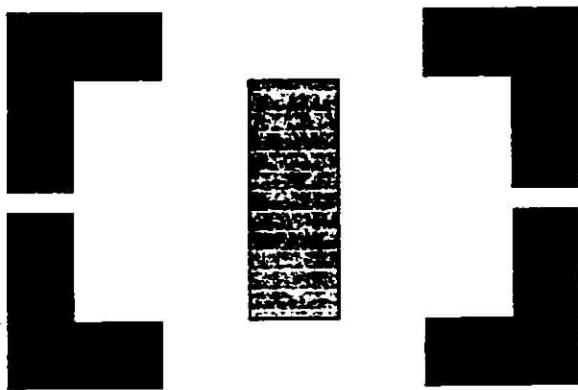
blue, yellow and green. This feature makes them more personal, easy to maintain and gives the school a cheerful atmosphere. The learning stations can be grouped in various arrangements to fit each particular teaching situation. The following diagrams show some examples of possible arrangements:



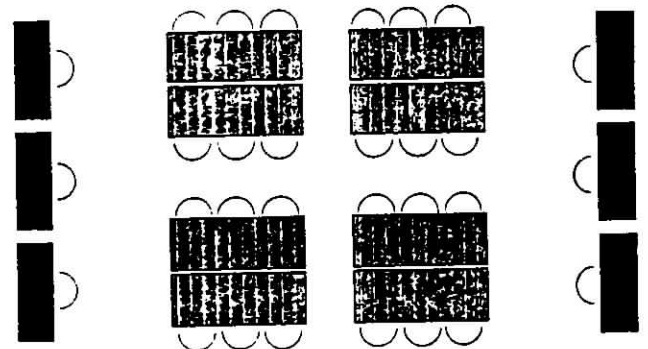
A THE STUDENTS ARE FACING A SCREEN OR THE TEACHER FOR A LECTURE.



B THE STUDENTS ARE FACING INWARD FOR ADDED CONCENTRATION; THE TEACHER CAN WALK THE ISLE AND ADDRESS EACH STUDENT INDIVIDUALLY.



C A STUDY GROUP HAS FOUR LEARNING STATIONS AND A CONFERENCE TABLE FOR DISCUSSIONS; THIS ARRANGEMENT SERVES A TEAM OF MORE THAN FOUR STUDENTS, SINCE THE COMPUTER EQUIPMENT CAN BE USED IN TURN.



D FOR YOUNGER STUDENTS, THE CONFERENCE TABLES ARE PLACED IN THE CENTER OF THE CLASSROOM; THE LEARNING DESKS ARE PLACED AT THE PERIPHERY AND THE STUDENTS TAKE TURN IN USING THEM.