DOCUMENT RESUME

ED 319 399 IR 014 427

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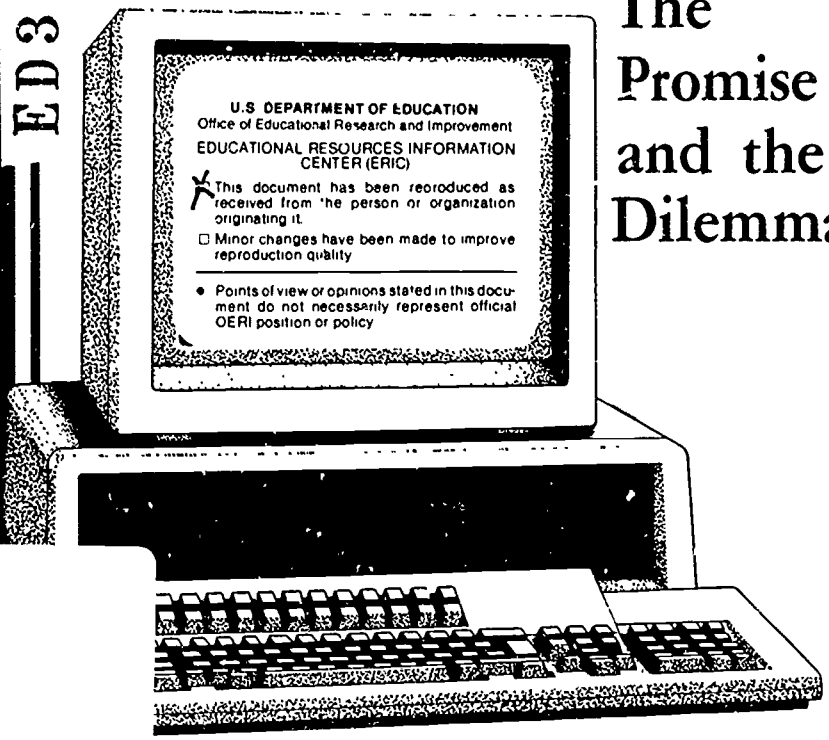
TITLE The New Information Technology and the Education of Hispanics. The Promise and the Dilemma. Policy Pamphlet Series No. 1.
INSTITUTION Tomas Rivera Center, Claremont, CA.
PUB DATE 86
NOTE 40p.; Includes a summary of the proceedings of a seminar, "The New Information Technology: The Promise and the Dilemma" (Claremont, CA, June 20-21, 1986).
PUB TYPE Collected Works - Conference Proceedings (021) -- Information Analyses (070) -- Viewpoints (120)

EDRS PRICE MF01 Plus Postage. PC Not Available from EDRS.
DESCRIPTORS *Access to Education; Bilingual Education; Computer Assisted Instruction; *Cultural Differences; Elementary Secondary Education; Equal Education; Financial Support; *Hispanic Americans; *Information Technology; Language of Instruction; *Policy Formation; School Community Relationship; *Teacher Education

ABSTRACT

Intended as a tool to help bring the issue of technology and the education of Hispanic Americans to a practical and positive resolution, this pamphlet is divided into four sections. The first provides background information on and a summary of the proceedings of a one and one-half day seminar held in June 1986. The second section contains discussions of seven facts about and seven findings of research on educational technology and Hispanic Americans, including the role of technology in the schools; teacher preparedness for technology use and multicultural education; the need for equitable funding of educational technology programs for all groups; the danger of focusing on remediation rather than on high achievement; and the importance to Hispanic Americans of bilingual education, school-community linkages, and increased functional and physical access to computers. These discussions lay the groundwork for the third section, which contains suggested policy statements for use in establishing school or organizational policy as well as for use in publications and in meetings. These statements correspond to the following areas: (1) language and culture; (2) the community-classroom connection; (3) training of educators; (4) fiscal responsibility; (5) attitudes toward technology; and (6) access to computing. The final section provides the names and addresses of seminar participants and Tomas Rivera Center scholars. (GL)

The New Information Technology and the Education of Hispanics: The Promise and the Dilemma



Policy Pamphlet
Series No. 1

THE TOMÁS RIVERA CENTER
A National Institute for Policy Studies

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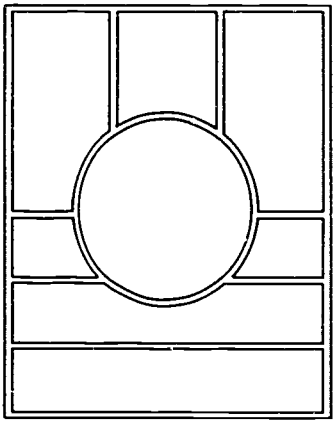

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Prepared by Liza Loop for
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4

THE NEW INFORMATION TECHNOLOGY AND THE EDUCATION OF HISPANICS

The Promise and the Dilemma

The Tomás Rivera Center,
a National Institute for Policy Studies
Claremont, California

The Tomás Rivera Center
710 N. College Avenue
Claremont, California 91711

Printed in The United States of America

6

DEAR READER.

This document addresses educational policymakers. Policymakers serve in many capacities: as legislators, school board members, and as national, state or local administrators. Some are parents who exercise their right to have a say in the conduct of the school attended by their children. Others are influential teachers — those who teach teachers, sit on advisory committees, or develop the classroom programs and curricular materials.

What the policymaker says and does is key. But new or controversial ideas are not always accepted the first time they are expressed. Only after the hard work of enlightening colleagues — by talking quietly in corridors, making speeches, drafting documents, and raising a hand to be counted in the voting — will the policymaker's point of view be translated into action. But it does make a difference.

Will the difference be positive or negative?

This pamphlet alerts educational policymakers to 7 facts and 7 findings that will affect the very nature of society in the United States over the next decade. To be effective, a policymaker needs to know these facts. To be an informed decision-maker, he or she needs to consider these findings. Then a personal decision must be made on how to make that difference. The four sections of this pamphlet give evidence for these facts and findings.

Who calls you to action so strongly? We the scholars of the Tomás Rivera Center. Along with leaders in education and politics with parents and citizens who have studied the issues, we invite you to join us in shaping better schools for all our children.

To assist in this effort, we include suggested policy statements for use in establishing school or organizational policy as well as for use in presentations or in meetings. These statements correspond to the following areas: Language and Culture; The Community-Classroom Connection; Training of Educators; Fiscal Responsibility; Attitudes toward Technology and Access to Computing.

This pamphlet should function as a tool to bring the issue of Technology and the Education of Hispanics to a practical and positive resolution.

FACTS

FACT 1. Technology cannot solve the pedagogical problems of what to teach or how to teach. Technology provides opportunities, but it cannot make "expert" judgments on educational issues. Computers and other electronic devices are a means to transmit the knowledge of master teachers through software. They can carry an educational message but they cannot create one.

FACT 2. The school children of the future will come from more diverse cultural, ethnic, and language backgrounds than ever before in the history of public education in the United States.

FACT 3. Few teachers have been trained to use computers and other electronic educational aids in their teaching of minority and limited English proficient students.

FACT 4. When instruction, including electronic instruction, is delivered in a language a student does not understand that institution cannot be said to have "taught" that student.

FACT 5. Although Hispanic and other minority parents strongly believe that "a good education" is indispensable for their children to succeed they often find the school environment not conducive to the presence or participation of parents.

FACT 6. Access to computers does not solve the problems of instruction. The kind of activities offered to specific groups of students, the type and quality of software, supplementary curricular materials and, most important, the quality of teachers are equally vital to assuring adequate instruction.

FACT 7. Today, there are more computer hardware software, and adequately trained teachers available to schools serving middle and high socioeconomic status children then ever before. But there are considerabley fewer technological resources available to lower SES children. Moreover, when low SES children are exposed to computing, it is likely to be to remedial drill and practice, not to programming or computer tool use provided to higher status students.

FINDINGS

FINDING 1. Educational software must be appropriate for the classroom environment, relevant to the population and non-discriminatory with respect to gender, race or national origin. Teachers must be critically involved in the development of software.

FINDING 2. Cultural diversity is central to the planning and implementation of educational programs. Language, diverse styles of delivering and receiving instruction, motivational strategies and appropriate role models must be taken into account in such processes.

FINDING 3. Better quality of training of teachers is urgently needed both in computing and in serving minority/LEP students. Such training should be provided by colleges and universities, private industry and by school systems.

FINDING 4. Students should have the opportunity to come in sustained contact with gender, racial and ethnic role models in order to incorporate actively into their daily lives what they learn at school about technology.

FINDING 5. Schools can serve as conduits for technological knowledge and skills by bringing expertise from the community into the school and by creating courses and workshops that serve the interests and needs of parents and other citizens.

FINDING 6. Funding for educational technology is frequently inadequate for the task at hand, is all too often allocated by persons who have little or no expertise, and thus fails to benefit the populations for which the funding was intended.

FINDING 7. Remedial, basic-skills instruction, even when computer-based, should not be allowed to substitute for the acquisition of computer skills such as word processing, database management, telecommunications, or programming. Although remedial instruction may be necessary for some students, it may exacerbate a student's low self-image while the independent desire for computing skills is likely to enhance motivation to master basic skills.

"EDUCATIONAL TECHNOLOGY IS NOT HARDWARE: IT IS THE WHOLE SCIENCE OF TEACHING"

Henry Ingle,
Dean, College of Communications
California State University at Chico

CONTENTS

With so much notoriety being focused on drop-outs and on attributing the deficiencies of education to students, it occurs to me that we should instead invest our time and our energy in identifying those educational experiences that challenge youngsters to learn.

M. Beatriz Arias
Department of Education
Stanford University

I

The June 1986 Seminar: The New Information Technology and the Education of Hispanics: the Promise and the Dilemma

On June 20 and 21, 1986, a one and one-half day seminar was held at the Computer Center of the Claremont Graduate School in Claremont, California. At the invitation of The Tomás Rivera Center, university scholars, school personnel and board members, as well as state-level decision-makers met to share information about the use of technology for the education of Hispanic students, and to clarify and give priority to the policy issues that surround its use. The facts, findings, and policy statements in this pamphlet are the direct result of their deliberations.

The seminar was organized by M. Beatriz Arias, Ph.D., Professor of Education at Stanford University School of Education, who has carried out research on patterns of access to computer technology in school districts with largely Hispanic student populations. During the 1985-86 academic year she was on sabbatical from Stanford and served as a Scholar of The Tomás Rivera Center where she worked on issues concerning Hispanics and educational technology. She has recently been appointed the Court Monitor for the San José, California School District Desegregation Order.

According to Prof. Arias' research, national data indicate that Hispanic students are more likely than others to attend school in urban, overcrowded settings with limited resources. National surveys indicate, furthermore, that educational technologies such as computers and telecommunications are disproportionately allocated to wealthier school districts in comparison with their poorer counterparts. These trends suggest that Hispanic students may be excluded from access to educational innovations or reforms which often accompany the "electronic classroom." At the same time, there is growing evidence that computer-assisted or computer-based instruction, the use of telecommunications and of robotics can be academically beneficial to precisely the types of students who suffer the most from unequal access. Prof. Arias has drawn attention to some important questions which informed the development of the seminar. We list a few here:

Are there cultural features associated with adolescents' use of micro computers which are relevant to Hispanic culture?

We must push our youth—our college graduates and prospective leaders—to use newly developed conceptual and knowledge tools not just to help themselves and to further individual career goals but to go beyond that for reasons having to do with notions of equity and social justice.

Tomás A. Arciniega
President
California State University, Bakersfield

Are there gender differences in how Hispanic students interact with the computer?

What structural barriers exist in extending literacy education through computers for Hispanic students?

What are the requirements and prerequisites necessary for Hispanic students to have access to computer literacy courses and other types of computer assisted instruction?

Are there differential types of exposure to computers and related hardware according to educational track?

Can the technology help address the critical teacher undersupply anticipated for 1990?

Prof. Arias designed this seminar on The New Information Technology and the Education of Hispanics to identify the critical

areas in which technological innovation meets and anticipates the schooling needs of Hispanic students.

Seminar participants were asked to examine the knowledge base on this issue and then to formulate questions which needed to be answered. It has been claimed that the largest growing segment of the U.S. student population — Hispanic students — is experiencing systematic exclusion from access to technological innovations in our schools. The principal questions that flowed forth from the discussion were:

- ★ What are these innovations?
- ★ How can we counteract this trend?
- ★ What policy changes will make it possible for Hispanic students to take advantage of computers and other related technologies in order to improve their educational experience?
- ★ How can we ensure that our schools prepare these students to be productive in an increasingly more demanding technological society?

The participants were then requested to add findings from their own work and research to the existing body of knowledge. The seminar discussions resulted in policy recommendations which provided the raw material for this pamphlet.

Seminar Organization and Proceedings

Keynote addresses by *Antonia Stone* of Playing to Win, Inc. in New York City, *Janet Schofield* from the University of Pittsburgh, and *Tomás A. Arciniega*, President of California State University, Bakersfield spoke to the scope and importance of the issue. They were followed by four sections including two panels, one on "Exemplary Projects and Applications," at which *Robert Fullilove* (Professional Development Project, U.C. Berkeley), *Sueanne Gilman-Ponce* (Alhambra HSD Bilingual Programs) and *Paul Resta* (Albuquerque Public Schools) gave stimulating presentations. The second panel, "Teacher Education," included the following speakers: *Leonard Beckum* (City College, New York), *Guillermo López* (California State Department of Education), and *Allison Rossett* (San Diego State University). In addition, the meeting was interspersed with hardware and software demonstrations led by *Estevan Díaz* (Laboratory of Human Cognition, San Diego), *Susan Brooks* (Riverside TEC Center), and *Richard Wenn* (EPIE Institute) in the areas of bilingual software, robotics and the Educational Software Selector (TESS). The conferees

then came together in small groups for a structured discussion of the issues with the following as leaders: *Henry Ingle* (Dean, California State University, Chico), *Richard Duran* (University of California, Santa Barbara), *Bobby Goodson* (Bobby Goodson & Associates), *Judith Hubner* (Director, Computers in Schools Project), *Mary Poplin* (Director, Factors in Education, Claremont Graduate School), and *Teresa Delgado* (Director, Title VII Programs, East Whittier City School District). The meeting ended with a forum in which the issues identified by the groups were summarized and discussed. *Esteban Soriano* (Director of Development, University of California, Riverside) moderated the debate.

The conference was organized in order to promote discussion after each panel presentation and during small group sessions held in the afternoon. Group leaders were urged to focus the discussions around three major themes: innovative pedagogy, equitable access to tehnology, and teacher training.

Within pedagogy, issues concerning telecommunications and networking, robotics, computer tool use, and bilingual software were explored. Equitable access policy matters included hardware and software allocations, computer lab versus classroom arrangements, scheduling and prerequisites for access. The discussion on teacher education covered what teachers should know about technology, computer literacy as a requirement for certification, how technology can be used in teacher preparation, how teacher productivity can be enhanced by technology and whether these will affect the teacher shortage.

A synthesis of seminar facts and findings was put together during the closing plenary session. Each small group leader reported the results of the group deliberations as a basis for policy recommendations which could be supported by the seminar as a whole.

The facts, findings and policy statements provided in this pamphlet were compiled from verbatim transcripts of the seminar, from notes generated by the small groups and from papers submitted by seminar participants.

II
Discussion of the Facts

FACT 1: TECHNOLOGY

We must learn to differentiate between educational technology as "the science of teaching" and educational technology as a collection of computers, videodiscs, robots, tape players, headphones, and the like.

This lesson is being learned, sometimes painfully, in school districts throughout the United States where expensive equipment fails to produce the expected educational outcomes. Positive lessons are also being learned, however. Seminar panelist, Sueanne Gilman-Ponce, Director of the Alhambra, California High School District Bilingual Supplement notes, "Having started the program thinking that we could use computers to teach English we have now come, I feel, full circle and realize that the best teachers of English are teachers in their human form, and that computers need to be used to facilitate learning."

This comment was reinforced by Paul Resta of the Albuquerque Public Schools who observed, "...the students we had using the problem-solving simulation software did better in reading comprehension than in the tradiational CAI reading comprehension programs. Plus, they were a lot more excited, a lot more enthusiastic about the program and they also did better on measures of problem-solving as well."

FACT 2: DEMOGRAPHICS

The majority of Hispanic students now attend urban schools that are under-financed, poorly equipped, and overcrowded. In these school settings, Hispanic children are often unchallenged and attrition rates are high. Furthermore, the equipment available to these students is often antiquated.

Due to immigration from Latin America and to higher birth rates among Latinos, as compared to the larger population, an increasing proportion of our school-age and young adult population will be of Hispanic origin.

The impact of the changing composition of the schools will arrive at time when there will not be enough teachers who have the cultural or

technological sophistication to meet the special needs of minority children.

FACT 3: PREPARED TEACHERS

Few of today's teachers are prepared to meet the dual challenge of working with technological aids and of teaching classes comprised of students of a mixture of cultural and language backgrounds.

The high dropout rate for Hispanic students attests to the current inability of schools to motivate these children. Seminar participants who had actually observed the events in schools reported that the question of access to computers is tied very closely to the question of teacher education because teachers make access decisions.

When required to integrate computing into the curriculum, the unprepared teacher is likely to be unaware of the whole range of hardware and software available or the consequences of differing pedagogical approaches. Such teachers often unintentionally discriminate against Hispanic children by offering only remedial work at the computer They conceptualize these technologies in narrow classroom roles and functions limited to drill and practice instructional modes They are untrained in, and therefore not oriented toward, the implementation of many appropriate curricular strategies such as networking, management, data bases or information transfer and exchange

It turned out there's no real problem in terms of class differences or language differences when you organize the environment to support bilingualism.

Esteban Díaz
Laboratory of Comparative Human Cognition

18

FACT 4: BILINGUALISM

A student's level of proficiency in English is not a satisfactory measure of a student's level of literacy, cognitive capacity, speed of learning, or ability to benefit from appropriate electronic learning tools.

Nevertheless, non-remedial, bilingual classes that use such tools are rare and leave the majority of Hispanic students "untaught" in computing. Janet Schofield, of the Learning Research Development Center at the University of Pittsburgh, identified the problem when she said, "for students who have less than complete facility with English, the task of learning to use computers is doubly difficult given the paucity of bilingual or Spanish-based software, computer manuals and the like. the idea of attempting to learn to use software, to learn a new, and for many people, rather mystifying or anxiety-provoking technology in a second language is sufficiently daunting to be a major block to functional access (to computers) even where physical access isn't a problem."

In contrast, the facts offered by Esteban Díaz from the Laboratory of Comparative Human Cognition at San Diego State University indicate a solution He states, "it turned out there's no real problem in terms of class differences or language differences when you organize the environment to support bilingualism."

FACT 5: COMMUNITY

Several factors combine to increase the likelihood that relations between Hispanic homes and schools will be distant

Schools can be and frequently are intimidating to parents. Family responsibilities placed on Hispanic children often conflict with teachers' expectations for attendance, homework or after-school activities. Both teachers and peers may put pressure on students to adopt values that conflict with parental values This leads parents to try to *protect* their children from the influence of the school. Language barriers serve to ensure that little or no contact takes place between parent and teacher Explicit and implicit discrimination discourages the child from staying in school.

At the same time, Hispanic parents know that there is a strong correlation between success in school and success in the greater economic

community. And they expect the school to provide what is not available at home

FACT 6: FUNCTIONAL ACCESS

The mere presence of computers in a school does not guarantee that all students, or even all groups of students, will actually learn to use them.

Physical access is distinct from functional access or use. According to Mary Poplin, Director of the Factors in Education Project at the Claremont Graduate School, "... Hispanics, both male and female, tend to follow the same pattern that women do. Although they have equal aptitude for computer work, they have much less interest in computer work, much less experience and much less achievement in computer work."

Unless teachers, administrators, and counselors take action to modify the patterns of functional access to computing already established in schools the gap between the computer haves and have-nots will continue to widen.

FACT 7: PHYSICAL ACCESS

Significant differences, in both the quantity of hardware and the academic quality of courses using that hardware, emerge when schools serving higher socioeconomic status communities are compared with schools serving lower SES communities.

Robert Fullilove, Director of the Professional Development Programs at U.C. Berkeley, reports on the nature of courses offered. "In minority schools computers are used to build up their skills, most particularly in mathematics. (by contrast) in lower socioeconomic, white, working-class schools ... computers were targeted for the high ability groups ... kids were being given extensive and intensive exposure to the use of computers in schools, everything from programming knowledge to a general orientation to how computers are being used in the work force."

Research by M. Beatriz Arias documents two barriers to access, the higher rate of students per computer in predominantly Hispanic high schools and the pervasiveness of prerequisite course requirements for entering elective computer courses.

Discussion of the Findings

FINDING 1: EDUCATIONAL SOFTWARE DEVELOPMENT

All participants at the seminar agreed on the need for more coordination between groups who create and adapt software for Hispanic students and teachers trying to use that software in the classroom.

Most software can be assigned to one of nine categories drill and practice, simulation, games, tutorial, problem presentation, computer managed instruction, teacher aids, programming languages and information processing applications

Although some remedial drill and practice software is currently available, its quality and appropriateness varies widely. The same is true for simulations, games, and tutorials with the added problem that the teacher may be hard pressed to find any connection between the activity supported by the software and the concepts he or she is trying to teach

Cultural and sexual stereotyping is most likely to occur in these categories Both drill-and-practice and games often set up competitive scenarios with scoring and time-keeping as well as publicly-proclaimed winners.

Tutorial software that employs advanced artificial intelligence techniques was reported to be under development but sentiment concerning its realistic availability was mixed.

Problem presentation software, often called problem-solving software, presents a problem, puzzle, or situation which calls for creative and/or logical thinking from one or more students. This software has been used with success with all types of students However, if the student cannot solve the problem, the software sometimes gives only small hints about solutions leaving most of the active teaching to be supplied by peers or the teacher So far, problem presentation software is concentrated in the areas of math/logic and social studies. Creative development in language, literature, and the arts is sorely needed

Computer-managed instruction provides diagnosis of individual instructional needs and prescription of appropriate lessons The lessons may be on the computer, in textbooks or some other medium such as film or videotape All computer-based testing would fall into this category. Some seminar participants expressed confidence that

such software would enable teachers to pay more attention to individual difference in learners, while others were concerned that students should not be dictated to by machine.

Gradebook and word processing programs are examples of teacher aid programs. They are intended to relieve the teacher from some of the tiresome paperwork and, on occasion, they succeed.

Most programming languages and data-processing applications such as spread sheets and word processors were originally designed to make life easier and more productive for adults. They can be equally beneficial for older children. Simplified versions such as FREDwriter (available in Spanish as well as English) are now available for younger children and older beginners.

In addition, participants acknowledged that it takes considerable skill on the part of teachers to use even good software well in the classroom, thus reemphasizing the importance of adequate teacher preparation.

Although the exact nature of teacher-developer collaboration was not specified, participants expressed the hope that better software would permit more students to benefit from the skill of the master teachers who develop it.

FINDING 2: CULTURAL FIT

Electronic media are just as susceptible to cultural blunders as is the older technology of textbooks.

When teachers work with games, simulations, and programming problems to stimulate higher order problem solving skills culture-specific as well as personal learning styles must be considered.

Students from traditional backgrounds may benefit more from highly-structured, teacher-led lessons than from a "discovery" approach. Such students may shy away from competition with their peers or from demonstrating higher levels of competency than their teachers. Software that promotes cooperative learning in a non-violent atmosphere may be needed and, most obviously, attention must be given to the ethnicity of heroes, heroines and villains in thematic material.

The bilingual issue is crucial. Seminar participants felt that heavily text-oriented computer programs which are often encountered in computer-assisted instruction should be available in Spanish language versions. Computer applications software such as word processors, and data base managers do not necessarily require translation *IF* manuals and instruction sheets are available in the students' primary language. Verbal instruction by teachers or peer tutors must also be available in the primary language for LEP students.

Even if all software and print materials were made culturally sensitive, minority students still will need contact with teachers and members of the community from their own ethnic background to serve as role models for the behaviors and aspirations being promoted by the school.

FINDING 3: TEACHER TRAINING

Teacher training in the use of technology with Hispanic and minority students is rudimentary, where it exists at all.

There are programs in many states similar to the Teacher Education and Computer Centers in California that provide in-service training in computing.

Yet, teachers who have completed such programs are often not computer trained themselves and do not usually specialize in bilingual or minority education.

Guillermo López of the California Department of Education, Office of Special Projects observed that "we have not seen fit to provide in the guidelines that direct the organization of those TEC Centers...in-service training, either in language acquisition or special adaptation of technology and hardware to the teachers that work with language minority students."

López also mentioned a document being prepared by the California State University system on what the future teacher will look like. He says, "that document makes little reference to the need to train our future teachers in our State in the delivery of the technology that we're talking about... the present mind-set of the current teaching cadre in our State is not really sensitive to the growing number of minority populations and their needs" Successful teacher training programs do exist. A good example is the California Title VII – funded Bilingual

Instructional Technology Program at San Diego State University. But there are not enough to meet the needs of the growing numbers of Hispanic children

Concern over current demographic trends surfaced often and two recommendations resulted from the discussion: raise general public awareness about the problem, and enlist more well-prepared minority teachers into the schools.

What they found here is that children learn more using computers in co-operative ways than they do in other ways. So, the fact that schools are, after all, about academic achievement shouldn't stand in the way of trying to create uses of technology which are culturally congruent rather than ones which are dysjunctive.

Janet Schofield
Professor of Psychology,
University of Pittsburgh

FINDING 4: GENDER ROLE MODELS

Personal contact with individuals who are "just like me" is indispensable to the minority student who is struggling against those social forces that hold him or her back.

Textbooks have long been criticized for sexism but structural sexism within the school itself must also be countered. Keynoter Janet Schofield, Professor of Psychology at the University of Pittsburgh noted that "all of the people who teach computer science (in the school currently under study) are male and all of the people who teach, essentially, business courses involving word processing are female and I'm sure that's hardly an unusual situation."

Estevan Díaz recounted an experience in one of his programs in which sex differences were strikingly underscored. They found sex differences to influence both student choice of word processing over programming as well as teacher decisions regarding student's progress. His story initiated an intense discussion regarding the assignment of women's roles to some modes of technology (word processing) and male roles to others (programming). Although participants did not agree on whether it was important for Hispanic girls to learn to program, they were united on the influence of role models. The cultural pressures which encourage girls to avoid mastering a broad range of technological tools cannot be overcome by simple appeal to the intellect. Like the psychological barrier posed by the 4-minute mile, exposure to technically-competent minority women is necessary for both male and female children to overcome their prejudices and to permit female students to realize their own human potential.

FINDING 5: COMMUNITY OUTREACH PROJECTS

The importance and success of school-community linkages organized around technology was a major highlight of the seminar.

The community serves the school as both educational client and resource. Community-based organizations close the information gap between community and schools and provide a stronger infrastructure for the teaching of high-tech applications. These linkages create a necessary bond between parents, schools and community organizations themselves.

Computer lending libraries that make software and hardware available to the families of students provide a point of entry for parents to the school and reduce the gap which has begun to develop between those students who have computers at home and those who do not. Neighborhood computer centers such as Playing to Win in New York City or Barrio Logan project in San Diego involve children in non-classroom learning that is not only personally relevant but also translates into classroom skills. Parents and other adults infiltrate these centers even when they are not initially included in the planning. They seek out access to vocational skills that are equally valuable to them and to their children.

One school district in Salinas, California, has outfitted a van with computers and bilingual teachers in order to reach out to families in rural neighborhoods via an after-school and week-end program. As

with other successful projects noted in this pamphlet, community outreach projects combine access to computers and knowledgeable bilingual teachers with a flexible attitude toward curriculum, concern for the relevance of content and respect for cultural values.

FINDING 6: FUNDING

Basic and categorical funds for educational technology must be allocated more carefully to ensure that they actually benefit the populations for whom they were intended.

Current expenditures are often distributed to administrative personnel who lack adequate expertise for succesful use of electronic technology-based projects or purchase of hardware which remains underused because the necessary facilities, personnel, maintenance, software, or supporting curricular materials are excluded.

School governance and planning for the introduction of computers and technology should take into account the costs associated with software, supplementary materials, upkeep and staff time.

In the State of California, for example, there is currently no mechanism with which to evaluate the effectiveness of funds earmarked for hardware, for mentor teachers, or for innovative uses of technology. Since such monies are distributed largely on the basis of proposals written by teachers, seminar participants wondered whether teachers from predominantly minority, low income, or LEP schools were even submitting proposals much less receiving funds.

In order to assure both quality and equality, data must be collected to show who receives money for educational technology and also independent evaluations of funding effectiveness must be made. Those schools and districts which have missed out on their share of equipment and enrichment services must be included. In the event that knowledgeable planners and implementers are not available to these schools, funds for additional training and personnel must be supplied.

FINDING 7: REMEDIATION VS. HIGH ACHIEVEMENT

For too many minority students, remedial tracking is a one-way ticket to boredom, conflict with the school, and eventually to dropping out.

As Robert Fullilove explains, "We worry intensely about the heavy focus on remedial developmental education. We feel, as we look at the progress of our students, that this is a dead-end. You do not convince kids that they are competitive by telling them in the same breath that they don't measure up."

Although, in the foregoing statement, Dr. Fullilove was speaking of high-achieving minority students who participate in his Professional Development Program at U.C. Berkeley, his concept struck a responsive chord among seminar participants. It may be that intensive remedial and English as a Second Language classes do give some students that extra push to perform at grade level. But remedial education also transmits the self-fulfilling message that they are second-rate students at best. This contrasts strongly with the sense of achievement gained by students who master computer-based tools and learn to apply them in their school work and daily lives.

Computing and other technologies offer us the opportunity to reach these students with multilingual, multisensory instruction that is not dependent on their ability to read in English or to do arithmetic rapidly or accurately. We cannot afford to consign our minority students entirely to the ever-patient (but ultimately boring) screens of the remedial computer lab.

Implications for Educational Policy

If Hispanic and other minority students are to receive a high-quality education in the United States, strong, carefully-designed policies must be developed, adopted and CARRIED OUT in our schools. Today, there are policy voids in a number of areas:

- ★ Understanding the linguistic and cultural context within education;
- ★ The building of mutually beneficial relationships between minority families and schools;
- ★ The importance of accomodation by schools to the language and culture of their students;
- ★ Appropriate training for classroom teachers, school administrators and support staff who will serve minority students through the use of electronic tools;
- ★ Fiscal responsibility of the public bodies which allocate expenditures for educational technology and minority programs.

Computers must be seen as a small part of the inventory of electronic tools available to teachers and administrators Policymakers must actively explore the potential of video and telecommunications to improve and extend the services now provided by schools. Classroom teachers and administrators must adapt their methods to take advantage of these tools and thereby increase their personal productivity and flexibility.

In general, policymakers must view the application of recent developments in electronic devices as a means to higher educational goals and not as educational ends in themselves.

Educators must look beyond existing hardware and software to the surrounding learning environment. Attention must be paid to the design and accessibility of the larger physical facilities, to psychological and cultural environments which detemine real patterns of equipment use, and to developing a personnel infrastructure that keeps doors unlocked, machines running, and teachers highly trained and motivated.

As a nation, we are rapidly discarding the notion that education is acquired only during our youth and adopting a commitment to lifelong learning. Such a commitment requires that each school district expand the definition of the population it serves in order to include, not only the neighborhood children of a certain age, but all residents within its service area.

Schools must grapple with new concepts such as *recreational education* and *retooling the adult workforce* in addition to preparing youth to be contributing members of an information society. In the process of reaching out to the wider adult community, schools will connect with Hispanic and other minority parents and thereby enhance the school experience of the children. In the proce of providing technolgical tools for the education of children, schools will establish themselves as an even greater resource for adults.

Changing population pressures are making cultural dominance by any single ethnic group incompatible with a democratic form of governance. Sensitivity to and respect for differing cultural values must be the explicit policy of every school system and the practice of every student and staff member.

Language must be viewed as inseparable from culture. Although the value of proficiency in English for successful participation in the social and economic life of the United States is inarguable, this does not imply that other languages or their speakers are inferior.

Methods of instruction, whether oral, print, or electronic must include the presentation of words in a language that the student understands AT THE TIME OF INSTRUCTION. Methods of instructional delivery and responses expected from students at school must not conflict with the basic behavioral values required of them at home.

Teachers, like students, do not acquire knowledge of new structures, methods, and skills by magic. Teachers must have adequate time and training to become knowledgeable about other cultures and new machines. Like students, teachers must have motivating incentives to change and grow. Motivations may differ, but money, status, and personal satisfaction must not be overlooked.

Although a cascade effect can be achieved by training a few teachers from each site and having them educate their colleagues, there are advantages to organizing administrators and classroom teachers into cooperative learning teams when the goal is to introduce new technologies into a school.

Finally, the principle of cybernetics, of feedback which underlies so many of the advances in modern electronic technology, must be applied to the activities of the legislative and administrative bodies which influence action at the local level. State legislators must be required to ask, "when we allocated funds to teach the children of migrant farm workers saleable skills for computer industries, who actually benefited?" Teacher certification committee members must ask, "would our teaching cohort be stronger if we required minimum competency in a second language of all teachers?" Those setting high school graduation requirements must ask, "will a computer literacy requirement ensure that Hispanic students receive some exposure to valuable skills or will it be just one more push to drop out?"

Policy can be defined as prudence or wisdom in the management of affairs. Current educational policy as it affects educational technology and the Hispanic student is neither prudent nor wise. But we have the knowledge to begin to move in the right direction, to formulate and

implement policy that will guarantee that the fastest growing population in the United States does not continue to be the last to benefit from computers and electronic learning tools.

The use of computers and other electronic technologies will not, in and of itself, solve our educational problems. Rather technology provides tools which, when used by knowledgeable teachers and administrators, can aid in the application of sound solutions.

Liza Loop
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III

Conclusions: Suggested Policy Statements

LANGUAGE AND CULTURE

Education policymakers must:

1. be informed of the current and projected demographic character of the population we serve. We will adjust our staffing to include qualified members of that population in order to ensure that we remain sensitive to its needs and desires. We will be alert to the effectiveness of our methods and modify them if and when they are inappropriate for any segment of our population.

2. accommodate to the cultural diversity of the people we serve. We understand that standards of behavior with respect to sex roles, initiation of independent action, cooperativeness and competitiveness and many other variables differ across ethnic origins Our goal is to promote knowledge of and respect for each student's individual values and through that knowledge to empower each student to find personally satisfying roles within the society of the United States.

3. ensure that language is not a barrier to our services. This implies that English as a Second Language instruction will be available to those who are not yet literate in English and that bilingual instructors will be employed whenever students are not able to benefit from English-only classes. We value fluent bilingualism for all students and whenever possible, will promote mastery of both primary and secondary language speaking, reading and writing.

4. provide our students with same-sex and same-ethnic role models on the school staff and in the community who embody the values and accomplishments promoted by this educational system.

COMMUNITY-CLASSROOM CONNECTION

Education policymakers must:

5. respond to our surrounding community as both resource and client of our school system. Links will be sought between families and the school, between non-school agencies such as public libraries or youth clubs and school, and between private industry and school. We will encourage our students to avail themselves of educational opportunities outside of the school and will create activities that involve parents, other family members, and friends in student learning whenever possible.

6. expand access by the community to school facilities so that these rich resources are used during afternoons, evenings, and weekends.

7. raise public awareness concerning the possibility of and the value of mastering the use of modern technological tools such as computers for those planning to live and work in the contemporary industrialized world.

8. encourage a lifelong commitment to learning among all members of our community and to promote an expanded definition of education which includes recreational and vocational as well as academic orientation.

TRAINING OF EDUCATORS

Education policymakers must:

9. support a team approach to technical training which groups teachers, administrators, and aides together into a cooperative unit. This strategy will ensure that both practical as well as pedagogical issues are confronted within the training milieu resulting in a more coordinated implementation of programs designed around new technologies.

10. emphasize the "personal tool" aspect of technology from the outset of training. Each trainee and each team will become familiar with the administrative, classroom management, instructional management, and instructional delivery potential of computers and other electronic aids. We will emphasize flexibility in the use of such tools and skill in adapting to new hardware and software.

11. train for mastery of, not nodding acquaintance with, electronic educational tools. Adequate time to explore and easy access to equipment and software will be available to all staff who are expected to employ technological devices as personal tools in the office or in the classroom.

12. actively engage in dialogue with training institutions such as state college and university systems to ensure that they offer training in the critical skill areas of technology, language, and culture.

FISCAL RESPONSIBILITY

Education policymakers must:

13. hold legislators accountable for the effective use of public funds which they distribute. Such accounting will include formative and summative evaluations and cost benefit analysis of individual funded projects as well as meta-analysis on state, regional, and national scales.

14. provide feedback to funding agenices in a timely fashion, to

cooperate fully with outside efforts to evaluate our educational technology projects and to engage in honest self-critique in order to gain maximum benefit from each experience in the application of technology to the education of Hispanic and other minority students. To accomplish this, some staff members may require release time to attend seminars or hearings, to prepare written materials, or to meet with legislators and evaluators.

15. encourage our staff to take advantage of the incentive grants available from private, local, state, or federal agencies that support growth and innovation in both educational technology and multicultural areas.

16. participate in the development, evaluation, implementation, and reevaluation of state-level master plans for educational technology.

ATTITUDES TOWARD TECHNOLOGY AND ACCESS TO COMPUTING

Education policymakers must:

17. view the use of electronic technology as a means to achieving greater personal productivity on the part of both students and teachers, not as an end in itself. Before we implement a program employing computers or other electronic technology, we will develop a clear understanding of the educational goals and objectives we expect to achieve through its use and we will explore the potential for achieving these goals through other, perhaps "lower" and more cost-effective, technologies.

18. view access to computing in all its aspects — hardware, software, facilities, infrastructure, trained instruction; to distinguish between physical and functional access; to eradicate systematic exclusion of any group from functional access to computers or other technologies.

19. guard against subordinating the student to the machine in any situation and specifically in cases of computer-based diagnosis and prescription of standardized testing delivered by machine. Our teachers will always be a higher authority than their mechanical aids and students will always have access to human teachers and counselors if students so choose.

20. develop a more robust framework than "access and equity" to apply to technology and Hispanics. We will focus on user characteristics, user needs, attributes of technological environments and settings for technological alternatives and solutions.

21. consider the introduction of computers and technology within the context of a broader policy agenda, issues and policy audiences.

IV

How to Contact Seminar Participants and Tomás Rivera Center Scholars

Each individual associated with the Tomás Rivera Center has made a personal commitment to work for the improvement of educational opportunity for all, but especially for Hispanic youth. They would like to hear from you about your ideas and concerns on the issues raised in this pamphlet. They would like to share their knowledge and expertise with you, to tell you about the work they have been doing, and to help you frame effective policy. Many of them will be available to address your committee or testify at hearings. They urge you to contact them, either directly at the addresses below, or through the Tomás Rivera Center.

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The Tomás Rivera Center is a national institute for policy studies that focuses on issues affecting the quality of life of Mexican Americans and the larger Hispanic population of the United States. The Center is named for and dedicated to the memory of one of its founders, the late Tomás Rivera (1935-1984), distinguished educator, prize winning writer and, at the time of his death, Chancellor of The University of California, Riverside.

After years of planning, the Center began operations in January, 1985 with the support of major grants from the Carnegie Corporation of New York and The Times Mirror foundation. Generous support for the Center and its activities is also provided by the William and Flora Hewlett and The James Irvine Foundations. An independent institution governed by an elected Board of Trustees and an appointed President, The Tomás Rivera Center joins several institutes and centers already affiliated with and housed at the Claremont University Center and Graduate School in Claremont, California.

The Tomás Rivera Center:

- promotes discussion and understanding of vital issues facing Hispanic Americans and the larger American community;
- conducts research on and analysis of social and institutional policies and practices that affect the Chicano/Latino communities of the United States;
- and produces timely, accurate and useful information on the Mexican American and larger Hispanic population of the United States.

The Center's current policy research and analysis agenda addresses those social and institutional policies and practices that determine the quality of education that Chicanos and Latinos receive and that influence their socioeconomic well-being in the United States.