ACHIEVE!

An Update on Student Retention Issues

This newsletter, published periodically as part of the League's student retention study, provides information on various aspects of the dropout problem, legislative issues relating to the crisis, prevention programs, and ways to encourage student retention.

Educational Technology in Texas

The at-risk coordinator at Brownsville Independent School District finds it difficult to set up a remedial reading lab using computer-assisted instruction because she has such a mismatch of equipment. The principal of Langford Elementary School in Austin, on the other hand, wonders why schools do not have fax machines that can easily receive the records of transfer students and prevent any confusion in class assignments. His school already has a state-of-the-art computer lab and his teachers have received three days of technology training as well as computers and phones for each classroom. Schools throughout Texas reflect this inconsistency in the availability and implementation of educational technology. Much is being done, however, to change this.

The number of technological innovations finding their way into classrooms is increasing. At the same time, technology's role in education is becoming more confusing. Some view educational technology as a cure to the problems plaguing the education system, others see it only as a tool to add variety to daily lesson plans. Clearly, it is neither. If educational technology is to have an impact on education, a middle ground must be found. Educational technology is not a panacea to low achievement levels or to high drop-out rates, but it can play a therapeutic role.

Many learning barriers for at-risk students are overcome with the use of computer-based instruction. (See February 1991 *Achieve!*.) Educational technology allows students to master each skill through self-paced learning before a new one is introduced. Most important, the student is given individualized instruction that cannot be obtained in a class with many students.

In addition, the existing mismatch between lecture-based instruction and visual and kinesthetic learning is impeding the achievement of students with alternative learning styles. Interactive videodiscs, integrated learning systems, and educational television are some of the technological innovations that give teachers choices for instructing these students.

Finally, advanced distance learning systems are developing in rural communities to meet spe-

Summary

This *Achieve!* is a summary of the Texas Research League's research on educational technology highlighting Texas' activities to expand the role of technology in its public schools. The report argues that educational technology can play an invaluable role in Texas schools. Texas is clearly at the forefront in its use of educational technology, thanks to substantial efforts by the state, local schools, and the business community.

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cific needs – teacher shortages and additional curricular demands. Although this form of educational technology is not specifically for low-achieving students, it can increase the mobility of students in rural areas. As the workforce becomes highly skilled and population increases slow, more students need to pursue college degrees or additional training. Distance learning systems give students from rural school districts the skills necessary to achieve these goals.

Several impediments, however, are preventing educational technology from having a greater impact on the education system – unequal access, insufficient teacher training, and a lack of research and development. Recent efforts in Texas, however, have concentrated on removing these barriers.

The Long-Range Plan for Technology

In December 1988, Texas established itself as a leader in educational technology when the legislature authorized the development of the *Long-Range Plan for Technology* (LRPT). The LRPT was developed by the State Board of Education, the Texas Education Agency (TEA) and representatives from the Education Service Centers, industry, and the schools to promote the following vision for Texas' education system:

- No student would be denied, by virtue of district sparseness or teacher shortage, course work necessary for employment or higher education.
- Teachers can have both the responsibility and the technical resources to guide the instruction of their students in the most appropriate and efficient ways.
- Performance, not processes, can determine advancement.
- Performance and socioeconomic status need not be related.
- Adults can continually enhance their job and life skills.

Figure One

Long-Range Plan for Technology: Phase One (1988-89 through 1991-92)

Proposed State Actions and Accomplishments

CREATE STATUTE TO ENABLE PLAN
Enabling legislation passed in 71st Legislature.

APPROPRIATE FUNDING
$6.0 million out of $16.6 million initial request appropriated.

ESTABLISH A TECHNOLOGY ALLOTMENT FUND OF $50 PER STUDENT PER YEAR
Fund established. Funding included as a part of the Foundation School Program, not yet appropriated.

REINSTATE SUPPORT FOR EDUCATIONAL T.V.
Not funded.

ESTABLISH STATEWIDE ELECTRONIC INFORMATION TRANSFER SYSTEM
$1.2 million of $3.3 million initial request appropriated. Project begun Feb. 1991.

ESTABLISH R&D CONSORTIUM
$800,000 of initial $1 million request appropriated. Texas Center for Educational Technology opened June 1990.

ESTABLISH 10 DEMONSTRATION PROJECTS
$600,000 of initial $1.5 million request appropriated. Eight programs begun Jan. 1990.

ADOPT COURSEWARE AS TEXTBOOK OPTION
In 1989, electronic textbooks approved as an option to traditional textbooks. First adoption made in November 1990.

EXPAND DISTANCE EDUCATION
Integrated Telecommunications System authorized. Feasibility study completed Sept. 1990. System implementation plan approved Feb. 1991.

ASSIST DISTRICTS WITH ACQUISITION OF EQUIPMENT
Districts' use of automated state contracts initiated in Jan. 1991.

REVISE CURRICULUM RULES TO ALLOW USE OF ELECTRONIC MEDIA
Not yet addressed.

TRAIN TEACHERS AND ADMINISTRATORS TO USE TECHNOLOGY SYSTEMS
Modern Teaching Practices established. Staff development in technology mandated.

ESTABLISH QUALITY, TECHNICAL, FUNCTIONAL, SECURITY, SERVICE, AND OTHER STANDARDS FOR EQUIPMENT, COURSEWARE AND TRAINING
Advisory Committee on Technology Standards authorized, appointed and active.

Source: Texas Education Agency, May 1991.

Phase I of the plan called for specific actions to be taken at the state, regional, and local level. Progress to date at the state level is summarized in Figure One.

Many important projects have been realized through the LRPT. The Texas Center for Educational Technology, the technology equipment allotment fund, the "electronic textbook," and the district survey are four examples.

The Texas Center For Educational Technology

In June 1990, the Texas Center for Educational Technology (TCET) was established at the University of North Texas at Denton with the University of Texas at Austin participating as a second-site collaborator. A report by the U.S. Office of Technology Assessment, *Power On! New Tools for Teaching and Learning,* states that it can take up to 20 years to apply innovative ideas in schools. One of TCET's goals is to overturn this trend and hasten the move of educational technology from the research stage to implementation.

TCET opened 11 research laboratories in September 1990 to explore the efficacy of existing classroom technology, to investigate technologies originally developed for commercial purposes, and to develop new technologies (See Figure Two). For instance, suppose Texas were to face a severe shortage of bilingual teachers for limited-English proficient (LEP) students in the elementary grades. Considering there was a 41% drop between 1982-83 and 1986-87 in the number of initial teaching certificates issued in Texas, this hypothetical situation is actually all too realistic. Nationally, the number of college freshman interested in pursuing teaching careers has dropped from 24% in 1960 to 9% in 1990.

Geoffrey Fletcher, Assistant Commissioner of Technology, feels TCET would be most valuable to Texas' education system in situations which demand the use of the latest educational technology. For instance, the State Board of Education could call upon TCET to develop a means to alleviate teacher shortage problems with the use of educational technology. TCET could then work with their members and technology vendors to develop a program that possibly could be marketed throughout the state or across the nation. In this arrangement, TCET provides the professional and financial resources needed to develop the technology. In turn, Texas' school districts can obtain a cost-efficient technological tool that can be integrated into their instruction. Most important, the education of LEP students would not suffer.

Texas' size and the constant evolution of technology makes it vitally important that TCET's

Figure Two

Topics of Research of the Texas Center for Educational Technology's Eleven Research Laboratories

- Assessment of Student Learning and Cognition
- Student Learning and Special Populations
- Teacher Productivity and Training
- Teacher Retention and Support Networks
- Curriculum and Instruction
- Instructional Design and Evaluation
- Educational Telecommunications and Informatics
- Multimedia and Emerging Delivery Systems
- Design of Computer-Based Instruction
- Student Learning and Physiological Factors
- Development of Hypertext-Based Courseware

Source: The Texas Center for Educational Technology, September 12, 1990. (Pamphlet.)

funding continue if educational technology is going to have an impact on Texas' students and workforce. Its membership dues are an important source of funding. In March 1991, the State Board of Education approved TCET's membership criteria with three goals:

- to encourage private sector participation, both financial and in-kind;
- to ensure active private sector participation in the research activities of the center; and
- to encourage PK-12 and other education community participation in the center.

Membership contributions will range from $100,000 or more for "Sustaining" members to $25 for "Individual" members. Private contributions to TCET in the form of donations of either hardware or software to support operations or research totaled $358,400 in May 1991.

Furthermore, TCET has obtained contracts totalling approximately $400,000. Fifty percent of the services TCET will provide include support for activities such as designing training curricula for the implementation of the Electronic Information Transfer System. Twenty-five percent of the services are to be performed for private industry and 25% for educational entities, including several Texas school districts.

In addition, corporate interest in TCET has grown as partnerships in projects dealing with telecommunications, satellite distance education, integrated learning systems, and videodisc technology have been established. Most important, TCET is also conducting activities specifically designed to involve the public education community in accepting and fostering the use of technology in the classroom:

- **Technology Excellence Contest** - an annual contest will be held to identify and reward Texas teachers who use technology in the best and most effective ways in delivering classroom instruction.
- **Training and Staff Development** - beginning in Summer 1991, summer institutes and workshops will be conducted.
- **Student/Faculty/Guest Lecturer Series** - information on educational technology and results of research projects will be provided at lectures conducted by TCET.
- **Information Dissemination** - publication of newsletters, research reports and videotapes of lectures and seminars will be made available by TCET.

THE ELECTRONIC TEXTBOOK

Approximately 22 states across the nation ask publishers to submit proposals each year for textbooks that can be adopted for particular subjects and grade levels. States are then allowed to spend designated textbook funds only on items that appear on the approved list. Texas' elementary schools will spend approximately $40 million on elementary textbooks and media systems alone during the 1991-92 school year. TEA, however, has now given Texas elementary schools a unique option for science instruction. In addition to two textbooks, an educational technology program which uses videodiscs has been placed on the approved list for elementary physical science instruction.

In November 1990, Texas became the first state in the nation to adopt a videodisc "textbook" and to allow textbook funds to be used for such a purchase. The adopted program, *Windows on Science,* includes a series of six-videodiscs (similar to compact discs used to record music) that will access almost 650,000 moving and still images and 3,000 pages of supplemental workbooks and teacher materials. Preliminary TEA estimates show that approximately 30% of the elementary science teachers in Texas will choose to use this technology in their instruction.

Monies from the technology fund cannot be used to purchase the hardware needed to show students the program. Therefore, if a school district wishes to use *Windows on Science,* it must

already have the equipment or find the money elsewhere to purchase it. The required videodisc player and television can cost an estimated $2,000. However, another program started by the LRPT - the Technology Allotment Fund - can aid school districts that do not have the resources to purchase the equipment.

TECHNOLOGY ALLOTMENT FUND

Perhaps one of the most important aspects of the LRPT, the Technology Allotment Fund, did not receive any appropriations when it was initially established in 1989. Subsequent legislation did provide for funding through the Foundation School Program. The fund will allocate $30 per student per year in 1992 and increase $5 per student each year until 1996 when the allocation will reach $50.

Money from the Fund will be released only to those school districts that have submitted a five-year Technology Plan as specified by the LRPT. Ideally, a school district would not simply divide the Fund among its campuses according to enrollment, but would use the Fund on campuses that have the most critical need for educational technology instruction.

Furthermore, 75% of the money from the Fund must be used for instructional purposes, ensuring that students and teachers will benefit the most from its use. If the Technology Fund is fully funded when the general appropriations bill is considered during the special legislative session this summer, school districts can expect to receive additional aid for obtaining educational technology in the 1992-93 school year.

TEA is in the process of publishing a planning guidebook for school districts to use in developing their Technology Plans. The Education Service Centers, private vendors and several education groups are also providing technical assistance.

PROJECT A+

State government has not been the only player committed to educational technology in Texas. Over the past decade, the business community's involvement with education has been on the rise. For example, in Austin, IBM has made an extraordinary commitment to the expansion of educational technology in the Austin Independent School District (AISD) through a partnership called Project A+.

Project A+, which began in 1989, does not deal exclusively with educational technology. The joint venture consists of groups of IBM and AISD executives, members of their staffs, and community members working in seven "momentum teams" – empowerment, strategic planning, curriculum, vision, dropout prevention, higher education, and technology. Their overall goal is to develop and implement plans that will ensure that all AISD students are functioning at their appropriate grade level. The "Educational Technology Vision Report" sets specific parameters for the use of technology to achieve this goal:

- Technology extends the teacher's menu of resources with which to inform and motivate students and provides for more efficient management of the learning environment.
- Technology delivers concepts and information for students in all learning styles (auditory, visual, kinesthetic, and tactile) to promote optimum learning.
- Technology rids schools of the constraints imposed by time, distance, and human capabilities to expand the traditional classroom and bring teachers and students together from all areas of the world.
- Technology provides new links between home and school.

Based on these principles, three objectives have been set for AISD's technology demonstration program. First, the number of students behind grade level and the number of underachieving students will be reduced by 50%. Second, a foundation for the promotion and the development of teacher training in educational technology will be established. Finally, the tech-

nology demonstration project will be used as a model for replication throughout the educational community.

In July 1990, Project A+ received one of the largest grants that IBM has ever made to a school district, $5.5 million worth of equipment, to achieve these goals. Three AISD elementary schools have received approximately 854 computers. Thanks to the grant, these schools are well on their way to meeting the targets outlined in the LRPT of one computer per 23 students by 1992.

Furthermore, computer training for teachers has been given first priority and reached new levels of professionalism through Project A+. The technology team guaranteed that each teacher would receive three full days of training – separate from inservice and preservice training – to help them fully understand the computer and to dispel any fears they had about the technology. Teachers trained during the Summer of 1990 were even given computers at the end of the program to take home to further develop their skills.

When additional training was conducted after the school year began, Project A+ found professors from the University of Texas and employees of 3M Corporation to substitute for teachers attending the program. This differs greatly from training sessions that normally would take place after a teacher has spent a whole day in the classroom and is too tired to benefit from the program.

Finally, each teacher has been given a computer and a telephone for his or her classroom to facilitate communication with other teachers, parents, and the administration. These simple technological tools not only cut down on the time a teacher must spend fulfilling administrative duties, but they have aided in enhancing a professional environment for teachers that is often lacking.

The Texas Learning Technology Group

A not-for-profit organization, the Texas Learning Technology Group (TLTG), was formed in 1985 through a partnership among the Texas Association of School Boards, the National Science Center Foundation, Inc., and 12 Texas school districts (See Figure Three).

TLTG's mission is to develop high-quality curriculum projects that integrate new technologies into delivery systems, evaluate the effectiveness of technology-based curriculum, train teachers in the use of new technologies, and provide support to schools implementing technologically advanced curricula.

TLTG has developed an interactive videodisc (IVD) curriculum for physical science instruction. A year-long program, the IVD is divided into chemistry instruction for the first semester and physics for the second. Forty-five percent of the instruction is delivered with the IVD, 40% is lab experiments, and the remaining 15% is practice, review, and examinations.

TLTG will not release its program to a school district unless all teachers participate in its three-day training program. They believe the system will not be successful unless teachers are prepared to "team teach" with the multimedia delivery system. The two main objectives of the seminar are to familiarize teachers with the software and hardware components and present innovative teaching techniques that can be used in conjunction with the IVD system.

The most recent evaluation of TLTG's physical science program was conducted in 1988 and funded with $500,000 from TEA's Federal Chapter 2 Discretionary Funds. Over 3,000 ninth and tenth grade students in 20 Texas school districts, one Washington, D.C. school, one Indiana school, and two Louisiana schools participated in the study. The evaluation concluded that IVD students outperformed non-IVD students in the mastery of physical science content and in quantitative ability. IVD students' interest in enrolling in higher level science courses was no different from other students; however, they did have a more positive attitude toward the course they were presently taking than did non-IVD students.

Paula Hardy, Division Director of TLTG, says that many schools have performed their own evalua-

tions of the program. Some schools have reported a 50% drop in the number of students failing the course. "A significant indicator of success," says Hardy, "is that our physical science IVD classrooms have on average a 5 to 10% failing rate compared to a national physical science failing rate of over 50%."

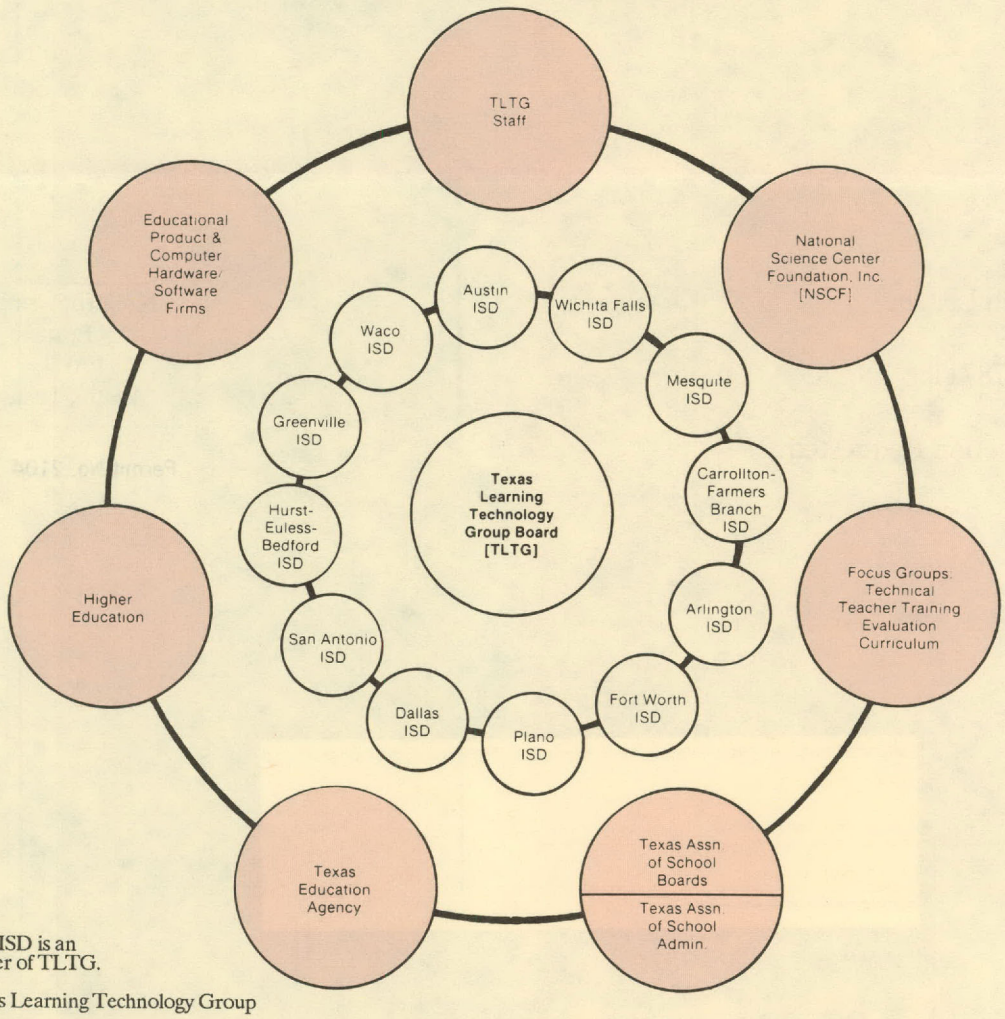
During the 1990-91 school year, TEA placed TLTG's program in five schools with Chapter 2 Discretionary Funds to test the efficacy of the IVD program for at-risk students. Results of the study will be released in the fall of 1991.

The physical science IVD developed by the Texas consortium has received four national awards and is currently being displayed at the Smithsonian Arts and Industry Building in Washington, D.C. Over 200 classrooms in 13 states, including 88 Texas school districts, and one school in Victoria, Australia, are using TLTG's program, and the number is growing.

Interactive videodisc curriculum is also being developed to teach chemistry with more than 25 school districts and 10 community colleges currently providing funding to TLTG for this project. TLTG chose chemistry as its second project in response to declining student enrollment in this field and increasing industry demands. As few as 69,000 out of 592,000 Texas high school students are estimated to be enrolled in chemistry classes. The chemistry IVD curriculum is set for completion in 1993.

Figure Three

TLTG Project Cooperation



Brazosport ISD is an added member of TLTG.

Source: Texas Learning Technology Group

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