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ABSTRACT

Texas educational legislation for 1991 required the Texas Higher Education Coordinating Board (THECB) to review the operations of, and the continuing need for, each of the four main campuses and five extension centers of the Texas State Technical College System (TSTCS), and to make recommendations concerning the facilities' continuation and/or abolishment. The TSTCS's mission is to offer occupationally oriented programs and supporting academic coursework for highly specialized, advanced and emerging technologies. To begin the review process, a review team was recruited by the THECB and, in keeping with the legislative requirements, findings were sought with regard to campus locations, student enrollment trends, funding mechanisms, physical facilities, industry support, and the need for technically trained workers in Texas. Principal findings and recommendations, based on site tours, interviews, and analysis of existing reports, include the following: (1) the system's four campuses were found to be fulfilling their legislative mandate, and the five extension centers were found to be more like community colleges than technical colleges, serving local needs and populations; (2) current funding for the TSTCS is inadequate, and special funding formulas should be developed to meet the TSTCS's operating and capital costs; (3) the TSTCS should limit its programmatic growth to advanced and emerging technologies, phasing out other programs; (4) the TSTCS should be limited to three regional campuses (at Waco, Harlingen, and Sweetwater) with current additional facilities becoming independent community colleges or part of the state community college system; and (5) the TSTCS should recruit students on a statewide basis. Data tables, and the TSTCS mission statement are included. (PAA)

TEXAS STATE TECHNICAL COLLEGE REVIEW

Texas Higher Education Coordinating Board

July 1992

by

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INTRODUCTION

In January 1991, the Texas Higher Education Coordinating Board (THECB) appointed Bruce Aumack of the IBM Corporation and Dr. Larry J. Blake, President of Lassen College in California, to evaluate the Texas State Technical College System (TSTC) and to make recommendations in accordance with a rider to a bill passed by the 1991 Texas State Legislature.

That rider stated that, "The Texas Higher Education Coordinating Board shall review the operations of and the continued need for each of the main campuses and extension centers of the Texas State Technical College (TSTC). In determining whether it is in the state's best interest to continue its existing level of financial support of TSTC, the review shall examine such factors as campus location, student enrollment trends, funding mechanisms, physical facilities, industry support and the need for technically-trained workers. The Texas Higher Education Coordinating Board shall report its findings and recommendations regarding the continuation or possible relocation and/or abolishment of existing TSTC campuses and extension centers to the Legislature Budget Board by August 31, 1992."

LEGISLATIVE MANDATES

In reviewing the appropriate future role for TSTC, one must not only review its legislative mandate but also that for its complementary informal system, the Texas Public Community/Junior Colleges (see Appendix I for complete texts of legislative mandates).

The Texas Charter for Public Higher Education (1987), in establishing roles and missions, states that, "Texas Public Community/Junior Colleges shall be two-year institutions primarily serving their local taxing districts and service areas in Texas and offering vocational, technical, and academic courses for certification or associate degrees."

TSTC's mission, as amended in 1991, states that the "Texas State Technical College System shall contribute to the educational and academic development of the State of Texas by offering occupationally oriented programs with supporting academic course work, emphasizing highly specialized advanced and emerging technical and vocational areas for certificates or associate degrees."

From the two legislative mandates emerges two distinct roles, for the community colleges to have a local mission and for TSTC to have a statewide mission; for community

colleges to be comprehensive in nature emphasizing a broad range of programs and for TSTC to be a single-purpose system, emphasizing "highly specialized advanced and emerging" technologies.

HISTORY OF TSTC

TSTC began, similar to other major national technical institutes or polytechnics i.e., California Polytechnic Institute (now California Polytechnic State University), Southern Technical Institute (now Southern Technical College), Oregon Technical Institute (now Oregon Institute of Technology), and Kansas Technical Institute (now Kansas College of Technology), as a response to the growing confirmed need for specific technical training in the United States. It should be noted that of the above institutions, all but Kansas College of Technology added BS degrees to their Associate Degrees (AS) in the 1960's while Kansas remains, as does TSTC, granting only AS degrees. [1]

TSTC began several excellent technical programs but, because of the major thrust of the primary funding source, the federal Manpower Development and Training Act (MDTA), emphasized shorter term vocational programs. It established its first campus in Waco in 1965, with the three others following in Harlingen (1967), Amarillo (1970) and Sweetwater (1970).

Although other technical institutes gradually reduced the number of vocational programs in the next two decades, emphasizing the technical offerings, TSTC stayed somewhat static beginning the major emphasis upon technology only in the late 1980's.

The other significant change in the past decade for TSTC was the gradual addition of extension centers, often for political as well as educational reasons.

TSTC TODAY

TSTC today is an evolving institution, changing from a vocational-technical institute to a single-purpose polytechnic college, from a broad spectrum of vocational and technical programs to a focus upon highly specialized advanced and emerging technologies.

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1 A single-purpose polytechnic college is generally defined as one offering, for the most part, associate and/or baccalaureate degrees in the applied technologies.

It is a unique system in Texas, differing from the community/junior colleges not only in the legislatively mandated uniqueness of the special advanced technology emphasis and a state-wide rather than a local mission, but also in other unique dimensions. TSTC emphasizes a majority enrollment of full-time students as opposed to a majority of part-time students for community colleges. True to its statewide mission, TSTC has a majority enrollment of non-commuting students as opposed to a majority of commuting students for community colleges. It offers an intensive cohesive curriculum with a practical laboratory-based emphasis with more contact hours per week than other higher education institutions. All advanced and emerging technical curricula are based, for the most part, upon science, mathematics and technology. For polytechnic colleges, this creates a distinction regarding some programs that use high technology equipment, such as auto body and auto mechanics, yet are low technology training in that training is not based upon advanced math, science, and technology. TSTC actively seeks uniformly strong industrial support in the form of advisory committees, graduate employment, equipment donation, and legislative support.

TSTC is strategically situated to assist the state of Texas as it moves into global competitiveness in a world economy based increasingly upon advanced and emerging technologies.

It is complementary to the community colleges of Texas, each serving a unique community with its individual differences, while TSTC serves a state-wide mission. TSTC fails its mission if it assumes, or is forced to assume, the local mission of a community college.

METHODOLOGY AND FINDINGS

The review team began its study by interviewing staff of the Coordinating Board, leadership of the community/junior colleges, and top administrators of TSTC. They reviewed a large number of reports, studies, analyses, and recommendations regarding both two-year systems.

They also traveled to the nine TSTC locations viewing facilities, equipment, and programs, as well as meeting with community and industrial leaders, TSTC administrators, and representatives of neighboring higher education institutions.

The legislatively requested findings include: campus locations, student enrollment trends, funding mechanisms, physical facilities, industry support, and the need for technically trained workers.

Campus Locations

The TSTC visits included the four campuses and the five extension centers. The campuses, for the most part, were found to be operating consistent with the mission assigned to TSTC, with the possible exception of Amarillo. The extension centers were found to be more like community colleges than technical colleges, serving local needs and local populations (see Table A). For the most part, they came into being because existing community colleges were unable or unwilling to satisfy the needs expressed. Those needs were consistently described as local needs for technical and adult retraining programs and could have been met by community colleges under different circumstances.

Table A

PERCENT TSTC STUDENTS ENROLLED FROM LOCAL COUNTY [1]

TSTC Unit	Percent Enrollment
McAllen	96.0
Abilene	80.6
Breckenridge	75.0
Amarillo	54.5
Harlingen	50.9
Waco	32.2
Sweetwater	31.0

(Source: THECB)

With regard to the optimum number of TSTC campuses needed, ideally, for a smaller state only one campus would suffice. However, because of the size of Texas, some regionalization appears to be necessary. Specific locations are not too critical due to the emphasis upon full-time residential student.

Although TSTC continued to experience growth during the first years of its history, it experienced some decline in the mid-1980's along with other polytechnics (see Table B). That decline has been stabilized and any decline experienced by TSTC now is as a result of

[1] Brownwood and Marshall are authorized sites but are not yet operational.

a self imposed reduction of 27 unneeded (generally vocational) programs since 1987. In this period, 14 new programs were added. Table B also contrasts actual enrollments with those which would have resulted had only current programs been in place. By emphasizing its mission in this way, TSTC should experience growth into the future.

Table B

SYSTEM ENROLLMENTS 1980-1990

Year	TSTC	Actual TSTC Adj.*
1986	8,958	7,942
1987	8.784	7,995
1988	8,254	7,590
1989	8,303	7,844
1990	8,155	7,813

(Source: THECB)

* Adjusted to include only enrollments of programs currently offered.

Funding Mechanisms

Current funding mechanisms do not take into account the unique character and statewide mission of TSTC but have only utilized approximations of existing mechanisms for other systems. For example, because TSTC is somewhat similar to community colleges in programmatic structure, programs and operating expenses are funded by a community college formula yet the TSTC System has no way to add revenues by taxation. Also, because the TSTC System is similar to state universities in statewide missions, they are funded for capital and maintenance on a statewide basis yet have no established funds for this purpose. Both formulas do injustice to TSTC and its important role and mission. New formulas, or use of multiplying factors (see Appendix II for an example) should be implemented to take into account the laboratory-intensive nature of TSTC's curricular operations and new formulas for capital outlays should take into account the obsolescence of the facilities used to train for advanced and emerging technologies.

Physical Facilities

Since the original four campuses were established on surplused air bases in the late 1960's, TSTC has used whatever funding sources available (generally US Economic Development Agency grants, corporate contributions, and local sales tax) to build new facilities (see Table C). Because of this, a comprehensive plan for demolishment and replacement of remaining old facilities should be undertaken and built into a short range development plan.

Table C.

AGE OF TSTC FACILITIES*

Gross Sq. Ft. Assigned to Education

Campus	Original Facilities	Facilities Built for TSTC	% New
Amarillo	346,791	115,511	25.0
Harlingen	37,404	287,283	88.5
Sweetwater	23,845	171,791	87.8
Waco	664,076	350,953	34.6

(Source: THECB)

Industry Support

Based on many interviews and meetings with business/industry and community leaders as well as a review of recent studies, industry support is one of the major strengths of TSTC. As Texas moves into the independent, world-wide competitiveness of the 21st century, Texas industry leaders recognize the requirement for technology-based training for a critical portion of tomorrow's workforce. They look to TSTC to provide a significant portion of that education. In return, they actively recruit TSTC graduates causing an average placement rate for TSTC graduates of 88%; they donate considerable new and state-of-the-art equipment, $7.69 million in 1990-1991; and they provide active advisory committee members.

Need for Technical Trained Workers

A complementary study on this subject by Dr. James Wattenbarger of the University of Florida, reviews the literature of recent reports, analyses, and recommendations with regard to Texas and confirmed the range and extent of this need. Specifically, the TIINS Report on Technology and Emerging Occupations (Aug. 15, 1991) substantiated the need for the specific program areas mandated for TSTC by the Texas Legislature. The growing percentage of TSTC graduates in the advanced and emerging technologies is listed in Table D.

Table D.

PERCENT OF TOTAL TSTC GRADUATES IN
ADVANCED AND EMERGING TECHNOLOGIES*

Year	Percent
1986	48.2
1987	49.1
1988	51.1
1989	54.
1990	59.4

(Source: THECB)

* Defined by Texas Innovation Information Network System (TIINS) as the technologies of information, energy and environment, medical, laser-electrooptics, manufacturing, and biotechnology.

RECOMMENDATIONS

1. **It is recommended that** TSTC be limited in programmatic growth to its statutory mission of advanced and emerging technologies and be fully funded in both operating and capital costs to accomplish that mission. More specificaliy, it is recommended that:

a. The THECB develop and maintain a listing of higher educational programs of "advanced and emerging technologies" as fully meeting TSTC's mission.

b. TSTC phase out all non-listed programs over five years.

c. Funding formulas be developed and implemented, independent of commu nity college and university funding, for both operating and capital costs that recognize and compensate TSTC for its unique programs, equipment and laboratory requirements, and industry-competitive faculty salaries.

In this way, the State of Texas can limit TSTC to its unique role as a polytechnic system dissimilar from other institutions with their missions and funding systems. If this tailored funding systems is not forthcoming, TSTC's ability to serve the state with its unique mission as Texas approaches the 21st Century will be severly crippled.

2. **It is recommended that** TSTC be limited to three regional campuses, at Waco, Harlingen, and Sweetwater; that no additional extension centers be authorized; and that Amarillo, Abilene, McAllen, Breckenridge, and Brownwood become independent community colleges or parts of other community colleges within five years. Since it has yet to operate, the ultimate status of the Marshall center should be analyzed and determined within this five year period.

In this way, TSTC can truly serve the mission it has been chartered to perform, to deliver a state-wide service and yet recognizing the regional requirements of a very large state. With the elimination of extension centers it will also eliminate the unnecessary duplication of the community college's local mission. *

3. **It is recommended that** the community/junior college system be encouraged or required to certify that they are fully meeting their mission, particularly with regard to technical education. A promising solution to the later is the growth of 1 + 1 partnerships between community colleges and TSTC.

The major frustration of communities seeking TSTC extension centers is their concern that local community colleges are either unable or unwilling to meet their job training needs. The 1 + 1 partnerships allow the local community college to offer the first year of a TSTC program with the second year offered at a TSTC campus,

* ED. NOTE: At the June 11, 1992 meeting of the Community and Technical Colleges Committee of the Texas Higher Education Coordinating Board, Larry Blake clarified that he used the word 'elimination' to mean 'elimination from TSTC's offerings.'

similar to the bachelor's degree programs where the first two years are offered at the local community college and the last two years at a state university. By requiring the first year to meet the quality standards of TSTC, the local community can have students start a TSTC program at home without the high costs of duplication.

4. **It is recommended that** TSTC recruit students on a statewide basis.

   True to its statewide mission, TSTC must inform potential students in all parts of the state of the value of polytechnic education and its possibilities for them, whether through total attendance at a TSTC campus or through a 1 + 1 program with a local community college. TSTC should be present at college fairs and career fairs as well as being active in such industry sponsored programs as Texas Alliance for Minorities in Engineering (TAME), working with disadvantaged youth.

5. **It is recommended that** TSTC consider quality control or standard setting to insure uniform quality at all campuses and in 1 + 1 programs. A possible national standard would be accrediting by ABET (Accreditation Board for Engineering and Technology).

   By doing so, TSTC can assure the same uniform quality of outcomes at each of its campuses and in all of its 1 + 1 programs. Students can be assured that they are fully educated for future employment and industries and employers can be assured of satisfaction with graduates.

SUMMARY

This report completes the specific analyses requested of the review team by the Texas Higher Education Coordinating Board in assisting it to respond to the requirements of the 1991 Texas Legislature. The major findings are:

1. That TSTC, for the most part, is fulfilling its legislative mandate and, with the implementation of the recommendations contained herein, TSTC can refine its programs and services to more fully meet that mandated mission.

2. That current funding for TSTC, both operational and capital, is inadequate for TSTC to fulfill its statutorial mission and must be modified to assure success.

APPENDIX I

Mission Statements

§ 135.01 Texas State Technical College System; Role and Mission *

(a) Texas State Technical College System is a coeducational two-year institution of higher education offering courses of study in technical-vocational education for which there is demand within the State of Texas.

(b) Texas State Technical College System shall contribute to the educational and economic development of the State of Texas by offering occupationally oriented programs with supporting academic course work, emphasizing highly specialized advanced and emerging technical and vocational areas for certificates or associate degrees. The Texas State Technical College System is authorized to serve the State of Texas through excellence in instruction, public service, faculty and manpower research, and economic development. The systems's economic development efforts to improve the competitiveness of Texas business and industry include exemplary centers of excellence in technical program clusters on the systems's campuses and support of educational research commercialization initiatives. Through close collaboration with business, industry, governmental agencies, and communities, including public and private secondary and postsecondary educational institutions, the system shall facilitate and deliver an articulated and responsive technical education system.

(c) In developing and offering highly specialized technical programs with related supportive course-work, primary consideration shall be placed on industrial and technological manpower needs of the state. The emphasis of each Texas State Technical College System campus shall be on advanced or emerging technical programs not commonly offered by public junior colleges.

§ 130.003 State Appropriation for Public Junior Colleges *

(e) The purpose of each public community college shall be to provide:

(1) technical programs up to two years in length leading to associate degrees or certificates;

(2) vocational programs leading directly to employment in semi-skilled and skilled occupations;

(3) freshman and sophomore courses in arts and sciences;

(4) continuing adult education programs for occupational or cultural upgrading;

(5) compensatory educational programs designed to fulfill the commit ment of an admissions policy allowing the enrollment of disadvantaged students;

(6) a continuing program of counseling and guidance designed to assist students in achieving their educational goals; and

(7) such other purposes as may be prescribed by the Coordinating Board, Texas College and University System, or local governing boards, in the best interest of postsecondary education in Texas

* Texas Education Code

APPENDIX II

Example of Factors of Facilities Costs

Classroom A Courses taught --- English, history, math, sociology, etc.

Needs: Writing board
Tables and chairs (30±)
Normal audio visual equipment

Summary: Relatively inexpensive fitup
High versatility
Few physical changes required over time

Factor: 1-X

Classroom B Courses taught --- keyboard skills, basic electronics, auto, chemistry, physics, and biology labs

Needs: Writing board
"Workstations"
Appropriate supplies
Necessary equipment

Summary: More expensive fitup
Restricted versatility
Some changes/replacement activity required
Constant need for supplies
"Real" restrictions on class size

Factor: 2-X

Classroom C Courses taught --- new, emerging technical courses and courses re quiring high capital investment (either for equipment or to meet vari ous regulations) such as laser electro optics, semi-conductors, com puter integrated manufacturing

Needs: Specialized fitup
Expensive equipment
Appropriate Supplies

Summary: Very expensive fitup
Little versatility (dedicated space)
Frequent change required to facilities
Constant need for supplies
Small class size

Factor: 5-X