



Texas Institute for Education Reform

"Every child a high school graduate ready for college, the workplace and citizenship."

October 20, 2008

Senate Education Committee
P.O. Box 12068 – Capitol Station
Austin, Texas 78711

Dear Madam Chair and Members,

Thank you for your work on the state's K-12 public education system. We appreciate your efforts to improve our current system and look forward to working with you during the upcoming legislative session.

TIER believes that our public education system should prepare students for post-secondary success in a four-year college, a two-year college, the military, or the workforce. Career and technology education (CTE) is a vital component in reaching this goal. TIER believes that CTE programs should be challenging, flexible, and relevant. To that end, TIER has published *Career and Technology Education: Many Paths, Equal Rigo, and One Destination for Texas High School Students*. I have enclosed a copy of this paper along with the executive summary for your review. I hope that you will incorporate this paper's recommendations into the committee's interim report and, ultimately, into legislation regarding CTE.

Thank you for your consideration. If you have any questions or need additional information, please do not hesitate to contact me.

Sincerely,

Andrew Erben
President

Career and Technology Education: Many Paths, Equal Rigor and One Destination for Texas High Schools

**Executive Summary
September, 2008**

By Chris Patterson



Texas Institute for Education Reform

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***Texas Institute for Education Reform
1209 Nueces Street, Austin, Texas 78701
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***Career and Technology Education:
Many Paths, Equal Rigor and One Destination for Texas High Schools***

Texans are striving to meet the twin challenges of increasing the high school graduation rate and equipping high school graduates with the knowledge and skills necessary for postsecondary success. Like other states, Texas is using Career and Technology Education (CTE) reform as a lever for improving the performance of all high school students. CTE reform has proven a powerful lever for systemic improvement of secondary education in other states and nations because CTE generally serves a large population of high school students, customarily enrolling a high proportion of students who struggle to succeed in traditional high schools.

Two distinct models of CTE reform have emerged in Texas and other states. The primary difference between the two models consists in the role that CTE plays in the organization of teaching and learning in high school. The first model integrates high school college-preparatory academics into CTE, and expands the choice of occupational and technical programs within CTE. Most states presently use this model – redesigning CTE to serve as an academically rigorous, technically sophisticated, and occupationally-relevant alternative to the general college-preparatory academic program. This model represents an enhancement of the traditional high school program; it offers students the opportunity of choosing to enroll in CTE or a wholly academic program, or a blend of the two, both of which are designed to ready students for postsecondary success. The second model uses CTE as a framework for comprehensive school reform, redesigning high schools by organizing instruction into a selection of career clusters (occupational areas) and career pathways (a selection of course sequences and work-based learning activities that relate to the students' career choice). Students must select a career pathway by no later than 8th grade, but are permitted to review and revise this selection annually, provided the chosen pathway is locally available and revision will not prevent on-time graduation. Although described as high school redesign, the more appropriate description is K-12 reform because, in addition to high school reform, the model integrates occupational awareness into the elementary school curriculum and introduces occupational activities in middle schools for students for career exploration. In reorganizing K-12 around vocational or occupational preparation, the second model significantly changes and limits what and how students learn. At present, five states are implementing this model.

Both models are present in Texas public schools today in a variety of forms, including: Tech Prep, High Schools That Work, magnet schools, and career academies. Generally, Texas school districts offer CTE as an option or alternative to the college preparatory academic program; however, there are some districts that have replaced traditional high school options with a fully integrated academic and vocational program that must be completed by all students (a reform that reflects the second CTE model). The diverse forms of CTE, evident throughout Texas public schools, have been encouraged by a long history of strong local control for CTE instruction, historically considered a local option. Over the past decade, however, state policymakers have introduced sweeping reforms to the traditional high school program in Texas public schools, strengthening the academic program and CTE, as well as strengthening state authority over both forms of instruction. A new state initiative, AchieveTexas, was introduced in 2006 to provide a framework for districts to reorganize K-12 education around career pathways and blending academic and career preparation for all students. This initiative reflects the second national model of CTE, although in Texas this reorganization is presently voluntary for districts (unlike the statewide mandate established by the five other states presently engaged in this reform).

Today, Texans stand poised at a critical juncture in CTE and high school reform. Will CTE become a viable *part* of the high school curriculum – an academically rigorous, technically sophisticated, occupationally relevant alternative to the college preparatory academic curriculum? Or will CTE become the *entire* framework for high school instruction – serving all students and eliminating the choices associated with traditional high school instruction? Answers to these questions are enormously important for every student in Texas public schools. Of equal importance are the questions: What should students learn in Texas public schools, and who should make this decision?

The preponderance of evidence from CTE reforms introduced by other states indicate the first CTE reform model – strengthening CTE – as a viable alternative to the fully academic program is an effective lever for improving high school outcomes and postsecondary transitions. There is also strong international evidence that this approach significantly increases secondary and postsecondary success, as

well as reduces the achievement gaps between student groups. Additionally, international evidence suggests the fully academic, optional college preparatory program is an essential component of public education, particularly for high diverse student populations.

Findings of research also support the first model of CTE reform. Numerous studies confirm the need for a school, district or state system to offer a diverse array of educational choices, and conclude that different student groups require different educational experiences in order to succeed. Additionally, numerous studies reveal the significant educational limitations of using CTE as a framework for comprehensive K-12 reform (the second reform model). This approach defies the fundamental lesson that can be learned from research and the practice: no one single educational system, program, course, or instructional method has ever succeeded in meeting the needs of all students. Texas can increase high school completion and successful transitions to college and workplace by enhancing both the fully academic program and technical education. Texas public schools must provide many paths of equal rigor, both academic and technical, that lead all students to the one destination of postsecondary readiness.

Recommendations for Reforming Texas CTE

- Enact legislation that clarifies the meaning of HB 3485 and validates the educational obligations of school districts to offer high school students the opportunity to choose to concentrate either in CTE or a fully academic, traditional Liberal Arts program;
- Reserve state policy decisions that introduce fundamental reforms to the public school curriculum for elected representatives of the Texas Legislature or State Board of Education;
- Make CTE a viable (academically and technically rigorous), and attractive option for high school students;
- Expand, enrich, and diversify the menu of CTE options available to all students in every school district;
- Expand, enrich, and diversify the ways that CTE is delivered to students, including a choice of applied and theoretical instruction, and virtual classrooms;
- Revise the CTE course curriculum requirements to ensure they are relevant to current and emerging occupations, and include college and workforce readiness standards;¹
- Ensure that all school districts provide all high school students the opportunity to choose to concentrate in either CTE or the traditional, fully

academic Liberal Arts program, or a combination of both;

- Equalize access to high quality educational programs between schools and districts by developing a state sponsored electronic high school;
- Require all students to take the college preparatory, core academic curriculum through 10th grade and establish occupationally focused versions in core subjects (math, science, English and Social Studies) for grades 11 and 12 that cover the state curriculum standards – TEKS;
- Ensure that all CTE and academic courses/programs culminate in postsecondary readiness, credits, industry-recognized credentials, or state licenses;
- Define the educational outcomes of CTE and all graduates of Texas public schools that are associated with postsecondary readiness, including completion of specific core high school courses and minimum scores on tests of college readiness;
- Define a list of required CTE courses that constitute coherent sequences for a broad, diverse selection of occupational opportunities;
- Require districts to use external, industry-related or national association tests whenever possible for CTE course assessments;
- Predicate state approval and funding for CTE courses that lead to industry certification wherever available and postsecondary credits;
- Phase out weighted CTE funding for courses that are not part of a state-approved coherent sequence, and base state CTE funds initially on completion (but not passing) of approved courses and externally-developed end-of-course tests;
- Designate state funding to underwrite the costs related to test-taking for certification, accreditation, licensure, and credentials;
- Develop a recommended ratio of academic and CTE courses for high school students;
- Encourage school districts to expand Tech Prep as the primary model for CTE and withhold state funding for reform models that have not proven the equal to or superior to Tech Prep;
- Treat CTE courses the same as academic courses with regard to dual credit and GPA weighting;
- Establish state guidelines for state, federal, and privately funded grants for CTE and all high school redesign initiatives to
 - align grants with state goals for postsecondary readiness,
 - prioritize grants that are based on evidence that programs increase high school graduation and postsecondary readiness,
 - evaluate student outcomes of each grant annually and compare high school graduation

rate and postsecondary outcomes of students participating in grant programs with students who are not, and

- terminate grants that do not produce targeted student outcomes for high school graduation and postsecondary readiness within 3 years.
- Strengthen statewide articulation of college credit between high schools and colleges in a way that is economical for students;
- Create a seamless system for transferring credit from public community colleges to state four-year colleges; and

- Create a new K-20 public education information system that provides specific, real-time detail about CTE students, programs, teachers, and schools that is necessary to evaluate and improve outcomes (and begin with clearly identifying the number of students participating in different kinds of CTE, the number and kind of different CTE programs, and the number of schools offering only some form of CTE).

¹ The author has taken the liberty of including a recommendation for CTE reform issued by the Governor's Competitiveness Council in the *Council's Report to the Governor* (June 2008), available online at <http://www.governor.state.tx.us/gcc>.

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Who is TIER?

TIER is a 501(c)(3) non-profit, non-partisan organization of community and business leaders throughout the state who have organized themselves to raise public awareness and educate Texas opinion leadership on the current status of public education in Texas, the progress of our standards and accountability-based reforms to date, the prognosis for achieving the essential universal educational proficiency of the children of Texas, and the daunting challenges that we face in doing so.

Through its leaders and advisors, TIER has access to the nation's leading education policy experts and will use these resources to provide the best available research-based strategies, benchmarked practices, and policy innovations.

For more information, to order a copy of the complete report, or to learn how you can become involved in TIER's mission, contact Andrew Erben at (512)477-1006 or visit our website at www.texaseducationreform.org.

Acknowledgements

TIER is indebted to Pat Bubb (Executive Director of Tech Prep of the Rio Grande Valley), Lee Holcomb (Director for Evaluation and Special Projects, Texas Schools Project), and Drew Scheberle (Senior Vice President of Education and Talent, Greater Austin Chamber of Commerce) for generously sharing their expert knowledge of public education research and practice, reviewing this paper and providing suggestions. TIER is, however, solely responsible for all interpretations of fact, recommendations, and any possible error.

About the Author

Chris Patterson serves as a consultant for state and national policy centers, and provides analysis of K-12 research and state education policy. She is a policy advisor for TIER, visiting scholar for the Texas Public Policy Foundation, member of the board of directors of the Texas Center for Education Research (appointed by the State Board of Education), research associate with the National Center for Performance Incentives at Vanderbilt University, and member of the Texas High School Completion and Success Initiatives Council (appointed by the House Speaker of the Texas Legislature).

***Career and Technology Education:
Many Paths, Equal Rigor and One Destination for Texas
High Schools***

**Policy Series, Issue 9
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EXECUTIVE SUMMARY

Texans are striving to meet the twin challenges of increasing the high school graduation rate and equipping high school graduates with the knowledge and skills necessary for postsecondary success. Like other states, Texas is using Career and Technology Education (CTE) reform as a lever for improving the performance of all high school students. CTE reform has proven a powerful lever for systemic improvement of secondary education in other states and nations because CTE generally serves a large population of high school students, customarily enrolling a high proportion of students who struggle to succeed in traditional high schools.

Two distinct models of CTE reform have emerged in Texas and other states. The primary difference between the two models consists in the role that CTE plays in the organization of teaching and learning in high school. The first model integrates high school college-preparatory academics into CTE, and expands the choice of occupational and technical programs within CTE. Most states presently use this model – redesigning CTE to serve as an academically rigorous, technically sophisticated, and occupationally-relevant alternative to the general college-preparatory academic program. This model represents an enhancement of the traditional high school program; it offers students the opportunity of choosing to enroll in CTE or a wholly academic program, or a blend of the two, both of which are designed to ready students for postsecondary success. The second model uses CTE as a framework for comprehensive school reform, redesigning high schools by organizing instruction into a selection of career clusters (occupational areas) and career pathways (a selection of course sequences and work-based learning activities that relate to the students' career choice). Students must select a career pathway by no later than 8th grade, but are permitted to review and revise this selection annually, provided the chosen pathway is locally available and revision will not prevent on-time graduation. Although described as high school redesign, the more appropriate description is K-12 reform because, in addition to high school reform, the model integrates occupational awareness into the elementary school curriculum and introduces occupational activities in middle schools for students for career exploration. In reorganizing K-12 around vocational or occupational preparation, the second model significantly changes and limits what and how students learn. At present, five states are implementing this model.

Both models are present in Texas public schools today in a variety of forms, including: Tech Prep, High Schools That Work, magnet schools, and career academies. Generally, Texas school districts offer CTE as an option or alternative to the college preparatory academic program; however, there are some districts that have replaced traditional high school options with a fully integrated academic and vocational program that must be completed by all students (a reform that reflects the second CTE model). The diverse forms of CTE, evident throughout Texas public schools, have been encouraged by a long history of strong local control for CTE instruction, historically considered a local option. Over the past decade, however, state policymakers have introduced sweeping reforms to

the traditional high school program in Texas public schools, strengthening the academic program and CTE, as well as strengthening state authority over both forms of instruction. A new state initiative, AchieveTexas, was introduced in 2006 to provide a framework for districts to reorganize K-12 education around career pathways and blending academic and career preparation for all students. This initiative reflects the second national model of CTE, although in Texas this reorganization is presently voluntary for districts (unlike the statewide mandate established by the five other states presently engaged in this reform).

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The preponderance of evidence from CTE reforms introduced by other states indicate the first CTE reform model – strengthening CTE – as a viable alternative to the fully academic program is an effective lever for improving high school outcomes and postsecondary transitions. There is also strong international evidence that this approach significantly increases secondary and postsecondary success, as well as reduces the achievement gaps between student groups. Additionally, international evidence suggests the fully academic, optional college preparatory program is an essential component of public education, particularly for high diverse student populations.

Findings of research also support the first model of CTE reform. Numerous studies confirm the need for a school, district or state system to offer a diverse array of educational choices, and conclude that different student groups require different educational experiences in order to succeed. Additionally, numerous studies reveal the significant educational limitations of using CTE as a framework for comprehensive K-12 reform (the second reform model). This approach defies the fundamental lesson that can be learned from research and the practice: no one single educational system, program, course, or instructional method has ever succeeded in meeting the needs of all students. Texas can increase high school completion and successful transitions to college and workplace by enhancing both the fully academic program and technical education. Texas public schools must provide many paths of equal rigor, both academic and technical, that lead all students to the one destination of postsecondary readiness.

Recommendations for Reforming Texas CTE

- Enact legislation that clarifies the meaning of HB 3485 and validates the educational obligations of school districts to offer high school students the opportunity to choose to concentrate either in CTE or a fully academic, traditional Liberal Arts program;
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- Expand, enrich, and diversify the menu of CTE options available to all students in every school district;
- Expand, enrich, and diversify the ways that CTE is delivered to students, including a choice of applied and theoretical instruction, and virtual classrooms;
- Revise the CTE course curriculum requirements to ensure they are relevant to current and emerging occupations, and include college and workforce readiness standards;¹
- Ensure that all school districts provide all high school students the opportunity to choose to concentrate in either CTE or the traditional, fully academic Liberal Arts program, or a combination of both;
- Equalize access to high quality educational programs between schools and districts by developing a state sponsored electronic high school;
- Require all students to take the college preparatory, core academic curriculum through 10th grade and establish occupationally focused versions in core subjects (math, science, English and Social Studies) for grades 11 and 12 that cover the state curriculum standards – TEKS;
- Ensure that all CTE and academic courses/programs culminate in postsecondary readiness, credits, industry-recognized credentials, or state licenses;
- Define the educational outcomes of CTE and all graduates of Texas public schools that are associated with postsecondary readiness, including completion of specific core high school courses and minimum scores on tests of college readiness;
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- Require districts to use external, industry-related or national association tests whenever possible for CTE course assessments;
- Predicate state approval and funding for CTE courses that lead to industry certification wherever available and postsecondary credits;

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- Phase out weighted CTE funding for courses that are not part of a state-approved coherent sequence, and base state CTE funds initially on completion (but not passing) of approved courses and externally-developed end-of-course tests;
- Designate state funding to underwrite the costs related to test-taking for certification, accreditation, licensure, and credentials;
- Develop a recommended ratio of academic and CTE courses for high school students;
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 - evaluate student outcomes of each grant annually and compare high school graduation rate and postsecondary outcomes of students participating in grant programs with students who are not, and
 - terminate grants that do not produce targeted student outcomes for high school graduation and postsecondary readiness within 3 years.
- Strengthen statewide articulation of college credit between high schools and colleges in a way that is economical for students;
- Create a seamless system for transferring credit from public community colleges to state four-year colleges; and
- Create a new K-20 public education information system that provides specific, real-time detail about CTE students, programs, teachers, and schools that is necessary to evaluate and improve outcomes (and begin with clearly identifying the number of students participating in different kinds of CTE, the number and kind of different CTE programs, and the number of schools offering only some form of CTE).

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INTRODUCTION

Texans are striving to meet the twin challenges of increasing the high school graduation rate and equipping high school graduates with the knowledge and skills necessary for postsecondary success. Over the past decade, state policymakers have introduced sweeping reforms to the traditional high school program, strengthening both the academic program and career and technology education (CTE). Although much has been accomplished, much reform is still required. AchieveTexas, a state initiative introduced in 2006 to restructure high school learning in Texas public schools, offers CTE a new role to play in public education, and today, the status of CTE is at a critical juncture. Will CTE become a viable *part* of the high school curriculum – an academically rigorous, technically sophisticated, occupationally relevant alternative to the college preparatory academic curriculum? Or will CTE become the *entire* framework for high school instruction – serving all students and eliminating the choices associated with traditional high school instruction? Answers to these questions are enormously important for every student in Texas public schools. Of equal importance are the questions: What should students learn in Texas public schools, and who should make this decision?

This paper provides the information policymakers need to deliberate how CTE can best serve state goals for Texas public schools and make informed decisions about CTE. It provides a context for decision-making by describing the urgent need for CTE reform, the current state of CTE in Texas today, findings of empirical research, and successful reforms introduced by other states and nations. The paper concludes by identifying evidence-based strategies for CTE reform that hold promise for enhancing the graduation rate and postsecondary success of all students in Texas public schools.

TWO NATIONAL MODELS OF CTE REFORM

Like Texas, most states are grappling with the need to boost high school graduation rates and bolster the postsecondary readiness of high school graduates. Recognizing the large population of high school students served by CTE, many states are using CTE reform as a lever for improving the teaching and learning of all high school students. Two distinct models have emerged as a result of this reform; the primary difference between the two models consists in the role that CTE plays in the organization of teaching and learning in high school.

The first model integrates high school college-preparatory academics into CTE, and expands the choice of occupational and technical programs within CTE. Most states presently use this model and design CTE to serve as an academically rigorous, attractive, and occupationally-relevant alternative to the general college-preparatory academic

program. This model represents an enhancement of the traditional high school's dual-track program; it offers students the opportunity of choosing to enroll in CTE, a wholly academic program, or a blend of the two. In this paper, the first model will be identified as College Preparatory CTE (CTE-CP). The most sophisticated and successful example of CTE-CP is found in the State of Maryland where slightly over half of students participating in CTE meet the entrance requirements for the state university system.¹

The second model uses CTE as a framework for comprehensive school reform, redesigning high schools by organizing instruction into a selection of career clusters (occupational areas) and career pathways (a selection of course sequences and work-based learning activities that relate to the students' career choice).² Students must select a career pathway by no later than 8th grade, but are permitted to review and revise this selection annually, provided the chosen pathway is locally available and revision will not prevent on-time graduation. Although described as high school redesign, the more appropriate description is K-12 reform because, in addition to high school reform, the model integrates occupational awareness into the elementary school curriculum and introduces occupational activities in middle schools for students for career exploration. This model, which integrates academic and technical education, will be identified throughout the remainder of this paper as CTE-Comprehensive School Reform (CTE-CSR).

Five states³ have implemented the CTE-CSR model: Florida, Louisiana, Mississippi, South Carolina, and West Virginia.² All of the states are members of the Southern Regional Education Board, which advocates for states to adopt this model and describes it as "a new vision for high school."³ While the idea of combining academic and technical studies is certainly a vision for reform, it whether this reform should be described as new deserves to be questioned. This model was introduced to the nation in 1994 by the Federal School-to-Work Act; consequently, most states – including Texas – were awarded federal grants to introduce a new K-12 program that combines academic and technical studies for all students in public schools. Strong, widespread public opposition to School-to-Work led to its repeal in 2000.⁴

In the five states that are implementing the CTE-CSR model today, academic and technical studies are combined in slightly different ways. Although slight, the differences significantly alter the roles played by academics and CTE in public education. These differences are outlined in the following paragraphs.

² An example of a career cluster is Education and Training, and an example of a career pathway in this cluster is Social, Personal, and Public Service. Examples of elective high school courses that relate to this pathway are Individual and Family Life and Photojournalism, and educational activities that relate to this pathway are babysitting and peer tutoring. These examples are provided by the student handbook produced by Birdville I.S.D., the third largest school district in Northeast Tarrant County (*Educational Planning for Life: Choose Your Career Pathway*, available online at <http://www.birdville.k12.tx.us>).

³ Each of these states has historically placed at the bottom of the nation for lowest graduation rates and college readiness scores.

Louisiana passed legislation in 1997 that requires middle schools to provide career awareness activities, students to select a 5 year educational plan by the end of 8th grade, and high schools to offer career majors or pathways (Career Options Law, Act 1124).⁵ Beginning in the 2003-04 school year, high school freshman were required to complete either an academic or technical core high school curriculum with at least four courses in a career pathway, plus one related technical course major to graduate.⁶ By 2000, Louisiana had established 16 national career clusters, 68 career majors, and course requirements for each, with requirements for work-based learning activities developed in 2004.⁷

South Carolina passed legislation in 2005 to “customize” students’ high school studies according to their individual career interests (The Education and Economic Development Act).⁸ Pathways to Success requires 8th grade students to select a career pathway and high schools to offer at least three of the state’s 16 approved career clusters⁹ (none of which is academic). Beginning in the sophomore year, high school students are required to complete seven electives that directly relate to their chosen pathway, in addition to the required core curriculum (17 required high school credits),¹⁰ in addition to completing required work-based experiences that relate to their pathway.¹¹ For example, a student who has chosen a health careers cluster and health technology pathway might select x-ray radiology as an elective, and volunteer as a hospital x-ray department attendant. Upon full implementation of the Education and Economic Development Act in 2011, all South Carolina high schools must be established as High Schools that Work, a model developed by the Southern Regional Education Board that fully integrates academic and technical studies and is described in detail later in this paper.¹²

West Virginia enacted policy in 2005 to introduce integrated academic and technical instruction by State Board of Education Policy 2510.¹³ This policy requires students to select a career cluster in grade 8 and a career pathway in grade 10.¹⁴ Beginning with the class of 2008, students are required to choose one of three four-unit career pathways: the Professional Pathway, the Skilled Pathway, or the Entry Pathway.¹⁵ The Professional Pathway requires one math course above Algebra I, four units of science, and two units in a foreign language; the Skilled Pathway requires one math above Algebra I and three units in academics or CTE; and the Entry Pathway requires four units in academics or CTE.¹⁶ Additionally, all students are required to complete four electives and a work-based learning experience; all courses and experiences must be related to the student’s career pathway.¹⁷ The state grants school districts authority to design their own career cluster and pathways, but offers optional models for six career clusters.¹⁸

Florida passed legislation in 2006 that requires 8th grade students to choose a career pathway and four electives that pertain to this pathway, in addition to completing a required academic core high school curriculum (A++ Plan for Education).¹⁹ Students may choose from 445 major areas of interests (pathways) that include ROTC, CTE (such as Veterinary Assisting and Teacher Preparation), fine and performing arts, or an academic content area (such as social studies), and students are allowed to revise their career pathway annually.²⁰ Although state law requires students to enroll in a major area of interest (career pathway) each year, students are not required to complete one to graduate; Florida’s standard graduation program requires students to complete 16 courses in the

core curriculum, plus four elective courses in a major area of interest (pathway) and four additional electives (a second major or any combination of courses).²¹

Mississippi passed legislation in 2007 creating 14 pilot school districts where 9th grade students are required to select a career pathway from the state's 28 approved pathways and complete their high school studies, grades 10-12, in one of seven occupational clusters.²² The legislation allows school districts to choose the pathways that best fit their community needs and compliment the resources already in place,²³ and it provides students with the opportunity to change pathways as long as graduation requirements are met.²⁴ Additionally, this legislation requires workforce education to be fully embedded in the academic curriculum,²⁵ and a rewrite of English language arts and mathematics curriculum from kindergarten through 12th grade, begun in 2005, now connects these subjects with science, the arts, and CTE.²⁶

All five states have redesigned the general education program in public schools around an occupational framework, and all five states restrict students' access only to academic courses that relate to their career pathway. The state with the least academic restrictions is Florida where students are permitted to choose an academic pathway. For example, students in Florida high schools can select history as a career pathway and take a variety of academic courses as long as they relate to history (an astronomy course, for example, would be disallowed). The state with the most restrictive policy towards academics is Mississippi where students must select a non-academic pathway, all high schools will be converted to the High Schools that Work model that combines academic and technical studies for all students, and workforce education is embedded in all academic courses.⁴

With the exception of Florida, states using the CTE-CSR model require all students to take technical courses and complete work-based learning activities. Despite these occupational and technical requirements, all five states continue to differentiate CTE programs, such as Tech Prep (described later in this paper) and CTE academies (such as Project Lead the Way, high schools that concentrate on engineering). In other words, the integration of technical and academic studies seems to produce two high school tracks: highly technical studies and technical-“lite” studies.

INDUSTRY-RECOGNIZED CREDENTIALS AND CTE REFORM

Since the 2006 reauthorization of the Carl D. Perkins Career & Technical Improvement Act,²⁷ all states have strengthened the connections between CTE and industry-recognized credentials or certificates, college credits or postsecondary degrees, no matter what model of CTE reform that states have adopted. It is worth noting that states employing the CTE-CP model (integrating college preparatory academics into CTE rather than integrating CTE into the academic program) have established the most comprehensive, effective external credentialing of CTE courses and programs. The most notable are:

⁴ An example of workforce or integrated academics is Automotive Mathematics developed by the National Research Center for Career and Technical Education, available online at <http://cehd.umn.edu/NRCCTE/Math-In/Math/Auto.html>.

Alabama, Georgia, Indiana, Maryland, Missouri, Oregon, Pennsylvania, Vermont, Virginia, and Wisconsin.²⁸

Several of these states employ both external credentialing and school finance policies to leverage improvements in and validate the quality of CTE:

- Alabama, for example, requires all high school CTE programs to be externally certified, by national certifying agencies or state industry-certifying entities when no national agency exists.²⁹
- Vermont only funds CTE programs that result in industry certification, meet industry-approved standards for curriculum, facilities, and instruction or offer dual credit from a higher-education partner.³⁰
- Maryland directs Perkins Tech Prep funds only to high schools redesigned to meet the state's goals for high school graduation and postsecondary completion.³¹
- Virginia administers and funds industry certification exams for students in CTE, approving 250 credentials for high school CTE courses and/or course sequences that lead to a complete industry certification program, an external pathway exam that leads to industry certification, a state professional license, or an external occupational competency exam (such as those administered by the (such as those administered by the National Occupational Competency Testing Institute).³²
- Pennsylvania awards schools with rigorous CTE courses additional state funding.³³

Although external credentialing of CTE and linkages to state funding are relatively new in most states, and, therefore, not fully implemented, clear evidence of success is emerging: in Maryland, where the percentage of CTE concentrators⁵ who meet entrance requirements for the state university system has risen from 14% in 1993 to 51% in 2006,³⁴ and in Virginia, where over half of the state's 2007 high school graduates were awarded technical education diplomas.³⁵

CTE IN TEXAS TODAY

The two models of CTE described in previous paragraphs, CTE-CP and CTE-CSR, are present in Texas high schools today in a variety of forms. School districts generally offer CTE as one or more of the following options:

1. High school courses, individually and as a coherent sequence (program);
2. Integrated academic and CTE high schools (such as magnet schools,⁶ stand-alone career academies⁷ and career academies within a larger high school); and

⁵ The National Center for Education Statistics defines CTE concentrators as students who earn three or more Carnegie Units in one or more of 10 specific occupations: Agriculture, Business, Marketing, Protective Services, Technology and Communications, Trade and Industry, Food Service and Hospitality, Childcare and Education, and Personal and Other Services (see <http://nces.ed.gov/pubs2006/2006309.pdf>).

⁶ Magnet schools are generally defined as schools that draw enrollment across school/district boundaries and offer a specialized program, either with a general focus or a specific discipline or technical area.

⁷ Career academies are generally defined as a separate school or school within a school with an educational program that is based on one or more occupational themes.

3. Tech Prep (a federal model for CTE, funded by the Carl D. Perkins Career and Technical Education Act, and described later in this paper).

Texas school districts generally offer CTE as an option or alternative to the college preparatory academic program. However, there are some school districts in Texas,⁸ such as Birdville, that have eliminated the traditional high school options, and have established a fully integrated academic and technical education for all students.

The ways in which these options are offered by most Texas high schools today would probably surprise many adult Texans without school-age children. In 2005, state policymakers redesigned the CTE system to align with the national model of 16 career clusters, prioritizing three: Advanced Manufacturing, Informational Technology, and Science, Technology, Engineering and Mathematics (STEM).³⁶ At present, there are 114 state-recognized programs of study aligned with the 16 career clusters, and at least one program has been designed for each of the 81 cluster sub-groups. Every Texas high school is required to offer a minimum of three CTE programs from three different clusters.³⁷ For each cluster, the state has developed at least one program of study that represents a coherent sequence of CTE course options that culminates in dual credit, statewide articulated courses, locally articulated courses, Advanced Placement college credit, and industry-recognized certifications and licensures.³⁸ Texas has also aligned hundreds of industry-related certifications to the Career Clusters.³⁹

To streamline the transition from high school to college for CTE students, a statewide articulation system (the Advanced Technical Credit Program) was created to allow students to earn technical college credits while enrolled in high school. At present, 826 school districts offer over 100 CTE courses that have been approved for Advanced Technical Credit, and 8,460 high school teachers are certified to teach ATC courses that may be transferred to any participating community or technical college in Texas.⁴⁰

CTE reform has significantly advanced in Texas since 2005. Technical course content is being updated and linked to today's job market, and an effort to introduce college preparatory academics into CTE courses is now underway. A growing number of CTE courses and programs focus on postsecondary readiness, culminating in external credentialing (college credit and industry-related certification). Like many other states, Texas policymakers are redesigning CTE to serve as a viable option to the general academic high school program and path to postsecondary readiness – an approach that is consistent with the first model of CTE reform, described in the previous section.

At the same time, however, state policymakers have also introduced the CTE-CSR model by recommending that Texas school districts redesign high schools in career pathways and offer one high school program that blends academics with technical education.

AchieveTexas is a statewide high school initiative that is sponsored and funded by the Texas Education Agency (TEA).⁴¹ The initiative grew out of the state's 2005 CTE

⁸ The number of school districts in Texas that offer high school education as combined academic and technical education is currently unknown because the state does not collect or report this information.

redesign, and was crafted by representatives of the Governor's Office, TEA, Texas Higher Education Coordinating Board, Texas Workforce Commission, Texas Business and Education Coalition, and Education Service Centers.⁴²

The State Plan for Carl D. Perkins describes AchieveTexas as “the state’s college and career initiative,” the “cornerstone” of state efforts to prepare *all* students for postsecondary education.⁴³ According to the Implementation Guide produced by the TEA, the purpose of AchieveTexas is to “redesign high school education” and “organize learning around clusters of study or career pathways” by:

- “giving all students the academic and technical skills they need to succeed;”
- “blending academics and career preparation;” and
- “creating a truly seamless system that integrates academic and technical education.”⁴⁴

The Guide further states, “All classes would integrate academic subjects such as English and mathematics with career education,” under the system established by AchieveTexas, and “This would mean redesigning instruction to hands-on, interdisciplinary, problem- and project-based education.”⁴⁵ Under AchieveTexas, students are introduced to career clusters early in elementary school and choose a cluster in the 8th grade, annually reevaluate their education and career goals, and continue in a cluster during secondary education and training.

In July 2006, the AchieveTexas Implementation Guide was distributed throughout Texas to school district superintendents, counselors, College Tech Prep Consortia, postsecondary and workforce stakeholders, and academic and CTE teachers that attended a statewide professional development conference that summer.⁴⁶ To assist schools in implementing AchieveTexas, extensive training and technical assistance is being provided by Education Service Centers.

The purpose of AchieveTexas is to build an infrastructure for redesigning all high schools, according to a state profile developed for Texas by a national CTE association. This profile states, “Texas believes that Career Clusters are the basis for high school reform and is in the process of transitioning from traditional programs to the 16 career clusters.”

With AchieveTexas as the state’s high school reform initiative, Texas appears to be following in the footsteps of the five states that have introduced the CTE-CSR model and replaced the traditional high school program with studies related to occupational pathways.⁹ However, it should be noted that AchieveTexas is merely a state policy recommendation, and does not require district compliance; only the state legislature has the authority to require school districts to offer a specific educational program.

⁹ In this paper, a traditional high school program is defined as one that offers students the opportunity to choose to complete a fully academic college preparatory program (long associated with the Liberal Arts disciplines), a career and technical program, or a combination of academics and technical courses.

The 80th Texas Legislature may have signaled its intention of introducing the CTE-CSR model for high school redesign. In HB 3485, the legislature introduced the following language to the Texas Education Code: “School districts are encouraged to establish for each student entering grade 9 a personal graduation plan that identifies a course of study that: (1) promotes: (A) college and workforce readiness; and (B) career placement and advancement; and (2) facilitates the student’s transition from secondary to postsecondary education” (Texas Education Code Section 29.012).⁴⁷

The Southern Regional Education Board (SREB) recently reported on this legislation by stating that HB 3485 recommends school districts encourage 8th grade students to incorporate a *career major* in their high school plans.⁴⁸ Equating a personal graduation plan with a career major may seem like a stretch to some, but this interpretation is certainly consonant with the vision of high school redesign suggested by AchieveTexas.

Interpretations of HB 3485 and the AchieveTexas Implementation Guide make it clear that, with the implementation of AchieveTexas, Texas public schools are embarked on a course that could eliminate the traditional high school program and the opportunity students now have to choose a fully academic program or a program that combines academics with CTE.

A precedent for this state policy has already been established in Texas. In 1997, the TEA developed a high school redesign initiative to implement a federal School-to-Work grant. In a policy guide entitled *Recommended High School Programs of Study*,¹⁰ the TEA asked school districts to redesign their high school programs on the basis of seven career majors and to require all 8th grade students to select a career major for the purpose of defining the sequence of occupationally-focused academics and technical courses to be completed in high school.⁴⁹ As with AchieveTexas, the state’s 1997 high school redesign initiative was not established by elected representatives of the Texas Legislature or State Board of Education, but originated instead with a group of state agencies (the TEA, Texas Council on Workforce and Economic Competitiveness, Texas Workforce Commission, and Texas Higher Education Coordinating Board).⁵⁰ Because the TEA does not collect information about the types of CTE programs implemented in Texas public schools, it has not been determined how many school districts complied with the 1997 high school reform initiative.

This precedent is already well-established in school district practice through programs currently in use, although the prevalence is currently unknown because the state collects little information from school districts about their design of CTE programs. The high school redesign proposed by AchieveTexas is realized by two national CTE models that are common in school districts throughout Texas today: Tech Prep and High Schools That Work.

¹⁰ Additional information about the state’s 1997 high school reform initiative is provided by a paper presented at the Heritage Foundation’s School-to-Work Discussion Panel, February 3, 1998 in Washington, DC by Texas Public Policy Foundation. *School-To-Work: the Coming Collision* by C. Patterson is available online at <http://theroadtoemmaus.org/RdLb/21PbAr/Ed/STW03Collisn.htm> (No period at end of link).

TECH PREP

Tech Prep is funded by the Carl D. Perkins Career and Technical Education Improvement Act of 2006, and is established as a state program by the Texas Education Code (Chapter 61). Tech Prep is a formally structured program that is based on the Recommended High School Program,¹¹ and links the last two years of high school with the first two years of higher education.

Tech Prep now exists in more than 97% of Texas school districts (with all of the state community and technical colleges offering Tech Prep programs).⁵¹ Some districts offer Tech Prep as a stand-alone high school (or schools), but the majority of districts offer Tech Prep as one of the programs offered by a high school. According to an annual Carl D. Perkins Report completed by the TEA, 29 public high schools in Texas offered solely (or primarily) CTE courses during the 2004-2005 school year.⁵² The number of Tech Prep students has steadily grown in Texas, increasing from about 60,000 high school students in the 1996-1997 school year to about 160,000 in the 2005-2006 school year.⁵³ Student demographics for the Tech Prep population generally mirror the demographics of Texas public schools.¹²

According to PEIMS data for the past 11 years, Tech Prep students in grades 10-12 have had lower dropout rates and higher high school graduation rates than those students who did not participate in Tech Prep.⁵⁴ Approximately 55% of Tech Prep high school graduates entered two-year public colleges or universities in Texas immediately following graduation and almost 67% entered within two years.⁵⁵ These rates are significantly higher than non-Tech Prep graduates of Texas public schools. During the 2006-2007 school year, the college credit earned by Tech Prep students enrolled in Texas public schools represented a cost savings of approximately 36 million dollars in potential equivalent tuition costs and fees.⁵⁶

HIGH SCHOOLS THAT WORK

High Schools That Work (HSTW) is an initiative created by the Southern Regional Education Board (SREB) in 1987. The Board describes HSTW as “a framework for eliminating the general track,” and whole-school, comprehensive reform of high schools into career academies.⁵⁷

Presently, there are more than 1,200 HSTW in 32 states. Texas joined the HSTW Consortium in 1993, offering competitive grants to schools that are funded through state appropriations. HSTW can also be funded through federal grants for Comprehensive School Reform, and local, matching funds (minimum of \$10,000) are generally required by SREB.⁵⁸

¹¹ The Recommended High School Program is described as the state’s college preparatory high school curriculum which is established as the “default” curriculum because all students are automatically enrolled in this program unless parents request otherwise.

¹² According to Tech Prep Statewide Data 2007-2008: less than half Tech Prep students were economically disadvantaged, 4% were Asian, 12% were African-American, 41% were Hispanic, and 43% were White.

To secure a grant for HSTW, schools must develop a plan to redesign high schools according to the following principles:

- curricular programs that include four credits of each of the following – math, CTE, academics with at least one credit being Advanced Placement, International Baccalaureate, or Dual Credit;
- school-wide literacy goals across the curriculum;
- interventions for under-prepared students that provide challenging high school work;
- programs to reduce the ninth grade failure rate; and
- links to postsecondary education.⁵⁹

By 2005, 62 schools in Texas had received state grants for the purpose of redesigning their entire high school curriculum according to the criteria established for HSTW, replacing the traditional academic high school program with CTE and occupationally-focused academics.⁶⁰ For the period of 2006 through 2008, the TEA issued 12 additional grants for HSTW.⁶¹ Today, HSTW is described as one of the Key Initiatives of the Texas High School Project for creating new models of high schools, and grants are furnished to implement HSTW in school districts.⁶² This high school redesign model also serves as one of the state's intervention strategies for low-performing schools in the Texas Accountability System.⁶³

Some districts, such as Austin, have implemented HSTW in only one high school, leaving the traditional high school academic model available at other high schools to allow students the opportunity to choose between CTE and the traditional academic program. However, some districts, such as Birdville,⁶⁴ have implemented HSTW in all of the district's high schools,¹³ and consequently eliminated the traditional academic program entirely throughout the district, allowing students no choice about participating in CTE.

Dallas ISD recently announced plans to reorganize all of its high schools under the career academy model;⁶⁵ this initiative, entitled Dallas Achieves (based on principles established by AchieveTexas) is to be funded by the Texas High School Project, which underwrites use of the HSTW and ECHS¹⁴ models for high school redesign.⁶⁶

Unlike Tech Prep, there is little information publicly available about HSTW. There are no recent numbers of high schools that are participating in HSTW in Texas or recent numbers for the students presently enrolled in Texas HSTW. Nor is there any information that reveals how well HSTW student performance compares to students in traditional academic high school programs, particularly with regard to high school graduation rates, postsecondary readiness, and postsecondary participation.

¹³ Three of four Birdville high schools are HSTW, and the fourth is a learning center, organized into career majors, offering alternative programs such as DAEP and credit recovery.

¹⁴ Early College High Schools are small high schools from which students graduate with a high school diploma and a two year associate's degree or sufficient college credits to enter a four-year bachelor's degree program as a junior.

SREB's most recent profile of the Texas HSTW initiative provides information about the school year of 1999-2000. During this year, there were 53 HSTW in Texas (up from 24 in 1996) that served a total of 1,162 students.⁶⁷ This report notes that 51% of Texas HSTW students met the goal set by HSTW for performance on the National Assessment of Educational Progress (NAEP), 72% met HSTW's mathematics standard for NAEP, and 56% met HSTW's science standard for NAEP.⁶⁸ The meaning of these numbers is unclear because SREB does not identify the grades tested or when the tests were administered (although the HSTW standard is identified relative to NAEP scale scores); nor does this data permit a direct comparison between students participating in HSTW with students in traditional high schools.

TEXAS CTE: ENROLLMENT AND PERFORMANCE

Although Tech Prep and HSTW represent the two primary forms of CTE in Texas public schools today, there are also numerous unique district CTE programs throughout Texas that are tailored to fit local needs. This diversity results from a long history of local control of CTE. Until about ten years ago, CTE in Texas was regarded exclusively as a district program (optional enrichment), and not subject to state governance, in sharp contrast to academic instruction in Texas public schools (See Appendix A for a brief history of state CTE policy). The relatively recent development of state policy for CTE may account for the scarcity of centralized information about CTE enrollment and outcomes.

The precise size of CTE enrollment in Texas public schools is difficult to determine, although school districts are required to report the number of students enrolled in CTE. There are several sources reporting significantly different numbers on CTE enrollment (See Appendix B). It appears that 87% of students in Texas public schools take one or more CTE courses while 21% of students are enrolled in Tech Prep, the most demanding of CTE programs, funded by the federal Carl D. Perkins Career and Technical Education Act. The percentage of Texas students who complete one or more CTE courses but are not enrolled in Tech Prep is unknown, but likely represents at least 40%, based on national numbers.

Nationally, at least 50% of all high school students enroll in at least one CTE course, and between 25 to 40% complete the sequence of three or four courses that is considered a program of study.⁶⁹

Precisely how the performance of all CTE students compares to non-CTE students in Texas public schools is unknown. The TEA recently began issuing annual reports about the educational outcomes of CTE students in Texas public schools, based on information generated by a data system that was implemented in 2005. The Performance-Based Monitoring Analysis System (PBMAS) reports on students in federally funded programs: CTE, Bilingual Education, Special Education, and No Child Left Behind.⁷⁰ For CTE, PBMAS provides annual information about passing rates on state assessments (for all

CTE students, economically disadvantaged students, Limited English Proficiency students and Tech Prep students), dropout rates, graduation rates, and diploma rates (Recommended High School Diploma and Distinguished Achievement Diploma), and compares these rates with state average performance.

Information from PBMAS offers a narrow perspective on educational outcomes of CTE students, primarily because the system does not compare the performance of CTE students with non-CTE students.⁷¹ Additionally, the numbers raise serious questions about the usefulness of the state measures because CTE outcomes perfectly matched state average performance to the tenths place in each of the performance categories⁷² (the statistical probability of this occurrence is quite low).

If, as reported by PBMAS, the educational outcomes of Texas CTE students mirror the outcomes of all students in Texas public schools, far too many CTE students fail to attain a high school diploma and the vast majority of CTE graduates are not academically prepared to succeed in postsecondary endeavors. To understand and improve the educational outcomes of CTE students, an understanding of the challenges that face all students of Texas public schools is required.

TEXAS PUBLIC SCHOOLS: GRADUATION RATE AND POSTSECONDARY READINESS

While Texas elementary and middle schools have demonstrated significant gains on NAEP in reading and mathematics performance, as well as steady reduction of the achievement gap between student groups, no such gains are evident for Texas high schools.⁷³ Far too many high school students fail to earn a diploma after four years, and the rate at which students graduate from Texas public schools falls significantly below the national average (See Appendix C).

The state graduation rate, like the state dropout rate, is subject to much interpretation. The most recent report issued by the Texas Education Agency (TEA) provides a graduation rate of 80.4% for the class of 2006⁷⁴ (down from 84% in 2005, but up from 79.5% in 1999⁷⁵). Comparison of the state's graduation rate with other states is difficult because Texas, like many states, has created a method that is somewhat unique from other states.

Texas' method is also quite different from the calculations employed by independent organizations that compare state graduation rates. These differences, in particular how the state's new method of calculating graduation rates differs from the method proposed by the National Governor's Association, are outlined in Appendix A. That said, every national calculation of graduation rates indicates that students in Texas graduate at a lower rate than national average (See Appendix C); although the specific rates differ, all national calculations indicate that at least 3 of every 10 students in Texas high schools fail to graduate with their class.

The vast majority of students who do earn a diploma from Texas public schools are not equipped to succeed in postsecondary endeavors: skilled employment, on-the job training, advanced military training, vocational training at a community college, or a four year college degree.

In 2006, students in Texas public schools scored an average of 991 on the SAT (national average was 1017⁷⁶) and 20.1 on the ACT (national average was 21.1⁷⁷); only 27.1% of Texas students reached or exceeded the state's criteria for college readiness on these tests.⁷⁸ In 2006, ACT reported that only 18% of Texas students demonstrated college readiness in all subject areas tested;⁷⁹ in 2007, the percentage of Texas students demonstrating college readiness on the ACT increased to 19% (compared to 23% nationally).⁸⁰ National comparisons of college readiness indicate graduates from Texas public schools lag far behind their peers in other states; in 2007, Texas ACT scores ranked 7th lowest in the nation and SAT scores ranked 8th lowest.⁸¹

It is worth noting that state assessments (the Texas Assessment of Knowledge and Skills-TAKS) fail to identify the extent of academic weakness in high school graduates that is all too apparent on independent measures.⁸² Employing the Higher Education Readiness Component (HERC) in TAKS, the TEA rated more than half of Texas 11th grade students ready for college (53% in English and 54% in math).¹⁵

Performance data produced by the Texas Higher Education Coordinating Board also indicates that a significant percentage of Texas high school graduates are *not* prepared to succeed in postsecondary education or training (See Appendix B postsecondary readiness standards). Statewide 41% of high school graduates are required to complete developmental (remedial) education before allowed to enroll in credit-bearing college courses.⁸³ This rate rises to 50% in community colleges, and rises even higher for Hispanic and African-American students in Texas public schools – 62% of African-American and 60% Hispanic students must complete developmental education in the state's two-year colleges.⁸⁴

For students taking developmental education in Texas institutions of higher education the odds are stacked. According to the Higher Education Coordinating Board, statewide less than 10% of all students who take developmental courses successfully completed developmental education and were identified as college ready in their first year at college.⁸⁵ Of the students who complete developmental education, less than 20% will earn a bachelor's degree within six years (compared to 50% bachelor's degree completion of Texas students who do not enroll in developmental education).⁸⁶

Alarmed about the weak transitions from high school to college in Texas, state policymakers created a plan in 2000 to close educational gaps, particularly those

¹⁵ The utility of the Higher Education Readiness Component (HERC) in TAKS deserves reconsideration by state policymakers; according to the National Center for Educational Accountability, the HERC standard is associated with a relatively low probability of successfully completing college freshman courses (*Identifying Appropriate College-Readiness Standards for All Students*, NCEA Issue Brief # 2, 2006).

demonstrated by African-American and Hispanic students. This plan identified state goals for transitioning students from high school to college, as well as for college completion. Each year, the Texas Higher Education Coordinating Board evaluates the state's progress towards *Closing the Gaps by 2015*. The most recent Progress Report (2007) is disappointing.

While Texas students are on target statewide to meet the 2015 goal for bridging from high school to postsecondary education and training, the participation of Hispanic students is significantly below target,⁸⁷ a statistic which is especially disturbing because this is the fastest growing demographic group in the state. Texans should also be disturbed about White participation; while presently above target, White participation is declining.⁸⁸ Other statistics are sobering. The statewide rate at which students earn bachelor's and associate's degrees, and certificates is also slowing (although currently on target), and the award of technology bachelor's and associates is well below target.⁸⁹

Texas business leaders express significant concern about public schools and the failure of many graduates to acquire the basic reading and math skills to succeed in most entry level jobs. Tom Pauken, chairman of the Texas Workforce Commission, recently published a commentary in the state's major city newspapers, describing the anxiety of Texas employers about finding sufficiently skilled workers.⁹⁰ Mr. Pauken noted that 45% of recent high school graduates lack necessary skills, according to a recent survey of businesses conducted by Hart Research Associates and Public Opinion Strategies.⁹¹ This finding is consistent with a 2005 survey of businesses in Texas, commissioned by the Texas Public Policy Foundation, which found 33% of Texas employees lack necessary skills.⁹² The Foundation calculated the cost of this educational deficit to be \$13 billion annually for Texans (without considering the impact of inflation).⁹³

In July 2008, the Governor's Competitiveness Council issued a report to Governor Perry which identifies the pressing need to "make critical changes at every level [of K-12 and higher education]...to address the state's low graduation rate," and "ensure all students graduate with the skills required to be college- and workforce-ready."⁹⁴

POSTSECONDARY READINESS AND THE ECONOMY

As noted by the Governor's Competitiveness Council, the essential knowledge and skills required for high school graduates to be ready for college and the workforce "are the same and should be taught to all students at the appropriate grade level."⁹⁵ Ensuring all high school graduates, whether enrolled in the college preparatory academic program or CTE, are prepared to succeed in postsecondary efforts, both college and work, is a relatively new expectation for Texas public schools. The courses and program of study that was considered the college preparatory academic curriculum is evolving into the common, core high school program that is required for all students to Texas public schools. This evolution has been driven by changes in the economy and workforce demands.

Labor market research⁹⁶ indicates that all students, whether bound for college or work, are best served by a common, academically rigorous core preparatory high school program, designed to culminate in readiness for both college and career. This is not to say that all students should be taught and assessed in the same way; it does mean, however, that all high school students should be prepared to meet the same high standard of academic performance that is broadly described as “postsecondary readiness” (See Appendix D for definitions).

Significant shifts have occurred in the job market, reversing the need for skilled and unskilled jobs. The proportion of unskilled jobs has been steadily shrinking and, today, less than 20 percent of jobs are classified as unskilled.⁹⁷ Many blue collar jobs – in such fields as welding, manufacturing, and automotive repair – now require one to two years of postsecondary training delivered in the postsecondary institutions or the workplace.⁹⁸ Some labor markets studies indicate that 85% of today’s jobs require some postsecondary education or training.⁹⁹

Not only is the demand for low skilled jobs reduced, real average earnings of full-time workers with a high school diploma or less have also markedly decreased over the past 30 years.¹⁰⁰ Workers with little education and few skills generally enter the labor market and remain in low-wage, unskilled jobs throughout their lives because on-the-job training or postsecondary education is generally required to earn a wage sufficient to support a family.¹⁰¹

For these reasons, policymakers believe it is in the best interest of all high school students to graduate from Texas high schools prepared to attend postsecondary education or high performance training without remediation. This interest has not gone unrecognized; state and national studies show that almost 100 percent of parents want their children to attend college, and nearly 80 percent of students plan to attend college, according to both state and national studies.¹⁰²

Failure to prepare students to be knowledgeable, productive citizens presents a growing danger to the social and economic well-being of all Texans. The Texas Center for Demographic and Socioeconomic Research and Education predicts that Texans will experience a 12% decrease in average household income and a 40% increase in poverty within the next 30 years if the rates of high school graduation and postsecondary completion are not dramatically increased.¹⁰³ As economic conditions deteriorate, the social well-being of Texans will also fail.¹⁰⁴

Texas faces an immense challenge in developing an educated, nationally competitive workforce. Today, Texas lags behind many states, some with comparably diverse populations, in high school graduation (ranking 8th lowest in the nation) and college graduation (ranking 6th lowest in the nation).¹⁶ Texas faces an even greater challenge in developing an educated, internationally competitive workforce.

¹⁶ Rankings are based on 2005 Public High School Graduation Rates and 2005 Bachelor’s Degrees Awarded Per 100 HS Graduates 6 Years Earlier produced by the National Center for Education Management Systems, accessed online June 2008, <http://www.higheredinfo.org/#>.

For many decades, the U.S. led the world in education, producing the highest percentage of high school graduates. This is no longer true; most nations have markedly increased their high school graduation rates, some almost doubling, while our graduation rate has remained relatively stable.¹⁰⁵ Today, the population completing secondary and postsecondary education in the U.S. lags behind many other nations with diverse student populations. The U.S. ranks 18th in high school graduation and 15th for college graduation among developed nations, although the U.S. invests more in public schools¹⁷ than other nations.¹⁰⁶

As the pre-eminence of the American education system and economy wanes, efforts to improve the quality of high school programs, particularly CTE, grow increasingly important.

RECENT STATE POLICY TO BOLSTER CTE AND HIGH SCHOOL OUTCOMES

Over the past five years, Texas has introduced dramatic and sweeping reforms to improve the postsecondary readiness of high school graduates.

In 2003, state policymakers unveiled a public-private partnership with the Bill and Melinda Gates Foundation to improve Texas high schools. The Texas High School Project (THSP) was established to prepare all students for college and careers, a mission that challenged long-held views about reserving college preparatory academics for a small, elite group of college-bound students.

To date, the public side of the THSP partnership has invested approximately \$148 million state and federal funds in the Texas High School Project (THSP), while private partners – including the Bill and Melinda Gates Foundation, the Michael and Susan Dell Foundation and Communities Foundation of Texas – have invested another \$112 million.¹⁰⁷ THSP funds have been dedicated to discretionary grants, awarded to support schools and districts for the purpose of increasing the graduation rate and the number of students prepared for college and career success. To achieve these goals, THSP grants provide funding for: high school redesign (High Schools That Work – HSTW and Early College High Schools – ECHS¹⁸), the Texas Science Technology Engineering and Math Initiative

¹⁷ The combined elementary and secondary education per student expenditures of the U.S. were 42% higher than the average expenditure of members of the Organization for Economic Cooperation and Development in 2004, nations that outperformed the U.S. on international assessments (*Contexts of Elementary and Secondary Education*, IES, National Center for Education Statistics, U.S. Department of Education).

¹⁸ Given that this paper has described the research on other high school reform models, a summary of findings on ECHS seems appropriate. The research is limited on ECHS because this reform is relatively new and has yet to establish a record of outcomes; however, preliminary reports show mixed educational results (Jacobs, J. [2005]. Kirst Comments on Early College High Schools, *Chronicle of Higher Education*). Research on Texas Early College High School Programs is promising, but missing from the record is standardized measures of postsecondary readiness and information about postsecondary

(T-STEM), leadership innovations (the Pilot High School Principal Certification Project), and student interventions (Texas High School Completion and Success Initiatives).¹⁰⁸ In 2006, school districts received additional funds for ECHS, with monies appropriated by the Texas Legislature; today, there are 21 ECHS operating in Texas, with an additional eight slated to open during 2008.¹⁰⁹ Texas is now home to the second largest number of ECHS in the nation; only North Carolina has a higher number.¹¹⁰

Beginning in the fall of 2005, the Texas Legislature required all high school students to complete the state's academic college preparatory program, the Recommended High School Program (RHSP), to qualify for graduation from Texas Public Schools.¹⁹ During that same year, the legislature made completion of RHSP a requirement for award of the Texas Grant Program,¹¹¹ and in 2007 the legislature made the RHSP one of the eligibility requirements for automatic admission to state universities under the Top Ten Rule¹¹² (80th Texas Legislature, HB 3826).

Recognizing the need to academically strength the academic courses that comprise the RHSP,²⁰ legislation was passed in 2005 that makes graduation from the RHSP contingent on completion of four high school courses in each of the four core subject areas.¹¹³ Also in 2005, the Texas Legislature directed the Texas Higher Education Coordinating Board and Commissioner of [Public] Education to develop college readiness standards¹¹⁴ that are to be incorporated into the high school curriculum by the State Board of Education (House Bill 1).²¹ Additionally, a high school allotment (\$275 for each high school student) was created for districts to use in preparing students for higher education and advanced academic courses, increasing the academic rigor of high school courses, aligning secondary and postsecondary curriculum, and supporting promising high school completion and success initiatives.¹¹⁵

In 2007, the 80th Texas Legislature adopted landmark reforms to strengthen CTE, and bolstering the graduation rate and postsecondary readiness of all high school graduates. House Bill 3485, the capstone of a series of initiatives aimed at bolstering postsecondary readiness of all high school students, encourages districts to establish a personal graduation plan for each student that identifies a course of study promoting college and workforce readiness, and facilitates the transition from high school to postsecondary education. HB 3485 also calls for updating state standards for CTE²² and organizing them into coherent sequences that lead to an industry-recognized credential, postsecondary

transitions (for more information, see *Texas Study of the Middle/Early College Expansion Grant Program* [2007], prepared for the Texas Education Agency by Resources for Learning).

¹⁹ State law allows students to elect to enroll in the Minimum High School Program which has fewer academic requirements, or the Distinguished High School Program which provides advanced courses reflecting college or professional-level skills.

²⁰ According to the Texas Higher Education Coordinating Board, almost a third of students completing the RHSP are unprepared to succeed in higher education statewide, a rate that rose to 49% for students seeking to enter two-year institutions (*Developmental Education: Statewide Data Profile*).

²¹ At present, the college readiness standards have been adopted by the Texas Higher Education Coordinating Board, and await adoption by the Commissioner of Education and State Board of Education.

²² HB 3485 requires the panel responsible for reviewing and rewriting the state's CTE course standards to present revisions to the State Board of Education no later than September 1, 2009, and school districts to provide instruction in the new curriculum beginning with the 2010-2100 school year.

certification or postsecondary degree (associates or bachelor's). Additionally, the legislation creates definitions of "career and technical student," and "sequence of courses."

Most importantly, this legislation establishes a bridge between high schools and colleges for both academic and CTE students. HB 3485 requires each school district to offer all students the opportunity for earning at least 12 semester credit hours of college credit in high schools. Now state law provides four ways for high school students to earn college credit, by completing: the College Board's Advanced Placement Program (AP), Dual Credit (concurrent college enrollment), college credit by articulation,²³ and Credit by Examination.¹¹⁶

WHAT RESEARCH SAYS ABOUT CTE AND HIGH SCHOOL REFORM

National Research:

Although there is a sizable body of research on CTE in the United States, the research leaves significant gaps in our knowledge of CTE. Few longitudinal studies of large student groups have been conducted to compare the performance outcomes of CTE students with non-CTE students. Interpretations of this research are complicated by the great variety of CTE programs, as well as the huge variations within prominent CTE models (such as Tech Prep and HSTW) due to differences in implementation. Research is completely silent on the use of CTE as the framework for comprehensive high school reform by districts and states; these reforms are too recent and, in many cases, not fully implemented.

There are only a handful of studies that examine the student populations that are served by CTE. These studies report that students most likely to enroll in CTE are generally those in the lowest quartile of both achievement and family income.¹¹⁷ Studies also find the average high school student takes more CTE courses than academic courses, and that the majority of low-income students are more likely to complete more CTE courses than academic courses.¹¹⁸

A national overview of CTE was produced for Congress in 2004 by the National Assessment of Vocational Education (NAVE). One of the study's key findings was stated as follows: "Over the last decade of academic reforms, secondary students who participate in vocational programs have increased their academic course taking and achievement, making them better prepared for both college and careers than were their peers in the past. In fact, students who take both a strong academic curriculum and a vocational program of study – still only 13 percent of high school graduates – may have better outcomes than those who pursue one or the other."¹¹⁹

²³ ATC gives high school students who demonstrate college level competence in content-enhanced high courses, usually technical, to bank college credit for courses that are part of a college degree program, usually offered by a community college.

NAVE also found “the vocational courses most students take improve their later earnings but have no effect on other outcomes that have become central to the mission of secondary education – such as improving academic achievement or college transitions.”¹²⁰

These findings are consonant with most of the research devoted to CTE in the U.S. Many studies found that CTE exerts a positive influence on student attendance, the dropout rate, course taking, high school completion, and labor market outcomes, while also finding little or no evidence that CTE improved standardized achievement, postsecondary readiness or transitions to postsecondary education or training.¹²¹

More than a few studies found that CTE exerts a *negative* influence on standardized achievement, particularly for students who concentrate in CTE (taking a higher ratio of CTE than academic courses).¹²² A recent publication issued by the National Governors Association reports that two-thirds of CTE concentrators scored below basic on the NAEP, noting that CTE “struggles to provide sufficient [academic] rigor.”¹²³ A 2006 report by the National Research Center for Career and Technical Education noted that CTE is associated with reductions in the likelihood of college enrollment when students complete a higher proportion of CTE than academic courses, even when the research controlled for other influences associated with educational outcomes.¹²⁴ This negative impact is greatest when students substitute CTE for academic courses in the first two years of high school.¹²⁵

Nonetheless, there is growing evidence that recent reforms are strengthening both the academic and technical components of CTE, and improving educational outcomes. Several recent studies show CTE exerts a positive impact on high school graduation rates, labor market incomes, and postsecondary enrollment.¹²⁶ Researchers find this impact is greatest when CTE students take three technical courses for every four academic courses, and is greatest for students who are most at risk of dropping out.¹²⁷

Recent studies have also found a strong correlation between taking an occupational sequence of CTE courses with positive labor market outcomes, particularly for those who take a sequence of three or more courses in a specific occupational field.¹²⁸

It is important to note that research finds very different educational outcomes for career academies. A growing number of studies find little or no evidence that career academies provide graduates advantages either in the labor market or postsecondary education/training.¹²⁹ An analysis of seven studies that examined the effectiveness of career academies by the What Works Clearinghouse (Institute of Education Sciences, U.S. Department of Education) found very few sound studies have been completed on this issue; the one randomized, controlled study that met research standards established by the Clearinghouse found evidence that career academies exerted a positive impact on students staying in school and on students progressing in school on time, but found no evidence that career academies improved the likelihood that a high school student graduated or earned a General Education Diploma (GED).¹³⁰

Research on career academies recently released by MDRC (formerly Manpower Demonstration Research Corporation, an organization that promotes the expansion of career academies, particularly for disadvantaged youth) finds that career academies, where well implemented, “offer viable pathways to a range of postsecondary opportunities, but they do not appear to be more effective than options available to the non-academy group [of students].”¹³¹

Some policy analysts suggest the disappointing results of career academies may well reflect the need to increase the rigor of academic courses and the number of academic courses completed.¹³² In other words, career academies, where academics and technical courses are fully integrated, may not provide the rigorous academics that are required for students to attain a high school diploma, acquire postsecondary readiness, and transition successfully into postsecondary education/training. As noted in a publication exploring promising practices in the integration of academic and applied education, “the proposition that an integration model can foster greater educational success may not yet be proven.”¹³³

Other analysts suggest the disappointing results of career academies could result, at least in part, from research design; when the impact of career academies are averaged across diverse student populations, the full impact on individual student groups is masked. One of the most important findings from research on career academies is that this educational model exerts different impacts on different student groups. Research produced by MDRC found that career academies strongly improve the educational outcomes of students at high risk of school failure, but do not demonstrate these improvements for medium- or low-risk students.¹³⁴

The importance of examining the impact of educational experiences on different student groups was one of the key findings of a longitudinal study of Central Texas high schools conducted by the Ray Marshall Center at the University of Texas at Austin. The Center examined the relationship between school experiences and student outcomes, differentiating their findings according to family background, income, race and ethnicity. The Center found that the educational outcomes of student groups were significantly and differently influenced by different academic experiences. Researchers concluded that different student groups require different educational experiences to successfully transition into postsecondary activities, employment or college.¹³⁵

Tech Prep Research:

The national research on the effectiveness of Tech Prep programs is best described as “inconclusive.”¹³⁶ While many national studies found that Tech Prep improved students’ grades, lowered dropout rates, increased high school completion and improved postsecondary enrollment, studies did not find that Tech Prep improved students’ scores on standardized tests.¹³⁷ Findings were also mixed on whether Tech Prep improved postsecondary completion or labor market outcomes.¹³⁸

The findings of independent research that examine Tech Prep in Texas are more positive. The Texas Schools Project at the University of Texas at Dallas, in collaboration with Region I Education Service Center, is examining the education outcomes of Tech Prep seniors (over 90% Hispanic) graduating from Region I public high schools in 2004 and 2005.²⁴ Preliminary findings recently reported to the Senate Education Committee indicate that Tech Prep students participating in the Free/Reduced Lunch Program transitioned to four-year institutions of higher education in 2005 at a higher rate (59%) than students enrolled in the general academic program (49%), students enrolled in CTE without a coherent sequence of CTE courses (about 47%), and students enrolled in CTE with a coherent sequence of courses (45%).¹³⁹ Among Free/Reduced Lunch graduates in both 2004 and 2005, Tech Prep participants transitioned to two-year higher educational institutions at a higher rate than did non-Tech Prep participants.¹⁴⁰

Slightly different, but not necessarily contradictory, education outcomes were found by Region VI Education Service Center in studying the CTE programs funded by the Carl D. Perkins Vocational Act in Texas public schools (which include Tech Prep as well as other CTE programs that furnish a coherent sequence of courses). Performance gaps between students in federally funded CTE programs and students in non-CTE programs were found on both the Texas Assessment of Knowledge and Skills (TAKS) and the Higher Education Readiness Component (HERC) of TAKS.¹⁴¹ These gaps showed that the more structured the CTE program (in terms of course coherence), the better students performed on TAKS and HERC, though still not as well as the non-CTE students.¹⁴²

The findings of these two studies seem to complement findings of a 2005 unpublished study of CTE in Texas public schools that was produced by the Ray Marshall Center for the Study of Human Resources at the Lyndon B. Johnson School of Public Affairs at the University of Texas at Austin in 2005 for the National Assessment of Vocational Education (funded by the U.S. Department of Education).

This study found that substituting CTE for academic courses during the first two years of high school leads to a lower likelihood of enrollment in the following year – while substituting CTE for academics in the third year led to a higher likelihood of enrollment in 12th grade.¹⁴³ For all Texas students, substituting CTE for academic credits resulted in a higher likelihood of transitioning to two-year institutions of higher education and a lower likelihood of transitioning to a four-year institution.¹⁴⁴ Substituting CTE for academic courses lead to higher earnings in both the first and second year following high school graduation from Texas public schools, and additional CTE credits led to even higher earnings.¹⁴⁵ For Tech Prep students in Texas public schools, the likelihood of entering a two-year institution of postsecondary education is higher than for the non-Tech Prep student with the same mix of CTE and academic credits,¹⁴⁶ however the likelihood of non-Tech Prep students enrolling in a four-year institution is higher than that of Tech Prep students.¹⁴⁷

²⁴ This study was composed of 31 of the 37 non-charter districts in Region I.

High Schools That Work Research:

The research on HSTW is limited. SREB's website lists Four External Research Reports on HSTW, but only one report provides student achievement on standardized assessments.¹⁴⁸ This information only describes the performance of HSTW students relative to the SREB's goals for NAEP performance, without furnishing scale scores or any scores that could be used to compare HSTW students with average state or national performance.¹⁴⁹

Not listed on SREB's website is a positive review of HSTW that was produced by the American Institutes for Research (AIR) in 1999 that examined the research backing up HSTW and other popular reform models.¹⁵⁰ Of the 10 studies examining HSTW and student achievement, AIR identified only four studies that used sufficiently sound research methods to merit consideration. These four studies indicated HSTW had a positive effect on students' NAEP scores and scores on an assessment created by SREB.¹⁵¹ Based on these studies, AIR awarded HSTW a Strong Rating for student achievement;¹⁵² however, with the rating, AIR also furnished a caveat about the weakness of the HSTW's research base. Much of the research on HSTW, according to AIR, compares new HSTW with other HSTW that have used the vocational model for a longer time – a methodology, AIR noted, which does not produce evidence that the model itself improves learning.¹⁵³

Other reports on HSTW provide equally little information about student outcomes. In a progress report on HSTW for 2006, SREB provides composite average reading and math scores of all HSTW schools in the nation (with no grades given) that are based on an unidentified NAEP-referenced assessment.¹⁵⁴ In other reports, SREB offers comparisons of HSTW students with other HSTW or other CTE to describe programmatic success. For example, the most recent report on HSTW produced by the SREB compares the performance of students enrolled in HSTW with students enrolled in *Project Lead the Way*²⁵ (another SREB initiative that creates career academies focused on engineering).¹⁵⁵

One of the primary research reports on HSTW, produced by SREB, is a comparison of HSTW schools that received technical assistance to implement HSTW with HSTW schools that received no technical assistance; based on this comparison, SREB described HSTW as a successful model that results in high student achievement.¹⁵⁶ The other report, produced in 2008 by the Educational Testing Service, only identifies how well HSTW scores relate to students' self-reported educational experiences.¹⁵⁷

State information about HSTW in Texas is similarly unenlightening at present. An Interim Report on the High School Redesign and Restructuring Grant Program, commissioned by the TEA and published in 2007, focuses on the fidelity of implementing school redesign models and offers no information about educational outcomes, concluding "teachers in general felt it was too early to see much change in

²⁵ Texas has more than 130 Project Lead the Way high schools (career academies that concentrate on engineering studies). For more information, see *Lost in Translation: Building a Better Path from School to College and Careers* (2008), SREB, http://www.sreb.org/publications/2008/08V01_LostInTransition.pdf.

student achievement outcomes.”¹⁵⁸ More substantial information about HSTW in Texas should be available within the next several years; the TEA has recently contracted with SRI International to conduct a seven-year evaluation of the Texas High School Project.¹⁵⁹

International Research:

Over the past several years, researchers in the United States have turned their attention to other nations to study policies and practices that increase high/secondary school graduation and transitions to postsecondary education/training. This research finds a strong correlation between CTE enrollment and high/secondary school graduation; nations *enrolling* a large proportion of students in CTE programs have significantly higher graduation rates than nations with a smaller proportion of students enrolled in CTE.¹⁶⁰ International studies have also found a high correlation between the occupational specificity and technical strength of CTE and positive labor market outcomes; graduates who enter the workforce immediately after high school have significantly higher earnings if they complete advanced technical courses instead of general vocational courses.¹⁶¹

Studies of industrialized nations show a strong relationship between *increases* in the enrollment of the percent of upper secondary students enrolled in vocational education and the percent of secondary and postsecondary completion.¹⁶² The nations that introduced high school reforms to expand and diversify vocational options, while retaining general academic studies, significantly increased graduation rates.¹⁶³ The nations that expanded, diversified, and strengthened CTE as pathways to postsecondary education and training also show significant increased postsecondary completion, as well as improved labor market outcomes for students who enter employment directly after graduation.¹⁶⁴ By implementing these reforms, several nations²⁶ participating in the Organization for Economic Cooperation and Development (OECD), have almost doubled their rates of secondary completion.¹⁶⁵ Many of these nations, it should be noted, achieved this success with highly diverse student populations.¹⁶⁶

Researchers have also established a correlation between the time at which students are required to choose their educational concentration (CTE or the general academic program) and completion of both secondary and postsecondary education. Nations that defer the selection to a time that is equivalent to the junior year in our high schools generally encourage more students to complete the academic pathway and transition more students into postsecondary education and training.¹⁶⁷

Significant differences have been found among nations in the extent to which CTE and academic studies complement each other, whether these studies are integrated or run parallel for CTE students. Nations that separate CTE from general academic programs but retain links between CTE and general academic programs have the highest attainment levels, high rates of graduation and strong transitions into higher education.¹⁶⁸

²⁶ Graduation rates have almost doubled in France, Canada, Italy, Japan, and the United Kingdom (Alternative Pathways to High School Graduation: An International Comparison published by the California Dropout Research Project, 2008).

Although researchers find significant differences between the educational systems of OECD nations, the content and role of the general academic curriculum is a truly universal feature of all member nations. All member nations have a fully academic program that is designed to prepare students for postsecondary education/training, and all nations give pre-eminence to the academic program.¹⁶⁹ Differences between national education systems relate solely to the number, kind, quality, and scheduling of alternatives to the academic program that are made available to students.

Research indicates that educational pathways in OECD nations are generally highly stratified along socio-economic lines; this stratification contributes to the educational and social differentiation present in all nations.¹⁷⁰ However, there is evidence that differentiating CTE and the general academic program need not result in different educational and social outcomes when nations ensure that standards of learning, particularly those related to mathematics, are equally rigorous.

Studies show that a group of nations have significantly reduced the differences in educational outcomes between students completing CTE and academic paths (including France, Netherlands, Austria, Denmark, and Sweden).¹⁷¹ Several nations, including Switzerland and Luxembourg, have actually reversed achievement gaps between student groups; in these nations, CTE students demonstrate higher achievement levels than students completing the general academic program.¹⁷²

THE ROLE OF CTE IN HIGH SCHOOL REFORM

Because CTE serves most students in public high schools today, it offers a powerful lever for improving high school outcomes. The urgent need for significant growth in high school graduation and postsecondary readiness has spurred five states to establish a radically new role for CTE, establishing CTE as the framework for all high school students. These states are redesigning high schools around career majors and organizing high school curricula and extended work-based activities around a variety of occupational themes.

Other states have focused high school reform on strengthening the academic and technical components of CTE so that it will serve as a viable alternative to or complement the college preparatory academic program.

Texas public schools are poised on the brink of implementing a state initiative that requires 8th grade students to choose a career pathway and complete a high school program that blends career preparation with career-relevant academics. This initiative proposes to reorganize the entire public school curriculum and integrate career awareness and activities in all classes (such as English and mathematics) throughout the grades, beginning in pre-kindergarten.

According to the implementation guide, expectations of the AchieveTexas program are that the career pathway system will produce more well-rounded graduates, ready students

for postsecondary opportunities (a four-year university, two-year college, an apprenticeship, military service, on-the-job training) and prepare students for active citizenship. The guide also states that career pathways provide the way to expand opportunities for students, providing many different paths for students to follow to meet their individual needs and career choices.

These intentions and these expectations suggest important questions. Why should Texans implement AchieveTexas? Where is the empirical evidence to support the expectation that CTE-CSR is the best framework for redesigning either Texas high schools or the best educational model for K-12 education?

Research provides no evidence that this model of reform improves educational outcomes for a school district or state system of public education. Nor can this evidence be found in practice. Not one of the five states that have chosen to implement the CTE-CSR model has achieved full implementation, nor have these states had sufficient time to evaluate the impact of reform.

Not one of the member nations of the OECD that outperform the U.S. has implemented this model. On the contrary, nations that outperform the U.S. have expanded, enriched, and diversified CTE as a viable alternative to the college preparatory, Liberal Arts academic program in secondary schools.

How can student opportunities and pathways be expanded or students become well-rounded when AchieveTexas limits access to academic courses to those that directly relate to the career pathway? How is it possible for students to tailor opportunities and pathways to their individual needs when AchieveTexas allows school districts to decide which opportunities and pathways will be made available to students?

How can students become prepared for active citizenship if their opportunity to learn about the traditional Liberal Arts disciplines – arts, humanities (history, languages, literature, and social sciences), mathematics, and science – is completely limited by occupational application?

Should Texas replace the traditional high school program that offers students three choices (CTE, college preparatory Liberal Arts academics, or a blend of CTE) with one educational program that blends CTE and academics? Why should Texas adopt an initiative that reduces educational alternatives in high schools when high performing nations have increased high school graduation and postsecondary completion by expanding and diversifying educational choices? Why should Texas adopt the one-size-fits-all program of blending academics and CTE when research indicates that CTE serves the needs of some students well and some students not at all?

Do Texans want public schools to focus students solely on workforce development? Do Texans want the public school curriculum to blend occupationally-related academics and technical education for all students? What should be the ultimate objective and value of a Texas high school diploma?

Who should decide whether Texas public schools should organize high school instruction around CTE? Who should be responsible for determining what role CTE plays in Texas public schools? Should these state policy decisions be made by state agencies and school districts, a situation which is now occurring in Texas. Or should these decisions be made by elected representatives serving in the State Legislature or State Board of Education, as was the case in the five states that are now implementing CTE as comprehensive school reform?

There are no correct or incorrect answers to these questions. The answer to each involves a value judgment about public education that has long been vigorously contested in our state and nation. What kind of education is best--vocational or Liberal Arts academics? Both are defined as the antithesis of one another. Liberal Arts academics are intended to foster broad, theoretical knowledge about Western Civilization and a shared culture, as well as develop intellectual capacities for critical thinking (such as logic, reason, and judgment). Vocational education is intended to foster technical, professional knowledge and skills which prepare students to fulfill the economic needs of the individual and the competitive needs of business and the state. Historically, academics and vocational education have been pitted against each other in waves of reform under a variety of guises as new visions for redesigning educational programs. This struggle is well described by a report published by the Thomas B. Fordham Foundation, entitled *Beyond the Basics: Achieving a Liberal Education for All Children* (2007) and available online at <http://www.edexcellence.net>.

While skirting the debate about what kind of knowledge and skills students should learn in Texas public schools, the reasons for retaining Liberal Arts cannot go unrecognized, particularly since the state's high school initiative proposes to eliminate the Liberal Arts program in Texas public high schools.

It is argued by some that a Liberal Arts education offers practical preparation for future employment that is not offered by vocational studies. The general intellectual capacities and knowledge produced by a Liberal Arts education is intended to prepare students to be successful in jobs that have yet to be created; the Bureau of Labor Statistics predicts that 80% of children entering kindergarten today will eventually work in jobs that do not currently exist.¹⁷³ Many contend that Liberal Arts education goes beyond basic skills and workforce development to create a cultural identity and a shared cultural heritage that is necessary for the culturally diverse, pluralistic community in which we live (E.D. Hirsch describes this as cultural literacy).²⁷

Proponents also argue that the knowledge and skills associated with Liberal Arts best prepare students for the responsibilities and privileges of citizenship. Certainly, better preparation is sorely needed by today's youth. A recent survey of 17 year-olds revealed that almost a fifth could not name our nation's enemies in World War II, more than a

²⁷ The teaching of cultural literacy has particularly relevancy for the U.S. today; approximately 12% of the American population is foreign-born and 20% of nation's students speak at language other than English at home (Hess, F., 2008. *Still At Risk: What Students Don't Know, Even Now*, Common Core).

quarter thought Columbus sailed after the American Revolution, and half could not identify the Renaissance, according to a national survey of 17 year-olds recently conducted by Common Core.¹⁷⁴

The importance of a common core academic curriculum for cultural literacy is widely recognized by the member nations of the OECD, most of which need to educate highly diverse populations. These nations have resolved the academic-vocational debate by expanding, enriching, and diversifying both academic and technical concentrations in secondary education.

CONCLUSION

The Texas Education Code, Chapter 4, Section 4.001 (a) states: “The mission of the public education system of this state is to ensure that all Texas children have access to a quality education that enables them to achieve their potential and fully participate now and in the future in the social, economic, and educational opportunities of our state and nation.”

Thoughtful decisions about the role of CTE in Texas public schools are required to realize this mission. The right decisions will enlarge and diversify educational choices, and broaden access to both academic and technical knowledge.

Making CTE the template for high school reform defies the most fundamental lesson that can be learned from research and practices of high performing nations: no nation has yet devised the single educational system, program, course, or instructional method that adequately meets the needs of all students.

Constructing many diverse academic and career paths in Texas public high schools that all culminate in postsecondary readiness does offer promise for increasing high school graduation and postsecondary success. But this promise depends on three keys. The first key is a core Liberal Arts academic curriculum for all students. The second key is truly diverse and broad choices of both academic and technical concentrations, made available in both applied and theoretical forms. The third key is full access to academic and technical courses, no matter what path a student chooses to follow.

This model of high school reform would allow Texas, like the State of Virginia, to attest that the high school diploma will tell “admission officers at colleges, universities, and career and technical schools that the bearer is ready for the rigors of postsecondary education,” and tell “potential employers that the graduate possesses the reading, writing, and computational skills required for success in the workplace.”¹⁷⁵

This model would also allow Texas to improve on the Virginia diploma by attesting that the diploma from Texas high schools certifies the bearer recognizes the important individuals, events, controversies, and ideas that shaped our nation, has acquired the

cultural literacy required to thrive in a pluralistic society, and understands the obligations and privileges of living in a democracy.

For Texans, one of the most important obligations of citizenship is to ensure that public schools meet the changing, diverse needs of Texas youth. Many paths, equal rigor, and one destination for high school reform offer a way for Texans to fulfill this obligation.

RECOMMENDATIONS FOR REFORMING TEXAS CTE

- Enact legislation that clarifies the meaning of HB 3485 and validates the educational obligations of school districts to offer high school students the opportunity to choose to concentrate either in CTE or a fully academic, traditional Liberal Arts program;
- Reserve state policy decisions that introduce fundamental reforms to the public school curriculum for elected representatives of the Texas Legislature or State Board of Education;
- Make CTE a viable (academically and technically rigorous), and attractive option for high school students;
- Expand, enrich, and diversify the menu of CTE options available to all students in every school district;
- Expand, enrich, and diversify the ways that CTE is delivered to students, including a choice of applied and theoretical instruction, and virtual classrooms;
- Revise the CTE course curriculum requirements to ensure they are relevant to current and emerging occupations, and include college and workforce readiness standards;²⁸
- Ensure that all school districts provide all high school students the opportunity to choose to concentrate in either CTE or the traditional, fully academic Liberal Arts program, or a combination of both;
- Equalize access to high quality educational programs between schools and districts by developing a state sponsored electronic high school;
- Require all students to take the college preparatory, core academic curriculum through 10th grade and establish occupationally focused versions in core subjects (math, science, English and Social Studies) for grades 11 and 12 that cover the state curriculum standards – TEKS;
- Ensure that all CTE and academic courses/programs culminate in postsecondary readiness, credits, industry-recognized credentials, or state licenses;
- Define the educational outcomes of CTE and all graduates of Texas public schools that are associated with postsecondary readiness, including completion of specific core high school courses and minimum scores on tests of college readiness;

²⁸ This report takes the liberty of including a recommendation for CTE reform issued by the Governor's Competitiveness Council in the *Council's Report to the Governor* (June 2008), available online at <http://www.governor.state.tx.us/gcc>.

- Define a list of required CTE courses that constitute coherent sequences for a broad, diverse selection of occupational opportunities;
- Require districts to use external, industry-related or national association tests whenever possible for CTE course assessments;
- Predicate state approval and funding for CTE courses that lead to industry certification wherever available and postsecondary credits;
- Phase out weighted CTE funding for courses that are not part of a state-approved coherent sequence, and base state CTE funds initially on completion (but not passing) of approved courses and externally-developed end-of-course tests;
- Designate state funding to underwrite the costs related to test-taking for certification, accreditation, licensure, and credentials;
- Develop a recommended ratio of academic and CTE courses for high school students;
- Encourage school districts to expand Tech Prep as the primary model for CTE and withhold state funding for reform models that have not proven the equal to or superior to Tech Prep;
- Treat CTE courses the same as academic courses with regard to dual credit and GPA weighting;
- Establish state guidelines for state, federal, and privately funded grants for CTE and all high school redesign initiatives to
 - align grants with state goals for postsecondary readiness,
 - prioritize grants that are based on evidence that programs increase high school graduation and postsecondary readiness,
 - evaluate student outcomes of each grant annually and compare high school graduation rate and postsecondary outcomes of students participating in grant programs with students who are not, and
 - terminate grants that do not produce targeted student outcomes for high school graduation and postsecondary readiness within 3 years.
- Strengthen statewide articulation of college credit between high schools and colleges in a way that is economical for students;
- Create a seamless system for transferring credit from public community colleges to state four-year colleges; and
- Create a new K-20 public education information system that provides specific, real-time detail about CTE students, programs, teachers, and schools that is necessary to evaluate and improve outcomes (and begin with clearly identifying the number of students participating in different kinds of CTE, the number and kind of different CTE programs, and the number of schools offering only some form of CTE).

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and providing suggestions. TIER is, however, solely responsible for all interpretations of fact, recommendations, and any possible error.

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APPENDIX A OVERVIEW OF STATE CTE POLICY

Previous to 1997, the state's role in CTE had been largely limited to fiscal and advisory functions. The TEA disbursed state and federal funds to districts, and produced a State Plan for Career and Technology Education that recommended strategies for districts to achieve state goals.²⁹ Although the TEA continues to perform these functions, the state role in CTE began to significantly expand with reforms enacted by the 74th Texas Legislature.

Senate Bill 1 (1995) called for the State Board of Education to create new, more academically rigorous state curriculum standards: mandatory standards for the four core academic courses (the Foundation Curriculum), from kindergarten through 12th grade, and voluntary standards for all other curriculum, including CTE (the Enrichment Curriculum).¹⁷⁶ These standards were introduced to Texas public schools at the onset of the 1998-99 school year.¹⁷⁷ Subsequently in 2003, the Texas Legislature made the state standards for CTE and other Enrichment Curriculum mandatory in Texas public schools (Senate Bill 815).¹⁷⁸

In 1999 the Texas Legislature introduced Tech Prep to the State Higher Education Code, prompted by the 1998 Congressional Reauthorization of the Carl D. Perkins Career and Technical Education Act. House Bill 2401 outlined the federal provisions of Tech Prep and called for Texas public schools and Higher Education to develop secondary and postsecondary programs of study that provide opportunities for students to prepare for employment in jobs that require highly skilled, two-year college graduates.¹⁷⁹

Also in 1999, the state expanded a system to evaluate, monitor, and hold schools accountable for CTE, a system that originated in Senate Bill 1. This legislation called for the TEA to develop a statewide plan to ensure school district compliance with federally funded, state-administered programs for the instruction of disabled students.¹⁸⁰ As charged, the TEA developed the District Effectiveness and Compliance Process (DAS), a data-driven, risk-based monitoring system for Special Education. In 1999, the TEA replaced DAS with the Program Analysis System (PAS), and extended state monitoring to other special state programs, including CTE, Bilingual Education, Gifted and Talented Education, and State Compensatory Education.¹⁸¹

Again in 2003, the TEA expanded monitoring and evaluation of CTE with the introduction of the Performance-Based Monitoring Analysis System (PBMAS)³⁰ to replace PAS. Piloted in the 2003-04 school year and fully implemented in 2004-05, PBMAS evaluates such things as student performance and program effectiveness, use of funding, regulatory compliance, accountability ratings, complaints, and governance

²⁹ See the State Plan for Career and Technology Education 2008-2013 produced by the Texas Education Agency and available at <http://www.tea.state.tx.us/cte/Accountability/StatePlanFinal111607.pdf>.

³⁰ To review Annual Performance-Based Monitoring of CTE, see the 2006 and 2007 State Reports at <http://www.tea.state.tx.us/pbm/staterpts.html>.

issues; based on this information, the TEA identifies districts in need of additional monitoring and state interventions to ensure program compliance and student success.¹⁸²

Statutory responsibility for CTE is presently divided among several state entities: the TEA, State Board of Education, Higher Education Coordinating Board, and the State P-16 Council. The TEA serves as the lead agent in coordinating this effort, in addition to monitoring and evaluating CTE, disbursing funds, and developing state plans³¹ required by the Carl D. Perkins Career and Technical Education Act.¹⁸³ The TEA works with the Texas Higher Education Coordinating Board to ensure the quality of CTE and determines allocations of federal funding between higher and public education.

The State Board of Education serves as the State Board for Career and Technical Education, and also serves as State Administrator for the Carl D. Perkins Act, activities that are supported by the TEA. Additionally, the State Board is responsible for approving curriculum standards for CTE courses, and approving the State Plan for CTE developed by the TEA. The State P-16 Council is also responsible for approving the state plan for CTE, and advises the State Board and TEA on the coordination of CTE with postsecondary education and CTE teacher education programs.

³¹ The State Plan for CTE 2008-2013 can be accessed at <http://www.tea.state.tx.us/cte/Accountability/StatePlanFinal111607.pdf>.

APPENDIX B

NUMBERS OF STUDENTS SERVED BY CTE IN TEXAS PUBLIC SCHOOLS

The precise number of students in Texas public schools who enroll in at least one CTE course or complete a CTE sequence (program) is not easily determined, even though the state requires schools to identify student participation.³² The most recent publicly available data offers several different assessments of CTE enrollment, as follows:

- In the most recent Snapshot, the TEA reports 21% of the entire population of students in Texas public schools K-12 participated in CTE during the 2006-2007 school year;¹⁸⁴
- According to the most recent annual report prepared for the Carl D. Perkins Vocational and Technical Act by the TEA, 21% of Texas public school seniors participated in Tech Prep (one type of CTE that is a formally structured program which in Texas is based on the Recommended High School Program at the minimum, and links the last two years of high school with the first two years of higher education) during the 2005-2006 school year);¹⁸⁵
- In a 2007 report to the Texas Legislature, the TEA indicated that 73% of Texas students took CTE during the 2004-2005 school year, but most of these students took only one CTE course;¹⁸⁶
- Based on State Profile for Texas published on the website of the National Association of State Directors of Career Technical Education Consortium (updated 2.20.2008), 78% of Texas public high school students enrolled in CTE (percent was calculated by the author by dividing the given number of secondary students enrolled in CTE [893,243] by the given number of students in public high schools [1,140,954] – numbers that were abstracted by the National Association from the 2003-2004 Consolidated Annual Report submitted by Texas);¹⁸⁷ and
- For the 2004-2005 school year, 1,053,917 of Texas high school students were identified as CTE students (this represents 87% of the state's total high school population for the 2004-2005 school year), according to the Association for Career and Technical Education.¹⁸⁸

³² Texas school districts are required to identify student participation in CATE based on the student's four-year high school graduation plan – PEIMS Codes 0, 2 and 3 (Code 3 is designated for Tech Prep).

APPENDIX C CALCULATIONS OF TEXAS HIGH SCHOOL GRADUATION RATE

The current method used by the Texas Education Agency to calculate graduation rates was first introduced to the state's Accountability System in 2006. In the annual accountability manual, the agency describes this method as longitudinal and based on a four-year cohort of high school students. The graduation rate is calculated as the percent of students who first attended 9th grade four years previously and either graduated with a regular diploma (not a General Education Diploma – GED) or is enrolled as a continuing student.¹⁸⁹ The agency's method differs slightly but significantly from the method proposed by the National Governor's Association, a method that is also described as longitudinal and cohort-based. The Association uses the following formula: Graduation Rate = [On-Time Graduation in Year X] ÷ [First-Time Students Entering 9th Grade in Year X – 4] + [Sum of Students Transferring In and Out During these 4 Years].¹⁹⁰

The organizations described produce annual or periodic reports of national graduation rates and report state graduation rates. Each uses a different method to calculate graduation rates, and the most recent calculations apply to several cohorts of graduation students (different graduation classes). As a result, these rates cannot be used to validate the graduation rate reported by the Texas Education Agency; however, the rates provide valuable information about the percentage of students completing Texas high schools with a diploma, and show the need to use several different methods to gain a full picture about graduation rates.

- The National Center for Higher Education Management Systems reports a public high school graduation rate of 65.3% for Texas' class of 2005 (well below the national average of 68.8%);¹⁹¹
- Education Week's most recent Diploma Counts reports a public high school graduation rate of 68.5 for Texas' graduating class of 2005 (well below the national average of 70.6%¹⁹² and 84% graduation rate reported by the TEA for the class of 2005¹⁹³);
- The Manhattan Institute reports a public high school graduation rate of 69% for Texas' class of 2003 (below the national average of 70%¹⁹⁴ and the 84.2% graduation rate reported by the TEA for the class of 2003¹⁹⁵); and
- The Intercultural Developmental Research Association also reports public school graduation rates for Texas that lag below rates reported by the Texas Education Agency – 76.7% for Texas class of 2004 (well above the national average of 75) and 75.5% for the class of 2003 (well above the national average of 73.9%).¹⁹⁶

APPENDIX D

DEFINITIONS OF POSTSECONDARY READINESS

A definition of college readiness was developed by the Texas Commission for a College Ready Texas, an advisory body appointed by Governor Perry in 2007 to assist the work of the Texas Higher Education Coordinating Board, TEA, and State Board of Education in the introduction of college readiness standards to the public school curriculum. The Commission’s Final Report defined college readiness as “the knowledge and skills necessary to succeed in entry-level college courses without the need for remedial or developmental education services.”¹⁹⁷ In this report, the Commission recommends that expectations for college and workforce readiness should be aligned in every classroom of Texas public schools, and reflect a composite of available college readiness standards (including those produced by the American Diploma Project, ACT, Standards4Success, and the College Board).³³ Further, the Commission recommended that all students should successfully complete courses that indicate college readiness, including but not limited to Algebra II, Physics, and Statistics, in order to qualify for a diploma from Texas public schools.¹⁹⁸

The need for a broader view of the high school curriculum and college readiness was recognized by the Texas High School Completion and Success Initiatives Council, created by the 79th Texas Legislature (HB 2237). In deliberations about high school reform, the Council adopted the term “postsecondary readiness” because this term clearly conveys the notion that there is one expectation for teaching and learning that should apply to all students. The Council’s 2008 Strategic Plan includes a broad definition for postsecondary readiness, as follows: “the range of academic, workforce, and social proficiency that all high school students must acquire to successfully transition from high school to skilled employment, advanced military training, an associate’s degree, bachelor’s degree, or technical certification.”¹⁹⁹

The Council’s definition clearly reflects the mission of Texas public schools that is established by the Texas Education Code: “all children [should] have access to a quality education that enables them to achieve their potential and fully participate now and in the future in the social, economic, and educational opportunities of our state and nation.”²⁰⁰ Even more clearly, this definition reflects the goals for Career and Technology Education also established in state code: “Each public school student shall master the basic skills and knowledge for ... gaining entry-level employment in a high-skill, high-wage job or continuing the student’s education at the postsecondary level.”²⁰¹

For purposes of placement in higher education programs, state policymakers have defined college readiness as a minimum score on state and national assessments of college readiness. To be considered college ready and exempt from state developmental

³³ A composite of national college readiness standards (Standards Crosswalk) was prepared for the Commission for a College Ready Texas by REL-Southwest and presented to the State Board of Education in 2007.

education requirements,³⁴ Texas students are required to score at or above one of the following standards (the Texas Success Initiative):²⁰²

- 1070 on the SAT (with a minimum score of 500 in both math and reading);
- 23 on the ACT (with a minimum score of 19 in both math and reading);
- 2200 on the math and English sections of the 12th grade TAKS (HERC);
- 230 on Texas Higher Education Assessment (THEA) in reading and math, and 220 in writing;
- 81 on Compass in reading, 39 in algebra, and 6 in writing;
- 78 on Accuplacer in reading, 63 in algebra, and 6 in writing; and
- 41 on Asset in reading, 36 in algebra, and 6 in writing.

³⁴ It should be noted that some of Texas' public colleges and universities require some students to complete developmental education even though students have met state standards for exemption from developmental education. See Miller, D. (2007). *College Readiness and Development Education in Texas 1998-2005*, Commission for a College Ready Texas, <http://www.collegereadytexas.org/documents/College%20Readiness%20and%20Developmental%20Education120707.pdf>.

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