

Title of Nomination: Texas PK -16 Public Education Information Resource

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CATEGORY: Enterprise Information Architecture

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## **Executive Summary**

The Texas Pre-kindergarten-16 Public Education Information Resource (TPEIR) is a multi-agency data repository managed by three state agencies: the Texas Education Agency, the Texas Higher Education Coordinating Board, and the State Board for Educator Certification. The TPEIR project provides stakeholders in education – including citizens (students, parents), administrators, educators, state leadership, researchers, and professional organizations – with ready access to integrated public primary, secondary, higher education and educator credential information for purposes of research, planning, policy, and decision making.

In 2001, the 77<sup>th</sup> Texas Legislative session provided funding for the Texas Education Agency (TEA), the Texas Higher Education Coordinating Board (THECB) and the State Board for Educator Certification (SBEC) to collaborate to build an integrated data repository that would provide a comprehensive view of public education in Texas.

The Texas PK-16 Public Education Information Resource integrates an immense volume of educational data. The data from the Texas Education Agency include student enrollment, attendance, program participation, course completion, graduation, staff, school district financial budget and actual expenditures, general educational development (GED), adult education, and student assessment information. Texas Higher Education Coordinating Board data include higher education applicant/admission, enrollment, graduation, financial aid, skills assessment and testing results and faculty information. The State Board for Educator Certification data include credentials, educator accountability and professional discipline. Property values and tax rates are included in the integrated data from the Texas Comptroller of Public Accounts. With the assimilation of data from these agencies and the development of a statewide education person identifier, an individual can be linked through all three systems for longitudinal analysis and evaluation. TPEIR is perhaps the first publicly available statewide database in the nation that provides the capability to follow students from public pre-kindergarten through high school into public higher education and into educator certification.

The ongoing success of the TPEIR project requires the resources of a wide variety of dedicated personnel from the participating agencies. At the beginning of the project, the chief executive officers from each of the agencies endorsed a project charter to define the project goals, objectives, scope and governance. There are two primary project advisory groups. The Interagency Steering Committee comprised of the chief information officers from each agency review project plans, scope, budget, and issues for risk management to ensure the successful completion of the project. The Technical Advisory Group comprised of project managers from each agency determine technical infrastructure, practical implementation and resolve technical issues.

The TPEIR project focuses on the following objectives:

- 1) improve access to data and give customers the ability to produce reports and complete analysis
- 2) improve efficiency and productivity by combining and leveraging multiple agency resources
- 3) provide consistent, high quality data for performing reporting and analysis
- 4) improve customer service by providing multiple ways to access timely longitudinal data.

Public access to the information resource is available via a public web site, [www.texaseducationinfo.org](http://www.texaseducationinfo.org), developed and maintained as part of a consortium agreement. While protecting student privacy and confidentiality in compliance with the Federal Education Rights and Privacy Act (FERPA), the web site makes data available to the public through multiple channels: data can be viewed on-line as reports or graphs, or downloaded in various formats, from Excel spreadsheets to text files.

## **A. Description of Project**

### **Background**

Texas has been a national leader in electronically collecting and reporting public education data. Student and educator level public education data have been collected for PK-12 since 1989, public higher education data collection began in the 1970's, and educator credentials, preparation, testing, and enforcement have been available since 1993. In 1999, the Texas Education Agency began building a pre-kindergarten through grade 12 public education data warehouse to provide integrated access to public education data collected by the agency. In 2001 the Texas Education Agency, Texas Higher Education Coordinating Board and State Board for Educator Certification entered into an agreement to expand this data warehouse to include education data collected by all three agencies. This effort resulted in the development, integration and maintenance of the Texas PK-16 Public Education Information Resource (TPEIR) to provide access to comprehensive longitudinal student and educator information from pre-kindergarten through the university level and beyond. A new multi-agency web site was developed for public online access to integrated Texas public education data in January 2003, <http://www.texaseducationinfo.org>.

### **Participating Agencies**

#### ***The Texas Education Agency***

The TEA, in conjunction with SBEC, is the state agency charged with overseeing the requirements and foundations of public education for Texas public school students in grades Pre-kindergarten through 12. TEA provides leadership to help local school districts achieve high levels of student performance through curriculum, assessment, accountability, continuing education, funding, statewide initiatives and research and policy planning.

The *mission* of the TEA is to build the capacity of the Texas PK-12 public education system to provide to all students 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.

The fundamental goal of the *Texas Education Agency's Long-Range Plan for Technology (LRPT) 1996-2010* is to enhance students' acquisition of knowledge through technology. This fundamental goal is supported by the *Texas Education Agency's Strategic Plan for Information Resources Management for Fiscal Years 1999-2003*, which includes the following goals:

- Information Access to Educational Content: Make agency data and information available to those who need it for use in policy analysis, research and decision-making, including but not limited to administrators, educators, parents, students, state leadership, and professional organizations.
- Business Applications: Provide applications that support both internal agency operations and business transactions (including data collections) between the agency and school districts, Educational Service Centers (ESCs) and other business partners.
- Infrastructure: Build the technology infrastructure within the agency and the broad public education system to support information access, content delivery, business applications and distance learning, as well as to improve internal staff productivity.

### ***The Texas Higher Education Coordinating Board***

The THECB was created by the Texas Legislature to provide leadership and coordination for the Texas public higher education system to achieve excellence in the college education of Texas students. THECB works with the Legislature, Governor, and colleges and universities to coordinate Texas higher education and expand access, improve equality and promote efficiency. THECB is also responsible for providing information on higher education to state policy makers and citizens and administering state and federal programs such as the Advanced Research Program and Advanced Technology Program, the Hinson-Hazlewood College Student Loan Program, and the Carl D. Perkins Technical Vocational Funds.

The mission of the Texas Higher Education Coordinating Board is to provide the Legislature advice and comprehensive planning capability for higher education, to coordinate the effective delivery of higher education, to administer efficiently assigned statewide programs, and to advance higher education for the people of Texas.

The Texas Higher Education Plan of October 2000, entitled *Closing the Gaps, by 2015*, outlines the goals for ensuring an educated population and workforce for the future. It documents strategies for a coordinated PK-16+ effort to encourage students to participate and succeed as they transition from high school into colleges and universities. It notes the need for excellence in education programs and services within the higher education system, and encourages efforts for increasing the number of graduates in critical fields. Education, engineering, computer science, math, physical science, allied health, and nursing are examples of targeted critical fields.

### ***The State Board for Educator Certification***

The SBEC was created in 1995 by the 74<sup>th</sup> Legislature pursuant to the Ratliff-Sadler Act (Senate Bill 1). SBEC was created to give educators the authority to govern the standards of their profession, similar to the regulation of other professionals in Texas. The SBEC is responsible for regulating and overseeing all aspects of the preparation, certification, continuing education, and standards of conduct of public school educators. Oversight is by a 15-member board

The SBEC provides leadership to the education profession and serves public citizens and the public school students of Texas by striving to *ensure the highest level of educator preparation and practice to achieve student excellence*. Though the SBEC serves multiple clients, its major clients are the public school educators of Texas. For the first time in the state's history, certified educators now have an ongoing relationship with the certifying agency due to the elimination of the lifetime educator certificate for new educators and the implementation of periodic renewal requirements.

As of February 2003, the Board oversees 118 educator preparation programs. Preparation programs are currently housed in 71 institutions of higher education, 16 education service centers, 4 public school districts and 27 other alternative certification programs. According to rules adopted by the Board in 1998, all preparation programs operate under a single set of guidelines and their students must satisfy the same requirements for certification, irrespective of where the training occurred.

### **Texas PK-16 Public Education Information Resource**

The Texas PK-16 Public Education Information Resource (TPEIR) integrates data that are stored on several different operational systems in multiple distinct databases at each of the three agencies. The integrated TPEIR databases include student, educator and organizational data.

The Texas Education Agency collects enrollment, attendance, course completion, program participation, disciplinary actions, graduation, and exit data for approximately 4 million students per year. Role, responsibility and pay information are collected for approximately 500,000 PK-12 staff annually. Test assessment data are collected for over 1.8 million students annually. Financial data are collected for over 1,000 public school districts and approximately 200 charter schools annually. Data are collected for over

90,000 GED applicants and over 100,000 adult education participants. To date over 630 million records from TEA have been loaded into the TPEIR system.

The Texas Higher Education Coordinating Board collects applicant, enrollment, graduation, student financial aid, and skills assessment and test information for the approximately 1.1 million students enrolled annually in Texas public higher education. The Board also collects data for over 50,000 faculty members in each academic year. To date over 30 million records from THECB have been loaded into the TPEIR system.

The State Board for Educator Certification collects educator preparation organizations, credentials, enforcement, and testing information. To date over 20 million records from SBEC have been loaded into the TPEIR system.

### **Technical Infrastructure/Architecture**

The TPEIR technical environment is based on centralized data warehouse and reporting architecture. The central database server consists of an IBM P690 AIX server with 16 parallel processors, 32 GB of memory and 3.5 TB of DASD. An AIX server with 4 processors is used as the development and test environment to develop, test and maintain the data extract, transform and load process. Once a collection is successfully transformed and loaded on the development/test server the data for that collection are moved to the production server for use.

The TPEIR system consists of two distinct data repositories. One repository is for public use, and data are aggregated or approved for public release. All student education data are subject to the Federal Education Rights and Privacy Act (FERPA) protecting the confidentiality of education records. Public reporting is reviewed by appropriate internal technical staff, and if appropriate, by affected legal staff to determine whether the data are FERPA compliant. The second repository is for authorized customers. This contains student and staff level data. Proper authorization must be granted to access student level education data in accordance with federal and state standards.

The participating agencies agreed on definitions and rules for loading each of the data sources and/or data collections. The agency of primary responsibility reviewed and approved data models and data transformation and loading rules. All affected agencies participated in the review process for data models, data dictionaries, rules and reports that crossed agency boundaries.

The statewide person matching algorithm was among the most challenging efforts of the project. Demographic data from a specific agency and/or data collection had to be maintained for historical purposes, and matching algorithms had to be devised to allow matching across all data collections. Indicators were used to determine the source of the person data, and historical data had to be stored in order to maintain the integrity of each agency's data collection.

<b>B.</b>	<b>Significance of the Improvement of the Operation of Government</b>
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One of the major goals of this project is to assure that the entire system of public education is coordinated to provide citizens with efficient, effective, and high quality educational services and activities. This project is designed to ensure that the long-range plans and educational programs established by TEA, THECB, and SBEC complement the functioning of the entire system of public education, extending from early childhood education through postgraduate study. The integrated data resource provides each agency's staff as well as stakeholders in public education with ready access to timely education data.

Uniform data definitions, formulas, and data matching provide a cost effective means for answering the many requests received by the participating agencies. Before this project, requests for data matched across agencies would have to be completed with manual processes to extract and match data from each appropriate agency. Now that the data reside in a single repository, data and reports can be provided

with the appropriate demographics from each agency's data collection or matched across agencies providing consistent results.

The types and level of available data allow for a wide range of education questions and analysis to determine educational outcomes.

<b>C.</b>	<b>Benefits Realized by Service Recipients, Taxpayers, Agency or State</b>
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The Texas Pre-kindergarten-16 Public Education Information Resource provides a breadth of detail and years of data to allow for extensive longitudinal analysis to identify patterns and trends. Growth in student populations and examination of students moving into higher education provide higher education institutions with data for evaluating facility and resource requirements based on student population growth patterns. Student completion of courses, graduation plans, and program participation can be studied to determine the relationship between student attributes and achievement in public schools with later success outcomes in higher education. Educator data can be examined to determine what high schools and public two year colleges can become feeder schools to provide educators and compare that to the student population growth.

Dr. Hans L'Orange, Director of Data and Information Management for the State Higher Education Executive Officers (SHEEO) said "Texas' PK-16 Public Education Information Resource (TPEIR) system is an excellent example of a system designed to inform multiple stakeholders of the condition of education at various levels. It has the potential to increase the commitment among stakeholders as they collect, analyze, and (most importantly) use information on student and institutional performance. States are increasingly looking to their data and information systems to provide the support they need for decision making. Good decisions require both good data and coordinated efforts; TPEIR provides that data, information, and coordination for all of Texas' education and is one of the first resources in the country of this type."

The TPEIR data resource is designed to meet the following objectives

- Enhance analysis and reporting capabilities of agency staff and external stakeholders.
- Support trend analysis over an extended period of time, as far back as 1989.
- Provide access to consistent results through uniform data definitions, formulas, and matching requirements.
- Support multiple means of access by viewing data on-line, in formatted reports, or download in various formats
- Reduce time to fulfill education data requests
- Evaluate and implement additional data sources to enhance understanding of public education trends, outcomes and impacts.

<b>D.</b>	<b>Return on Investment, Short term/Long term Payback</b>
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Return on investment paybacks are realized through increased service levels, increased productivity, reduced costs, and the ability to use TPEIR data for planning and analysis.

- Increased service levels through enhanced access to data/analyses in a more timely fashion
  - Commonly requested data is available to public education stakeholders reducing demand on existing staff to fulfill custom report request
- Increased productivity through reduced effort to match data, complete analyses and fulfill custom requests

- Data are integrated once and available for use repeatedly to satisfy requests for all public education stakeholders, savings are realized when data is not manually matched for each request received
- Reduced costs can be realized by using data for analysis to identify potential costs savings
  - PK-12 student assessment data can be evaluated to determine which children are within points of achieving proficiency in subject areas. If only 1% of these children on the verge of passing the required test can be assisted to become proficient, the potential cost avoidance annually is \$1,610,729, based on 2002 data for 232 children \* \$6,913 annual state funding amount.

Real benefits are associated with the ability of stakeholders to obtain policy data in a timely fashion. For example, better policy decisions can be made by legislators during an active session if questions can be answered as they arise. Educators can project growth trends assisting with facility planning.

## Conceptual Architecture

