

Education Management Information System

A Model For Transforming Data Into Knowledge

**A PARTNERSHIP BETWEEN THE KNOX COUNTY, TENNESSEE, SCHOOL SYSTEM
AND
THE KNOXVILLE CHAMBER**

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EMIS

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The Need

Public school districts traditionally collect massive amounts of data, and data collection is a process deeply entrenched in the way they do business. Although districts accumulate lots of data, most struggle to transform the data into useable knowledge. Consequently, teachers, counselors, principals, district administrators, and school boards find themselves forced into “data free” decision making, a term coined by the Annenberg Institute for School Reform to describe situations where school districts -

- Find it difficult or impossible to pull data from different sources and recast it into meaningful information,
- Have administrative policies allowing only a handful of central office analysts to see data, or
- Make data available to district employees that are old, inaccurate, or in a form that makes the data cumbersome to use.

The Knox County, Tennessee, Schools System (KCS) is no exception. KCS routinely collects and stores financial and non-financial data in more than twenty electronic databases running on large centralized computer systems that – for the most part – do not talk to each other. Whether managing day-to-day operations or performing longitudinal analyses of individual student or student cohort performance, school district employees have in the past manually gathered data from these disparate systems and then used their desktop computers to transform the gathered data into useable information. Board members, administrators, principals, counselors, and teachers all have complained that the information the district needs to manage individual student instruction – as well as school-level and district-wide operations – was not readily available.

Our Response to the Need

In early 2007, a series of meetings between members of the Knoxville Chamber’s Board of Directors and KCS administrators was “kicked off” with Chamber members asking this simple question: “As a business community, how can we best help the school district meet its goals and objectives?” The resulting dialogue spanned several meetings, with the Chamber coming to understand the district’s need to overcome the tendency to “data free” decision making. The Chamber then proposed a collaborative project to design, develop, and implement an Education Management Information System (EMIS), which would (1) help the district meet the unique differentiated instructional needs of each of its students, and (2) support the district’s efforts to use its scarce financial and non-financial resources effectively and efficiently.

Since its inception, a guiding principle of the project has been to adopt current technology and best education management practices to—

transform DATA into INFORMATION

from which KNOWLEDGE is gained

for reasoned ACTION and DECISION-MAKING.

A formal project proposal was approved by the Knox County Board of Education and the Knoxville Chamber Board of Directors in late spring 2008. The scope of the project centers on providing information for “knowledge based” decision making to accomplish management tasks ranging *from* those used to monitor and manage district-wide, school-level, and program financial and non-financial resources *to* those that support individualized instruction for each of the district’s 56,000 students. The project timeline includes multiple phases extending through the first half of the 2010 – 2011 academic year. Even after the formally defined phases of the project end, the EMIS itself will continue to evolve as a “work in progress” as more and more management applications are designed, developed, and implemented. The goal is to make the EMIS indispensable to users within the district, because it enables them to transform themselves from “data gatherers” to “knowledge-based” decision makers

The Chamber secured initial funding from The Aslan Foundation, a local philanthropic organization which had the foresight to see that this project was a win-win for the schools and our community. With that initial funding, the Chamber and KCS then launched the project in late spring 2008. The “backbone” of the EMIS is a secure data warehouse that has the capacity to hold fifteen years of academic, demographic, human resource, financial, and statistical data. Data drawn from the current academic year, as well as from district files that date back to 2005-2006, are being loaded to the warehouse through September 2010. In July 2009, an initial version of the warehouse, that included more than 40,000,000 data points, was released and seventeen of the district’s eighty-six schools began piloting the business intelligence tools that transform the warehoused data into useable and useful information. These tools and access to the data warehouse will be made available to all schools in the district during the first calendar quarter of 2010.

Each night, student, teacher, and school level data is copied from the district’s disparate source systems to a central data store, where it becomes immediately available to users, as well as for analysis over time. Authorized users—including teachers, counselors, principals, and administrators—are able to access the data twenty-four hours a day, seven days a week, over the internet. Each is allowed to query the data and export the results based upon his or her access rights. Additionally, pre-designed and ad hoc reports are being pushed-to or pulled-by users, while other pre-defined information is communicated in the form of “dashboard” gauges that are customizable to each user’s needs.

The project has focused primarily on satisfying the information needs of principals, counselors, and teachers. Nevertheless, the project has been scoped and managed with the understanding that a critical application of the EMIS will be to help the district measure where it stands in achieving the objectives detailed in the current five-year KCS strategic plan that was developed and published in July 2009 by the KCS Superintendent with the Chamber’s assistance. Both requirements have guided the decision-making regarding what data dimensions to load to the warehouse, which now include:

- Student, teacher, principal, and administrator demographics,
- Class schedules linking students, teachers, and schools,
- Student attendance, mobility, and discipline records,
- Student special education and limited English proficiency needs,
- Student participation in special programs,
- Student participation in extracurricular activities,
- Formative assessment results,
- Gateway, end of course, and Advanced Placement exam scores,
- Summative assessment results including the annual state assessments and the ACT family of assessments,
- Reading, writing, and math proficiency indicators,

- Course grades and grade point average,
- Graduation and withdrawal related data,
- Human Resource data, including teacher attendance and certification,
- School level costs, and
- School level cost drivers.

Management Tasks Supported By the System

Early in the project, a distinction was made between administration and management, with the understanding that the EMIS would be designed, developed, and implemented to address the district's needs for information to make sound management decisions. Designing and developing the business intelligence tools to support the following management tasks ranks high among the project's priorities—

- Planning and scheduling each student's academic course of study,
- Plotting each student's progress along the path to high school graduation and post-secondary life,
- Reporting where each student actually stands, versus where he or she should stand, on the path to high school graduation and post-secondary life,
- Monitoring the performance of all students to identify those who will probably drop out of school or fail to graduate on time if the district does not intervene,
- Shepherding students from one school level to the next and helping them acclimate to the new learning environment,
- Integrating the development of twenty-first century skills into the core curriculum for all students,
- Engaging the student in learning outside the classroom using technology, networking channels, and applications,
- Offering courses that present the student with problems, tasks, and assignments that he or she cannot complete quickly or easily,
- Sharing practices that work and lessons learned among the district's educators, especially regarding how to use the EMIS,
- Tracking, measuring, and valuing parent and community contributions to each of the schools in the district,
- Measuring how well a program meets its objectives,
- Promoting operational efficiency and professionalism, and
- Budgeting and reporting the costs to operate each school in the district.

Key Features

The success of this project will be gauged in the long term by how widespread the EMIS is used within the district and by the extent to which the EMIS functions in a supporting role as individual student gains and district improvements are made. Before the design and development phases of the project began, the KCS Superintendent instructed that

the needs of principals, counselors, and teachers should be the project's highest priority. Those needs were identified and defined over several weeks through interviews and written questionnaires. As a result during the warehouse and decision support software procurement process—championed by the Chamber—the following features were noted as critical to the success of the implementation—

An EMIS user must be able to –

- Track any cohort of matching or non-matching students – as defined by the user – over any period of time within the full longitudinal breadth of the stored data.
- Query enumerated and non-enumerated numerical and textual data applying multiple constraints.
- Extract data.
- Perform *ad hoc* queries of the data.
- Save and share the *ad hoc* queries that he or she develops, along with the results of those queries, to promote a knowledge-based management culture, especially within the school district's Professional Learning Communities.

The data environment must –

- Be rich, current, accurate, frequently refreshed, scalable, and as granular as possible.
- Be organized using the hierarchy of student, class, teacher, grade level, school, and district.
- Include “high stakes” student performance data within the context of the formal standards for measuring student academic progress.
- Include as much “proxy” type data as possible to provide other evidence of student achievement, proficiency, and engagement and to help in planning and scheduling a student's academic course of study.
- Provide a complete set of human resource attribute data for the district's staff engaged in student instruction.
- Contain school level cost and cost drivers.

Business Intelligence tools – including any “dashboards” – must be –

- Web based, available 24x7, not require client software to run, and accessible using a common internet browser.
- Simple to use, easy to navigate, require minimal training, and have imbedded context-sensitive prompts and help features.
- Capable of interfacing with common desktop computing spreadsheet and word processing products and flexible in offering multiple output options.
- Targeted to the needs of classes of users, providing querying capability, static and dynamic reports, as well as “drill down” and “roll up” features.

Is EMIS unique?

Perhaps not, but the project might be –

- The effort has been both collaborative and complementary. The Chamber has managed the project from its inception, has worked to gain community endorsement and funding of the project, and has supported extensively the strategic planning process. The district has provided the internal resources, knowledge, executive support, and expertise to keep the project on track.
- From the beginning, the focus has been on building a system from the “bottom up” rather than “top down.” The management needs of principals, counselors, and teachers have received top priority, with the assumption

that once those needs are addressed, the needs of central office and the board of education will be satisfied by aggregating the results obtained through this “grass roots” approach.

- Just as the instructional needs of each student are unique, the task of managing each school is unique. To ensure the long-term success of the EMIS, the system is being designed and developed to be as adaptable and configurable as possible. The intent is not to build a marginally useful data warehouse as a “play thing” for researchers and central office staff, but to build an information system that supports day-to-day management and instructional improvement.
- And finally, we are unaware of any similar project underway elsewhere in the United States, where a local Chamber and school district are closely collaborating to build an information system that will help the district capture, report, and manage the costs to operate each of the schools in the district. Our goal is to provide detailed school-level operating cost data, as well as data on what drives those costs, to support critical management tasks, including cost benefit analyses of program effectiveness and initiatives to improve operating efficiency.