



SLDS Spotlight

Development and Use of Early Warning Systems

An early warning system is a data-based tool that uses indicators to help predict which students are on the right path towards eventual graduation or other grade-appropriate goals. Through early warning systems, stakeholders at the school, district, and state levels can view data from a wide range of perspectives and gain a deeper understanding of student data.

This Statewide Longitudinal Data Systems (SLDS) Spotlight takes a look at some of the early warning system development and expansion work going on in Massachusetts, Maine, and South Carolina. It discusses some of the benefits of using an early warning system and offers tips on the development of this type of system.

Massachusetts: Early Warnings for Local Use

Currently, the Massachusetts Department of Elementary and Secondary Education uses an Early Warning Indicator Index (EWII)—a system that was implemented in 2008 to target urban districts. In 2011, it was made available to all districts.

The EWII is used as a starting point to identify and support students who may be at risk of not graduating on time (in four years or less) or dropping out of high school. EWII assigns all first-time grade 9 students to one of five risk levels (Very High Risk, High Risk, Borderline, At Risk, or Low Risk) based on five indicators. For the 2011–12 cohort of first-time ninth graders, these indicators are as follows:

- spring 2011 grade 8 Massachusetts Comprehensive Assessment System (MCAS) results;
- spring 2011 grade 8 English Language Arts (ELA) scores;
- 2010–11 attendance rate;
- number of in- and out-of-school suspensions in the 2009–10 and 2010–11 school years; and
- age as of September 1, 2011.

Although this system has been refined over the years, it was limited in scope only focusing on rising ninth graders. Massachusetts received positive feedback on the information provided thru EWII, and many districts were interested in expanding the early warning system to provide learning-indicator data from earlier grade levels. After receiving an SLDS grant in 2010 (FY09 ARRA), Massachusetts began developing the Early Warning Indicator System (EWIS) to focus on P-12 data. Ideally, future versions of the model will expand even further to include children from birth through college.

Unlike the EWII, the EWIS will provide data to districts and other stakeholders through web-based technology solutions. Prior to this, the EWII provided Microsoft® Excel files to districts through a secure portal.

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For more information on the IES SLDS Grant Program or for support with system development, please visit
<http://nces.ed.gov/programs/SLDS>.

Rather than predicting the likelihood of students' graduation from high school, this model will focus on more proximate outcomes, such as the likelihood of reaching proficiency in grade 3 reading and passing all grade 9 courses.

Importance of Stakeholder Input

Throughout the process of creating a new early warning system, Massachusetts relied heavily on stakeholder input from both internal and external sources. According to Jenny Curtin, Coordinator of High School Graduation Initiatives from the Massachusetts Department of Elementary and Secondary Education, stakeholders provided critical and objective feedback that helped the project group improve and refine the system.

"We learned a lot from our stakeholders at both the state level and across districts," said Ms. Curtin. "Many times, they saw something that we may have missed, which produced a much better product in the end."

Massachusetts also created an advisory group at the state level that informs the development of this model on a regular basis. The group is comprised of a diverse group of stakeholders, including SEA members from education services, education data, research evaluation, as well as members from schools districts. Along with the advisory group, focus groups and interviews will continue through fall 2012.

Training on the Use of Early Warning Data

The next step for implementing the EWIS is training that will assist districts with the utilization of the data. Notably, this training will provide best practices for the use of the data to inform interventions. Because Massachusetts had not addressed training with the EWII model (development for the new system was already under way), the training for EWIS remains a crucial component.

Along with training district staff and other stakeholders on best practices, Ms. Curtin hopes to use training sessions to overcome the challenges of using early warning systems. For example, Ms. Curtin hopes to show that early warning indicator data should be seen as a tool for guiding further investigation of student needs rather than the interpreted as the reason students are at-risk.

Maine: Early Warnings at the Classroom Level

Maine's early warning system, the Ninth Grade Foundational

Dropout Model, was designed as a high school dropout early warning and management system. With the system, students are initially evaluated as they enter grade 9 using research-based indicators. After Maine was awarded an SLDS grant in 2006 (FY07), the state was able to implement a K12 Integrated Data System. Like Massachusetts, Maine also received feedback from stakeholders who wished to see earlier data that tracked a student's education from early years, and it was clear that a look at earlier indicators was needed.

"By the time you identify the students in grade 9 [who are at risk of dropping out], it's too late to take a lot of action," said Bill Hurwitch of Maine's Department of Education.

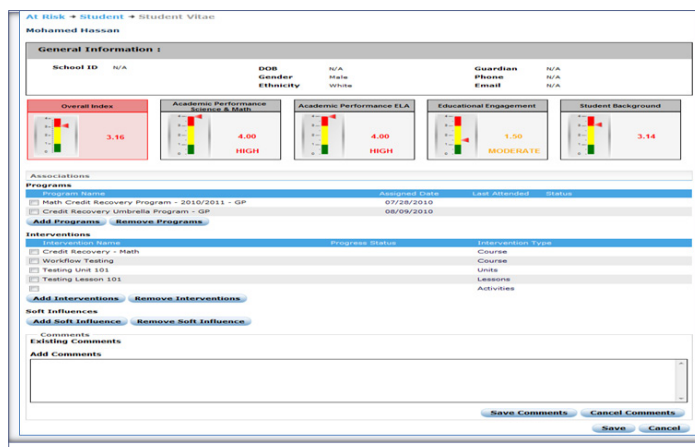
Maine is currently revising its student data collections for fall 2012 to add more data elements that will ultimately expand the model to include early indicator data. Maine researchers will also validate the indicators used for grade 9 are valid for elementary and middle school students. Unlike high school-level data, grade 3 through 8 data will include annual assessment data.

At-Risk Data Mart

Maine created the At-Risk Data Mart in 2010 to help educators identify students at risk of dropping out. This tool also allows educators to create, assign, and manage programs for at-risk students; track student performance in the programs; provide analysis of model results to help the state to improve the model's accuracy. This model measures academic performance, educational engagement, and student background.

Unlike typical early warning models, Maine's At-Risk Data Mart is specifically aimed at the classroom and state levels. This

Figure 1. Maine's At-Risk Data Mart



tool contains two areas of reporting: a Model Roster section, which is a quick link with access to all students' reports, and Report sections, which contain data snapshots and data tables

for deeper analysis at the district level. The At-Risk Data Mart also has a Soft Influences feature that allows educators to enter qualitative data that cannot be academically measured, such as their observations of and conversations with a student. This tool is used by teachers to track the effectiveness of interventions.

Increase College Readiness

The At-Risk Data Mart is being leveraged by the Maine Community College System (MCCS) Presidents Council to help identify high school students at risk of needing remedial or developmental courses. Rather than continuing to have students wait until college to take remedial or developmental courses, the MCCS Presidents Council pushed to deliver these courses during a student's senior year of high school. This saves students from paying for a non-credit course and provides feedback to high schools regarding which programs are (and are not) working. These courses may also influence a student's choice when considering postsecondary education.

Importance of Validating Measures

Through building and developing Maine's early warning system, Mr. Hurwitch noted the importance of validating early warning system measures and weights with qualified research to fine tune the system to improve predictive accuracy. "Measures" are data points for a model, while the "indicators" are the groups of measures that make up the model. Measures and indicators can be weighted to increase their value as part of the overall algorithm.

In order to validate the measures of the early warning system, Maine first looked at historical data and applied indicators to past students to see how well the system was able to predict individual student dropouts. According to Mr. Hurwitch, applying various combinations of historical data helps determine the reliability in predicting outcomes.

A Look to the Future

The At-Risk Data Mart was developed in 2010 and testing started in 2011. Through the work of researchers, Maine recognized the need to collect additional data from local education agencies (LEAs) before fully re-rolling out the At-Risk Data Mart. Maine is working to re-release the dropout model and the subsequent college-readiness model by fall 2012.

South Carolina: Capturing Every Student



The Student Potential Performance Snapshot (SPPS) was first

developed as an output of the South Carolina Education and Economic Development Act (EEDA), which coincided with an SLDS grant in 2005 (FY06). SPPS is a data reporting solution designed to inform educators of the at-risk characteristics evident in their student population. This early warning system provides the information needed for educators to select early and appropriate interventions for students who may be at risk of not advancing or graduating. The initial research, design, and data points of SPPS were formed by the EEDA At-Risk Student Committee.

The SPPS collects data for all students. Data for SPPS are stored in the South Carolina longitudinal data warehouse, which includes many years of longitudinal student data—dating back as far as grade 3 for some current high school students. The primary users of this solution are school personnel responsible for counseling students on grade advancement and/or graduation. School administrators responsible for at-risk models may also use SPPS.

There are a number of summary reports that show snapshot views of the entire student population at different levels of data: state, region, district, and school. The state-level report includes the total students for the state and totals by at-risk indicators for a single year, as well as aggregated information for each region, district, and school by student and at-risk indicator for a given year. The school summary report includes data on each student in the selected school for the current school year. The Student Detail Report, which is also referred to as the Student Journey, includes data on a student's entire "journey" through the South Carolina public school system.

The A-B-C's of Dropout Prevention

There are 27 indicators used in the SPPS that make up the Student Detail Report/Student Journey and fall under the following categories: socioeconomic; credits earned; assessment; student enrollment journey; discipline, expulsion, and attendance; retention and grade; and at-risk indicator programs (used to identify any prevention programs designated for that student).

One of the subcomponents of the SPPS system is the At-Risk Index that is made up of 10 of the 27 indicators. These 10 indicators include: daily absences, overage indicator, credits earned, suspensions, latest score of Priority Academic Student Skills (PASS) English Language Arts (ELA) and PASS Math, math grade, discipline events, and English proficiency. These indicators are assigned a weight based on criteria that are evaluated each time the Student Detail Report is executed. The weighted values for the 10 indicators are then added together to determine the At-Risk Index Score.

Of the 27 indicators, three of the indicators are considered the most important: attendance, behavior, and credits earned. Based on research by Johns Hopkins University and the National Dropout

Prevention Center,¹ these three indicators, also known as the “A-B-C’s of dropout prevention,” should be tracked for students who are flagged as at-risk. The A-B-C indicators also comprise part of South Carolina’s At-Risk Index.

In addition to creating data reports, South Carolina uses Microsoft® Excel and Excel PowerPivot, which lets users manipulate and graphically depict large data sets. South Carolina’s At-Risk Index makes it easier for administrators and counselors to view and interpret the data.

Merging Data to Expand Knowledge

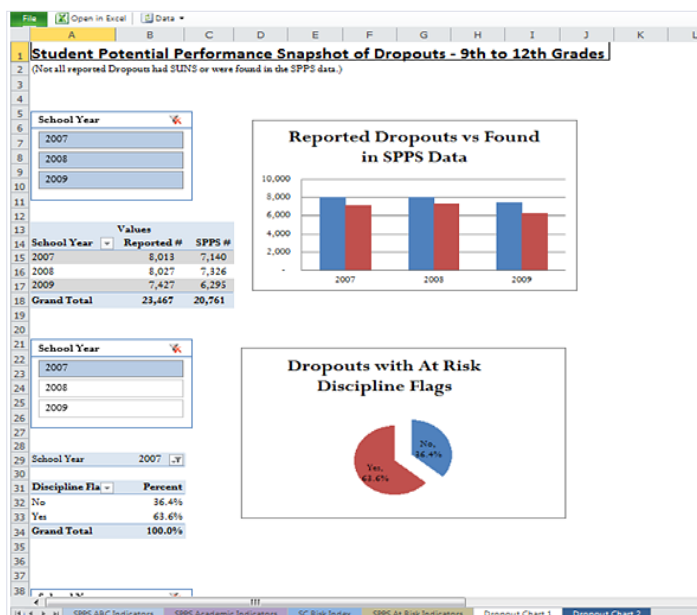
Another unique feature relatively new to the SPPS is the merging of South Carolina’s data with other data sources for use in graphic displays. These visualizations have been made with other data that focus on the dropout rate of students. The SPPS takes the student potential snapshot and matches it against another data source that is used for drop out reporting. Merging two data sources that display similar information helps districts and other stakeholders see the data from multiple perspectives.

In Figure 2, the data for the charts and graphs come from the summary tables in South Carolina’s data warehouse. The data shown in this worksheet screenshot are derived from quarterly district data collections. The tabs along the bottom present different views of the data. On the left are pivot tables of the snapshot, which can be used to customize the graphics by selecting specific school years. According to Figure 2, data related to students who dropped out during previous school years combined with the current SPPS indicators reveal that 63.6 percent of those dropouts had a number of discipline incidents, which increased their probability of dropping out. Having access to this type of information will help educators determine whether existing policies need to be reviewed or new policies should be established.

¹ National High School Center (2008). *Developing Early Warning Systems to Identify Potential High School Dropouts*.

As South Carolina’s longitudinal data warehouse expands, the Student Journey will also be able to include data on a student’s career from Pre-K through grade 12. These indicators are eventually entered into the South Carolina data warehouse. Currently, data are available primarily for students in grades 8–12. The state also plans to include additional assessment

Figure 2. Sample screenshot of South Carolina’s SPPS



data (e.g., MAP, end-of-course, and high school exit exam). Although South Carolina is currently concentrating on risk indicators for K12 data, the state is also working to add composite indicators for early childhood education. Although these indicators are considered sensitive and may not be displayed separately, indicators relevant to a student’s academic career will be included for that student’s Detail Report.

The ultimate goal is to develop a system that will allow educators to identify and arrange appropriate interventions for potential dropouts as soon as possible.

State Tips for Developing and Using Early Warning Systems

- Rely on stakeholder (internal and external) input throughout the development process to improve and refine the state’s early warning system.
- Create a plan to regularly revisit and refine risk models.
- Validate early warning system measures and weights by conducting quality research.
- Train stakeholders on best practices regarding early warning systems.
- Use visuals to help stakeholders view data from multiple perspectives.