Ed-Fi Dashboards Plug-in – Early Warning System and Intervention Catalog

August 27, 2015
Contents

Early Warning System ..................................................................................................... 1
Introduction .................................................................................................................. 1
EWS Dashboard Content............................................................................................. 2
Intervention Catalog feature ......................................................................................... 6
Technical Overview: Application .................................................................................. 6
Technical Overview: Database/ETL ............................................................................. 8
Intervention Catalog ...................................................................................................... 12
Introduction ................................................................................................................ 12
Intervention Catalog Dashboard Content ................................................................... 13
Technical Overview: Application ................................................................................. 37
About the Ed-Fi Exchange ........................................................................................... 39
Early Warning System

Introduction

The Early Warning System (EWS) was designed to provide teachers and school administrators the ability to identify middle school students at risk of dropping out of school.

While no online system alone can improve student outcomes, the goal of the Early Warning System is to provide a powerful tool for educators to identify areas of student needs and determine effective interventions to course correct trajectories for students at risk.

The system was developed through a partnership between the Pennsylvania Department of Education, the Michael and Susan Dell Foundation (MSDF), and Double Line Partners (DLP). The system was designed on the basis of research by Dr. Robert Balfanz at the Center for Social Organization of Schools, Johns Hopkins University. The Early Warning System focuses on 5 statistically significant predictors of dropout risk:

- A Daily Attendance Rate of less than 80 percent;
- More than 5 School Code of Conduct Violations;
- One or more State Reportable Offense Violations;
- A Failing Math Grade; and
- A Failing English Language Arts Grade

Dr. Balfanz’s research has found that students who are off-track with one or more of the indicators may have only a 15% to 25% chance of graduating from high school on time or within one year of expected graduation.
EWS Dashboard Content

Dropout Risk Flag

Students struggling in any of the five predictors of dropout risk will be flagged as a dropout risk in the Early Warning System.

Early Warning System Student View

The Early Warning System tab for a student displays data on the five Early Warning System metrics for that student. The page shows whether that student has met the goal, is in the caution range, or is in the failing range for each Early Warning System metric.
Early Warning System School View

The Early Warning System tab for a school shows a view of how many students are failing and approaching failing at that school. By clicking on the “More” menu, and then selecting the student list, the user can see a list of all students at the school who are failing or approach failing each metric.
### Early Warning System

#### Failing Summary
- **Percent failing all 6 indicators**
  - Metric Value: 6.0%
  - Trend: 6.0%
  - Difference from Goal: 0 of 240
  - Student Attainment: 0 of 240
  - More details available.

- **Percent failing 4 or more indicators**
  - Metric Value: 6.0%
  - Trend: 6.0%
  - Difference from Goal: 0 of 240
  - Student Attainment: 0 of 240
  - More details available.

- **Percent failing 3 or more indicators**
  - Metric Value: 10.0%
  - Trend: 10.0%
  - Difference from Goal: 4 of 240
  - Student Attainment: 4 of 240
  - More details available.

- **Percent failing 2 or more indicators**
  - Metric Value: 15.0%
  - Trend: 15.0%
  - Difference from Goal: 12 of 240
  - Student Attainment: 12 of 240
  - More details available.

- **Percent failing 1 or more indicators**
  - Metric Value: 26.6%
  - Trend: 26.6%
  - Difference from Goal: 64 of 240
  - Student Attainment: 64 of 240
  - More details available.

#### Percent Failing

- **Attendance - Failing (Through May 27, 2011)**
  - Percent failing daily attendance rate: 0.0%
  - Trend: 10.0%
  - Difference from Goal: 0 of 240
  - Student Attainment: 0 of 240
  - More details available.

- **Behavior - Failing (Through May 3, 2011)**
  - Percent failing state report card offenses: 0.4%
  - Trend: 10.0%
  - Difference from Goal: 9 of 240
  - Student Attainment: 9 of 240
  - More details available.

- **Current Course Grades - Failing (Through Sixth Six Weeks 2010-2011)**
  - Percent failing language arts: 15.0%
  - Trend: 10.0%
  - Difference from Goal: 5 of 240
  - Student Attainment: 5 of 240
  - More details available.

  - Percent failing mathematics: 11.4%
  - Trend: 10.0%
  - Difference from Goal: 1 of 240
  - Student Attainment: 1 of 240
  - More details available.

### Percent Caution

- **Attendance - Caution (Through May 27, 2011)**
  - Percent approaching failing on daily attendance rate: 5.0%
  - Trend: 10.0%
  - Difference from Goal: 12 of 240
  - Student Attainment: 12 of 240
  - More details available.

- **Behavior - Caution (Through May 3, 2011)**
  - Percent approaching failing on behavior indicator: 0.0%
  - Trend: 10.0%
  - Difference from Goal: 0 of 240
  - Student Attainment: 0 of 240
  - More details available.

- **Current Course Grades - Caution (Through Sixth Six Weeks 2010-2011)**
  - Percent approaching failing on language arts: 18.6%
  - Trend: 10.0%
  - Difference from Goal: 10 of 240
  - Student Attainment: 10 of 240
  - More details available.

  - Percent approaching failing on mathematics: 17.5%
  - Trend: 10.0%
  - Difference from Goal: 7 of 240
  - Student Attainment: 7 of 240
  - More details available.
Early Warning System District View

The Early Warning System tab at the district level shows how many students are failing and approaching failing across the entire district. By clicking on the “More” menu, and then selecting the student list, the user can see a list of all schools at the district and their school-level values for each Early Warning System Metric.
**Intervention Catalog feature**

The Early Warning System was developed in conjunction with a complimentary Intervention Catalog feature. The plug-in available on the Ed-Fi Technology Exchange contains code/assets for both features. The functional details of the Intervention Catalog are documented below. These 2 features can function independently, however the Intervention Catalog will display a summary of any available Early Warning System information to allow a user to easily filter for interventions relating to issues flagged by the EWS.

When used together, EWS alerts when a student is at risk, and IC provides a means to track Intervention actions that are implemented to reduce the student’s risk factors.

**Technical Overview: Application**

**Solution Architecture**

**Procure Core Changes**

In order to utilize the EWS plugin, several important updates to the Core codebase are required. In order for the plugin to work as intended the latest version of the Core codebase should be used. If the Core code being used has not been updated since July 14, 2014, the EWS plugin may not work as intended. For this reason and for completeness, below is a list of three pull requests that need to be incorporated into a dashboard application instance. This can be done by simply updating the version of core that is being used or by pulling down and applying each of these updates separately.

- [PR #108](#) - Plugin Architecture: Foundation of the Plugin Architecture
- [PR #120](#) - Fixing Plugin architecture enhancements to EdFiControllerFactory
- **PR #141** - updated fonts, css, and javascript files to support the plugin architecture

**Procure Code**

The latest version of the EWS plugin code is provided in a .zip file. It is recommended that this .zip file is extracted in the same directory where the code for Ed-Fi-Alliance/Ed-Fi-Core was pulled. For example, if the Ed-Fi-Core code directory lives at C:\Code, this should also be the location for Ed-Fi-Plugins. The root directory for both repositories and the plugin code should look as below:

![Folder Structure](image)

**Address Existing Build Order Issues**

Inside the Presentation.Web project folder should live a folder named ‘Plugins’. Plugin DLL files are expected to exist at this specific location relative to the executing project. Only files that live at this location are picked up by the application and included for execution.

Part of the build process for dashboard plugins is, in the post build event, to copy any DLL files from the bin directory of the plugin to the Plugins folders mentioned above. This will ensure that the executing applications will be using the most up-to-date version of the plugin code.

It is possible, depending on how the references in a project are set up, and how Visual Studio decides to order the build of projects, that DLL files may be built out-of-order, or that DLL files may be purged from the Plugins folders after they are copied, but before execution begins. This will lead to unexpected, incorrect, and often difficult to diagnose behavior.
The user can change the project build order by clicking on the Solution file in Visual Studio Solution Explorer, and selecting ‘Project Build Order…’. By ensuring that Presentation.Web builds before any plugin assemblies are produced, and ensuring dependent assemblies are built before the post build copy step, the user can ensure the latest version of plugin DLLs are always in the Plugins folders after each build.

**Technical Overview: Database/ETL**

**Overview**

Eight ETL packages, two stored procedures and one extension table are created to generate the Early Warning System metrics and drilldowns at each domain level (District, School and Student). There are no ETL packages required for Intervention Catalog.

**Database**

The Dashboard database and Dashboard Data Warehouse database should be extended to accommodate Early Warning System as follows:

Two new stored procedures:

- dw.DtsxFactCourseGradesExtension
- dw.DtsxFactDiscipline

These scripts are located at \Database\Structure\DashboardDW and include:

- Create-SP-StudentGradePerSubjectPerPeriod.sql
- DtsxFactDisciplineTempTableUpdate.sql

One new table to store historical grades (pulled by student, school, period, subject):
• dw.FactStudentGradesExtension

This script is located at \Database\Structure\DashboardDW and includes:
• Create-FactExtension-Table-FactStudentGradesExtension.sql

Dashboard

Four new dashboard packages:
• StudentEarlyWarningSystemMetrics
• SchoolEarlyWarningSystemMetrics
• LocalEducationAgencyEarlyWarningSystemMetrics
• ContextContainerMetricsExtensions

The ContextContainerMetricExtensions package can be merged into the existing Core ContextContainer package or renamed as desired.

Dashboard Data Warehouse

Four new fact packages (name conflicts with Core would need to be resolved):
• FactEarlyWarningIndicators
• FactAttendance
• FactDiscipline
• FactCourseGrades

ETL Load

Dashboard

SSIS ETL package 1. This package reads student data from attendance, behavior and grade domains from DDS (calculated by Core) to calculate and power student level Early Warning System Metrics and drill-downs. This package is located at \Etl\EdFi.Etl.Dashboard.Extensions.EWS and includes:
• StudentEarlyWarningSystemMetrics.dtsx

**SSIS ETL package 2.** This package will roll up data from student level metrics to power school level metrics and drilldowns. This package is located at \Etl\EdFi.Etl.Dashboard.Extensions.EWS and includes:

• SchoolEarlyWarningSystemMetrics.dtsx

**SSIS ETL package 3.** This package will roll up data from school level metrics to power district level metrics and drilldowns. This package is located at \Etl\EdFi.Etl.Dashboard.Extensions.EWS and includes:

• LocalEducationAgencyEarlyWarningSystemMetrics.dtsx

**SSIS ETL package 4.** This package will apply refresh dates to Early Warning Metrics at each level. This package is located at \Etl\EdFi.Etl.Dashboard.Extensions.EWS and includes:

• ContextContainerMetricsExtension.dtsx

**Dashboard Data Warehouse**

**SSIS ETL package 5.** This package calculates and stores student and school level Early Warning Indicators in the Dashboard Data Warehouse to support historical drilldowns. This package is located at \Etl\EdFi.Etl.DW.Extensions.EWS and includes:

• FactEarlyWarningIndicators.dtsx

**SSIS ETL package 6.** This package calculates and stores student and school level Early Warning Attendance in the Dashboard Data Warehouse to support historical drilldowns. This package is located at \Etl\EdFi.Etl.DW.Extensions.EWS and includes:
• FactAttendance.dtsx

**SSIS ETL package 7.** This package calculates and stores student and school level Early Warning Discipline in the Dashboard Data Warehouse to support historical drilldowns. This package is located at \Etl\EdFi.Etl.DW.Extensions.EWS and includes:

  • FactDiscipline.dtsx

**SSIS ETL package 8.** This package calculates and stores student and school level Early Warning Course Grades in the Dashboard Data Warehouse to support historical drilldowns. This package is located at \Etl\EdFi.Etl.DW.Extensions.EWS and includes:

  • FactCourseGrades.dtsx

**Execution Order**

If Ed-Fi provided Execution order is used to run Dashboard Packages, above mentioned packages should be added to graph as mentioned below:

• Run the Dashboard packages listed under SSIS ETL package 1, SSIS ETL package 2, SSIS ETL package 3, SSIS ETL package 4 in the same order.

• Run the Dashboard DW package listed under SSIS ETL package 5, SSIS ETL package 6, SSIS ETL package 7, SSIS ETL package 8 in any order.
Introduction

The Intervention Catalog was designed to provide teachers and school administrators with real-time, actionable data information about student performance at the middle school level. An Intervention Catalog will help educators provide meaningful programs for at-risk students. The goal is to provide a powerful tool for educators to identify areas of student need and determine effective interventions for students at risk.

The interventions incorporated into the Intervention Catalog may include a range of attendance, behavioral, academic, and social-emotional programs that are offered in each district. Under each category, the interventions detailed for the catalog could include the following:

1. **Attendance**: Truancy elimination services, attendance monitoring
2. **Behavior**: Positive behavior supports, character education resources, anti-bullying, anger management
3. **Academic**: Tutoring, afterschool programs, IEP, 504 services, career planning
4. **Social-emotional**: Social workers, counseling, SAP teams, mental health, substance abuse education and services, and mentors

Some mandated interventions may also be available to all districts including the Student Assistance Program, truancy elimination programs supported by the county courts, and various mental health and drug and alcohol abuse services. Each district will need to work with their community partners and district staff to determine the appropriate interventions to include in the Intervention Catalog. The Intervention Catalog is built to be a district specific list of records. However, a system admin has the ability to import interventions from one district to another. The import creates a separate record for the new district and they are not linked in any technical means.
Intervention Catalog Dashboard Content

Additional Items Added for Intervention Catalog

The actions highlighted in black were added to support the Intervention Catalog.

<table>
<thead>
<tr>
<th>Role</th>
<th>View my Metric</th>
<th>View my Students</th>
<th>View all Metrics</th>
<th>View all Students</th>
<th>View all Teachers</th>
<th>View Operational Dashboard</th>
<th>Assign Intervention</th>
<th>Manage Intervention Catalog</th>
<th>Administer Dashboard</th>
<th>Manage Goals</th>
<th>Access Organization</th>
<th>Impersonate Users</th>
</tr>
</thead>
<tbody>
<tr>
<td>Staff</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Specialist</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Leader</td>
<td>X</td>
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<td>X</td>
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<td></td>
<td>X</td>
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</tr>
<tr>
<td>Administration</td>
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<td>X</td>
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<td></td>
<td>X</td>
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</tr>
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<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Superintendent</td>
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<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>System Administration</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Viewing Interventions

District Overview Page

Intervention administrators can view and manage all district interventions from the Interventions tab. The Intervention Catalog is accessed by clicking on the Intervention tab.
**District Intervention List**

All available district interventions can be viewed by clicking on the Intervention tab. By clicking on the name of the intervention more details can be viewed for any intervention.
**Intervention Details**

An expanded view of the intervention with additional details will display by clicking on the intervention name.
## Grand Bend

### Site Configuration
- Claim Sets
- Metric Settings
- Photo Management
- Interventions

### Intervention List
- **Intervention:** A Social Work
- **Contact:** Dee Keena
dk@battlinminers.com
570-544-1400

### Education Level
- Grand Bend High School
- Grand Bend Middle School
- Grand Bend Elementary School

### A Social Work

#### Intervention Contact:
Dee Keena
dk@battlinminers.com
570-544-1400

#### Intervention Levels:
Tier 3, Individual/Small Group (with Specialist)

#### Gender:
Both

#### Improvement Areas:
Behavior
Other

#### Population:
General Population

#### Duration:
1 Day(s)

#### School Availability:
Grand Bend High School

#### Location:
Grand Bend High School
Grand Bend Middle School
Grand Bend Elementary School

#### Grade level:
K-12

#### Eligibility:
No Eligibility Requirements

#### Cost:
No Cost

#### Parent Permission Required:
No

#### Description:
General Counseling and Support provided school social worker
Searching Interventions

**Search Interventions Page**

In the Interventions section click on the Search Interventions tab to search for available interventions.

**Intervention Search Results**

Interventions can be searched by keyword, eligibility requirements, cost, parent permission required, school availability, location, population, improvement area, grade level, intervention level, and gender-specific. Interventions can also be edited, deleted, or assigned to a watch list.
Assigning Interventions to a Watch List

Assigning an Intervention to Watch List

When assigning an intervention to a watch list, the system creates a separate instance of the intervention for each student on the watch list.
Add Intervention Button

In the Interventions section, a new intervention can be added to the Intervention Catalog by clicking on the “Add Intervention” button.
### Grand Bend

<table>
<thead>
<tr>
<th>Intervention</th>
<th>Contact</th>
<th>Population</th>
<th>Location</th>
<th>Intervention Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>A Social Work</td>
<td>Dee Keese</td>
<td>General Population</td>
<td>Grand Bend High School, Grand Bend Middle School, Grand Bend Elementary School</td>
<td>Tier 3</td>
</tr>
</tbody>
</table>

[Image of Grand Bend dashboard]
**Add Intervention Page**

Enter values for each field and select “Add Intervention” at bottom of page to create a new intervention.
Add Intervention Page – Required Fields

Enter values for all fields except for “Intervention Contact Email” and “Intervention Contact Phone”. Select “Unknown” if the information is not known.
Editing Interventions

*Editing an Intervention*

An intervention can be edited by clicking on the “More” drop down button and selecting “Edit”.

![Grand Bend Intervention List](image)
Edit Intervention Page

The intervention can be edited and after making changes, click the “Save Intervention” button.

[Diagram of an intervention page with fields for Intervention Name, Description, Eligibility Requirements, Cost Requirements, Parent Permission Required, Duration, Intervention Levels, Gender Specific, Improvement Areas, School Availability, Location, Population, Grades, and buttons for Save Intervention and Cancel.]
Deleting Interventions

Deleting an Intervention

In the Intervention Catalog select the “More” button and then “Delete”.

![Intervention Catalog](image_url)
Deleting an Intervention – Confirmation

A pop up window will ask you to confirm your action. Once you confirm the deletion it cannot be recovered.

Assigning Student Level Interventions

Assigning an Intervention – Search

On a student’s “Intervention Catalog” page an intervention can be searched and assigned provided you have proper security access.
Assigning an Intervention

Locate the intervention to assign and select “Assign Intervention”.

**SAP Program**

Improvement Areas: Attendance Behavior Mathematics Language Arts  
Referral to the SAP program to assess for additional services.

**Student Assistance Program (SAP)**

SAP is designed to assist school personnel in identifying issues including alcohol, tobacco, other drugs, and mental health issues which pose a barrier to a student’s success. The primary goal is to help students overcome these barriers in order that they may achieve, remain in school, and advance. SAP is a systemic process using techniques to mobilize school resources to remove barriers to learning. The program uses professionally-trained team, including school staff and liaisons from community alcohol and drug and mental health agencies. SAP team members are trained to identify problems, determine whether or not the presenting problem lies within the responsibility of the school and to make recommendations to assist the student and the parent. When the problem lies beyond the scope of the school, the SAP team will assist the parent and student so they may access services within the community.  

**Colonial Intervention Assistance (CIA)**

Students who are flagged by the dashboard system showing deficiencies in Attendance, Behaviors and Course Grades in English/Math will receive interventions based on reported criteria. Interventions may include referrals to school-based teams such as SAP referrals, referrals to Crime Victims Center and the like.
Assigning an Intervention – Confirmation

Fill in the planned start date, end date, and the goal of the intervention for the student. Click “Confirm”.
**Student Level Notes**

By clicking on the “Notes” button, the user has the ability to track progress or any other comments about the student and the intervention. The goal will be the first note displayed.
Completing an Intervention

When the user clicks the “Not Completed” button they will see the below pop up to complete the intervention. The user has the ability to review the effectiveness of the intervention. The reviews will be displayed to all users within the district as the star rating.
**Intervention Security**

Since some interventions have privacy concerns, the person that assigned the intervention will have the ability to limit the users that will be able to see the intervention. If you click the “Security” button and switch it to “Restricted”, you can select individual users to have access to the intervention. Any user that does not have access will not be able to see any intervention that is assigned and the number by the student’s image will not count any restricted interventions.
**View Assigned Interventions**

After it is created the intervention will appear in the list of interventions. Please note the student’s count of open interventions is now 5 next to their image. Click on one of the assigned interventions.
View an Intervention Student List

**Intervention Student List More Menu**

The “More” menu offers several options to choose from. In this example click “Student List”.

![Intervention Student List](image)
Intervention Student List

The list of students assigned to the intervention will appear below the intervention.
**Intervention Import**

A system administrator will have the ability to import interventions from one district to another. The image below does not have any other districts to select but the user would select the district they want to import interventions from and then select which interventions they wish to copy to the new district.
Technical Overview: Application

Solution Architecture

Procure Core Changes

In order to utilize the Intervention Catalog plugin, several important updates to the Core codebase are required. In order for the plugin to work as intended the latest version of the Core codebase should be used. If the Core code being used has not been updated since July 14, 2014, the Intervention plugin may not work as intended. For this reason and for completeness, below is a list of three pull requests that need to be incorporated into a dashboard application instance. This can be done by simply updating the version of core that is being used or by pulling down and applying each of these updates separately.

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Procure Code

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About the Ed-Fi Exchange

The Ed-Fi Exchange is a hub of innovation for technologies aligned to the Ed-Fi Data Standard. States, Districts, and the Ed-Fi Alliance contribute solutions to the Ed-Fi Exchange that may be downloaded by other Ed-Fi Licensees.

Ed-Fi Exchange contributions may take the form of Data Standard Extensions, ODS and API Extensions, and Dashboard Plugins. In addition, higher-level contributions such as Technical White Papers and Implementation Project Overviews may be contributed to assist other licensees implementing Ed-Fi. The goal is to make the Ed-Fi Community greater than the sum of its parts by openly sharing innovations aligned to the Ed-Fi Data Standard.

For more information, visit http://exchange.ed-fi.org.