

# Case Study – DSST Public Schools

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## Case Study – DSST Public Schools Data Warehouse

Implementation and customization of a longitudinal and dimensional data warehouse based on the Ed-Fi solution to enable detailed administrative reporting on student and staff performance

### Challenge

DSST Public Schools, a high-performing and rapidly expanding charter management organization, was deeply versed in data driven education, but had outgrown the use of their reporting tools. They partnered with Double Line to address this issue, with the following primary goals:

- Provide administrators and teachers timely access to student level data in order to improve student and instructional performance
- Expand and right-fit their administrative toolset to better match the pace of their rapid expansion and instructional philosophy

### Approach

Double Line was hired to customize and implement an Ed-Fi-powered Operational Data Store (ODS) and Data Warehouse (DW) using DSST data aggregated from a variety of source data systems, including Denver Public Schools and Promethean, an assessment vendor holding vast stores of assessment data from daily classroom quizzes to state assessments.

The project team engaged in several stages of design and implementation, using the Ed-Fi solution design documentation as a framework.

### Planning Stage

DSST and Double Line began the planning stage of the project with a series of stakeholder interviews with administrators and school leaders designed to identify reporting needs. Subject matter experts in a variety of academic areas were engaged as a part of these interviews, with special attention to key areas of interest like assessments and interventions. A critical gap in comprehensive administrative reporting was identified, leading to the decision to invest in the development of a longitudinal and dimensional data warehouse based on the Ed-Fi solution. With an eye to long-term stewardship of the reports to be built off the data warehouse, the planned work was divided with the Double Line team focusing on loading DSST's data to an Operational Data Store (ODS) which would feed the new data warehouse. At the same time, DSST staff would focus on visualizing and developing reports off the data warehouse using Tableau software.

## ODS Design and Customization

Double Line worked with staff from both DSST and Denver Public School (DPS) to understand and load the majority of the data which would feed the data warehouse into the ODS. The majority of assessments data for the organization was held by Promethean, whose ActivProgress software had been in use by DSST educators for several years. Double Line staff worked closely with both groups to ensure that the appropriate data was being pulled. Additional data was held in Intuit's Quickbase HR application (staff), Naviance, a tool for tracking student college applications, and Compass, a homegrown application stewarded by DSST to hold data related to student behavior and academic preparedness. In the latter two sources, extensions to the Ed-Fi solution were identified and created to customize the ODS.

## Data Mapping

Identifying all data desired for reporting purposes and determining how it would all fit together in the ODS was key to the success of this project. Double Line mapped the data from the diverse source systems listed above to the Ed-Fi solution, enabling the data's load to the ODS. The analysis of the assessment data yielded a need for an interim assessments database to hold the most granular details yet enable efficient indexing for the load to the operational data store. The resulting mapping process connects data in a meaningful way, generates XML, and loads that XML using SSIS packages, and is comprised of over 50 source tables, 14 domains, and 22 ETL jobs.

## Data Warehouse Implementation

Central to expanding DSST's administrative reporting toolset was the design and development of a dimensional data warehouse based on the Ed-Fi solution. Double Line modeled the data warehouse on the Ed-Fi-powered ODS and extended it for the specific needs of DSST, particularly in the areas of interventions, post-secondary events, and student behavior. The team created ETL packages to aggregate and load the underlying tables and then created views through which the data could be easily accessed using Tableau, DSST's choice of reporting tool. Double Line staff worked very closely with the DSST team to validate the data and refine the views for the initial set of reports related to the spring 2013 pilot.

## Knowledge Transfer

Because DSST team members concentrated on developing pilot reports, Double Line focused knowledge transfer efforts on documenting the various data warehouse views and all load processes. This included artifacts relevant to the specific tools utilized (e.g. Altova MapForce, TeamCity), and the structure of the data warehouse views and ETL processes. DSST staff has rapidly become familiar with the structure and data in the data warehouse and use of the Tableau views for report development.

## Maintenance & Support

As DSST expands its suite of administrative reports using the data warehouse, Double Line will continue to support the DSST team with ongoing troubleshooting, issue resolution, and insight into continuing to leverage and extend the ODS and data warehouse.

## Impact

DSST staff members are actively developing a suite of administrator reports to be rolled out to Home Office staff and School Leaders (administrators in role similar to principals within the organization) for a limited release pilot in late January 2013. Revision based on feedback from the pilot will be incorporated into a larger release for educators at all levels of schools within the organization planned for spring 2013.