Part of my role as CIO and Vice Provost is to make sure we deliver high-quality data to the right people, at the right time, to inform the best decisions possible. With teaching and learning data, this requires a huge investment in data engineering to create the pipelines required to receive, transform, aggregate, and ultimately turn the data into information. Unizin's data engineering expertise allows our team to work directly with data consumers to ***accelerate*** the delivery of key metrics to different stakeholders across UW–Madison.

Lois Brooks, Vice Provost and Chief Information Officer, UW-Madison

Accelerate the Journey from Data to Decision-Making

Higher education institutions generate millions of data points a day, spread across dozens of systems, as staff, students, and faculty engage in their daily work. When we think about putting the power of data to good use to support student success, three big challenges emerge:

Aggregation: from a student success perspective, the data from the student information system (SIS) and the learning management system (LMS) can go a long way to support the educational journey. But they don't provide the entire picture. The UDP integrates data from SIS, LMS and nine other edtech tools (and counting). Managing the volume of data in this pipeline is a challenge, as the LMS clickstream alone can account for 5 million events a day at a large institution.

Translation: the aggregated data from disparate systems creates a very large data warehouse or data lake terabytes deep. Translating data points into user-friendly information takes time, effort, and trained professionals who can apply the SQL necessary to accurately turn raw data into valuable insights.

Delivery: supporting student success requires the timely collaboration of many stakeholders, including professors, advisers, curriculum specialists, and students themselves. When a student engages with an adviser, for example, the adviser should not only understand the student's academic history, but also have access to near real-time information about how the student is engaging with their coursework. When activity patterns, assignment histories, and other data are just a mouse click away, advisers can provide more effective guidance to help ensure students finish the semester successfully.

Data Marts Enable Information at Scale

Data marts enable institutions to deliver timely information to individuals driving student success efforts while using fewer specialized resources. Think of a data mart as a self-contained module of calculated fields designed to parse massive quantities of data and deliver information tuned to a specific aspect of

student success, that can be run daily. Each data mart contains 9,000 to 12,000 lines of SQL code, developed by Unizin data engineers, to join data from up to 85 different database tables. The data mart performs the calculations required to translate data into usable information for different stakeholder groups.

Unizin currently offers 15 different data marts to its members, including:

Student Activity Score: A calculation first devised by researchers at Indiana University's Indianapolis campus, the Student Activity Score combines data describing student session length in Canvas with data on assignment turn-in behaviors to create an activity score for each student in a course. This score is used in a proactive advising workflow, enabling an advisor to identify and reach out to a student who may be struggling early in a semester.

In a study conducted by IUI researchers, students receiving support from advisers with access to the activity score exhibited, on average, an increase of nearly one-third of a grade point in their term GPAs, a reduction in DFWs earned, and an 80% higher likelihood of persisting compared to a control group.

Log Inactivity Mart: It can be a challenge for teachers to know if someone has missed consecutive classes or is not regularly logging in to course-specific learning tools. This is particularly true in large enrollment courses. The Log Inactivity Mart identifies students with no registered activity at all in a course, as well as students who have not registered activity in five, seven, ten, or 14-day intervals for intervention.

LTI Launches: Since COVID-19, the diversity of the edtech ecosystem has exploded. Faculty who discovered powerful edtech tools to support remote teaching continue to use these tools in hybrid and in-person classrooms. The LTI Tool Launch data mart provides a university-wide view of edtech tool usage, including which classes use which tools and the intensity of each tools' usage.

Information from the LTI Tool Launch data mart can help align IT support resources to the various tools in use and inform funding decisions and contract renewals based on the proliferation of and frequency of use for each tool.
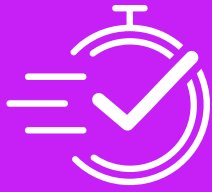
Go from Data to Decision at Light Speed

Unizin's data marts are designed to reduce the technical resources required to turn data into information, while simultaneously accelerating an institution's ability to deliver information to dozens, if not hundreds, of individuals empowered to support students on their academic journey.

A Growing Collection of Data Marts

Unizin's repository of data marts continues to grow. Unizin data engineers are now working on data marts to provide information to faculty in support of reflective teaching practices.

Our Members are Our Inspiration

Several of our existing data marts were directly inspired from work taking place across our membership. As Unizin members continue to innovate and investigate areas such as representing student engagement patterns through data, Unizin will continue to collaborate with our members to package these calculations into new data marts available to the wider consortium.