



Preventing Dropouts With Predictive Intelligence



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Declining enrollment and state funding. Layoffs and program eliminations. Threats to federal research grants, endowment funds, and student loans. — **Higher education is dealing with significant financial challenges these days.**

Adding to the concerns is the growing number of enrolled students that are dropping out. The National Center for Education Statistics (NCES) reports that 32.9% of college students drop out annually — about a quarter after their freshman year.¹

When a student drops out, there are consequences. For universities, attrition affects funding, resource planning, and institutional rankings. Any marketing dollars spent attracting those students are lost and few dropouts ever return to continue their education.

Yet identifying at-risk students early enough to intervene is notoriously difficult, especially when many of the warning signs aren't obvious.

That's why one multi-campus university turned to a new approach: using correlation analysis to uncover subtle patterns in their student data. By partnering with Intuitive Data Analytics (IDA), they moved beyond static dashboards and into dynamic, predictive intelligence to help their team better understand which students were most likely to disengage and, more importantly, why.

The Challenge

Predicting Dropout Before It Happens

The university, serving between 50,000 to 80,000 students across up to 15 campuses, had a mission to support lower-income, often first-generation students. While students were motivated, many faced obstacles, including working full-time, juggling family responsibilities, or lacking reliable internet access. Despite offering online and in-person classes, support services, and flexible options, student dropout remained a persistent concern.

What made early intervention so difficult?

The clues were indirect.

Students rarely report financial hardship or mental health struggles outright. Traditional business intelligence tools only told part of the story, such as who had low grades or unpaid tuition, but failed to surface the why or the patterns leading up to disengagement.

The Solution

Correlation Analysis Using IDA

Rather than looking for a single “dropout flag,” IDA analyzed trends across hundreds of variables. In this case, the university began by examining a wide range of student data:

✓ Academic performance over time

✓ Changes in attendance patterns

✓ Tuition payment history

✓ Distance from campus

✓ Work and family status (where available)

Instead of requiring perfect data or direct disclosures, IDA’s platform looked for correlated patterns. For example, a decline in attendance over several weeks (more than the total number of absences) emerged as a strong predictor of dropout. Similarly, a student who began missing tuition payments after months of consistency signaled elevated risk.

IDA doesn’t stop at surfacing these relationships, however.

It translates them into ranked insights, showing which variables are most tightly connected to dropout history. With this knowledge, staff can prioritize intervention efforts with data-backed confidence.

Building a Risk Scoring Model

Once the key variables were identified, the next step was to translate them into predictive models. IDA leverages a machine learning algorithm known as Random Forest, which classifies students based on patterns across multiple variables simultaneously.

Think of each student as falling into a particular “cluster” or forest that reflects students with similar risk profiles. For instance, a student with declining grades, dropping attendance, and recent missed payments might fall into a cluster where 85% of students historically dropped out.

The benefit?

Rather than assigning a basic score, IDA evaluates how closely a student resembles high-risk patterns seen in the past. This multidimensional approach ensures predictions are more nuanced, taking into account combinations of behavior rather than any one factor in isolation.

Refining the Model with Validation Playground

Prediction is powerful, but context is crucial.

IDA's solution includes a validation playground, allowing institutional leaders to test, tune, and compare multiple models before deciding which one to trust.

Using IDA's intuitive interface, the university could:

- ✓ Validate which fields to include (For example, excluding fields with mostly missing data).
- ✓ Visualize predicted vs. actual outcomes for historical periods.
- ✓ Adjust the weight of specific variables if human insight suggests they were under or overrepresented.
- ✓ Rerun simulations quickly without any coding required.

For example, the team discovered that simple grade averages were less useful than grade trends.

They also found that certain student clusters appeared high-risk by score but didn't actually drop out —often because they had received proactive academic support. This insight led the team to adjust their weighting model and build more targeted outreach campaigns.

The Outcome A Blueprint for Proactive Student Support

The university now has a smarter, faster way to spot trouble early. With real-time risk scores, student services teams can prioritize outreach to students who might otherwise slip through the cracks.

This data-driven approach supports initiatives like:

- ✓ Offering early academic support to students whose grades are trending down
- ✓ Connecting financially struggling students with scholarships or flexible payment plans
- ✓ Identifying systemic barriers (like commute distance) that correlate with disengagement
- ✓ Customizing communication based on each student's likely risk profile

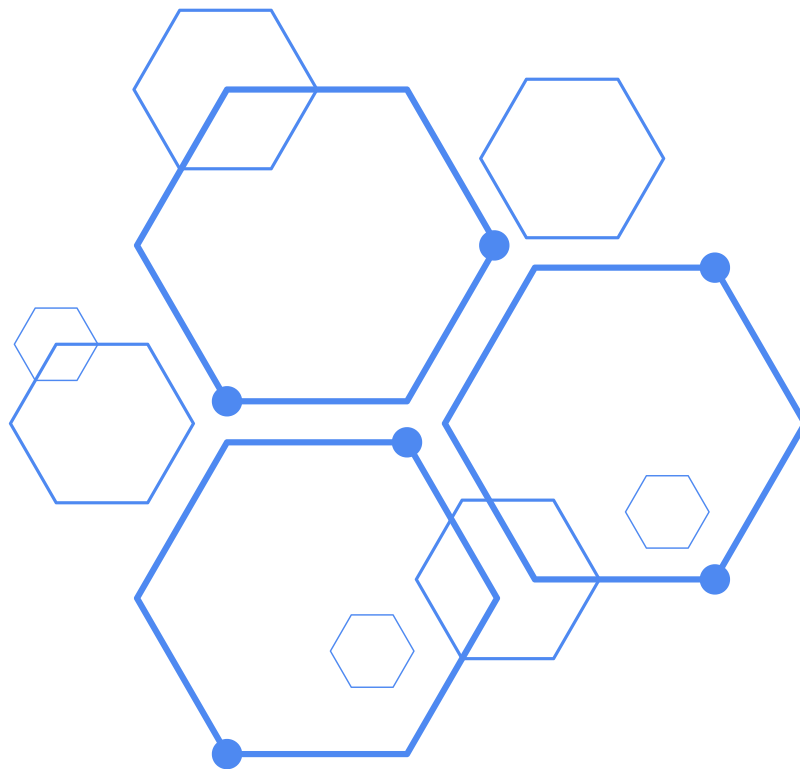
The result is a more responsive, more equitable educational experience, resulting in better outcomes for students and institutions.

By highlighting what really drives student outcomes, IDA empowers institutions to act earlier, smarter, and more effectively. Instead of guessing which students might be in trouble, universities can now see the risk patterns forming in real-time, and respond with the support that makes a difference.

With tools like IDA, higher education can move beyond static reporting and into the era of proactive, human-driven intelligence.

SOURCES:

1. <https://research.com/universities-colleges/college-dropout-rates>



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Why IDA is Created?

IDA was designed for next-gen BI. This technology enhances human intelligence for real-time deep dive study and inquiry, beyond traditional data analytics platforms.