

Empowering every student to achieve more



# A better chance: school district identifies early predictors of student performance

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—Rod Houpe, Chief Information Officer,  
Cleveland Metropolitan School District

When the Cleveland Metropolitan School District wanted to change how it delivers education, it looked for a better way to predict student and school performance. The district worked with Microsoft and Neal Analytics, an independent software vendor, to build a cloud-based data visualization and predictive-analysis solution using Microsoft Power BI and Azure Machine Learning. Now the district can monitor and help the children who need it, identify learning barriers, act quickly, and give every student a better chance.



## Cleveland Metropolitan School District

7,500 employees

[clevelandmetroschools.org](http://clevelandmetroschools.org)

United States

Public education

### Company profile

The Cleveland Metropolitan School District serves 40,000 students in kindergarten through grade 12 and manages 7,500 employees, 96 campuses, and an annual budget of almost US\$1 billion.

### Partner profile

Neal Analytics

[www.nealanalytics.com](http://www.nealanalytics.com)

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If a child in the Cleveland public schools fails to meet the third-grade reading standard, she cannot move on to fourth grade—and she is at very high risk of failing to graduate from high school. Her teachers know it. So does the district, and her parents have likely been told. She may not understand it all—yet.

Nobody gives up on her; her school and her teachers launch and maintain vigorous remediation efforts. But the Cleveland Metropolitan School District (CMSD) is a high-poverty district; every one of its 40,000 students qualifies for free or reduced-price lunches. That’s a lot of kids facing a lot of challenges, and dropout rates are high. Despite everybody’s best efforts, this young student may not graduate.

It’s one thing to try and help at-risk students, but CMSD can now go further—and start earlier. Using powerful analytics tools from Microsoft, the district can identify the early warning signs—from pre-kindergarten on—that indicate which kids may need help to meet the early reading standard. “When we can focus on early identification and intervention, it’s much more effective and less expensive than remediation,” says Rod Houpe, Chief Information Officer at Cleveland Metropolitan School District.

## Heed the warnings, avoid the hazards, meet the milestones

CMSD wants all its students to graduate from high school prepared for college and a twenty-first century career, and it has worked deliberately over several recent years to change how it delivers education in Cleveland. To help raise enrollment, improve student achievement, and cut dropout rates, district leaders needed better insight into future student and school performance.

The district wanted to build tools that would analyze test scores, grades, attendance, and other data to monitor school performance and predict which students and schools might fall behind important milestones such as the third-grade reading standard. But CMSD data came from many sources in many formats. The data sets were challenging to arrange and poor data governance made predictive analyses difficult.

District forecasters could analyze some data with Microsoft Excel and share the results in PDF files or using PowerPoint presentations, but they could not provide teachers, principals, or district decision makers anything like real-time data visualization. “There was a lag in decision making because it took so long to create the reports,” says Blessing Nwaozuzu, Executive Director for Enterprise Applications at Cleveland Metropolitan School District. “We needed more powerful technology, but our funding was limited.”

## Data visualization, predictive analytics, and an education vision

In 2015, CMSD began evaluating business-intelligence tools from Tableau, Cognos, and Oracle, but it wanted a more comprehensive, integrated technology. The district began a conversation with Microsoft to discuss its goals and challenges, and Microsoft invited CMSD to an envisioning workshop hosted by Neal Analytics, a member of the Microsoft Partner Network that specializes in data platforms and data science.

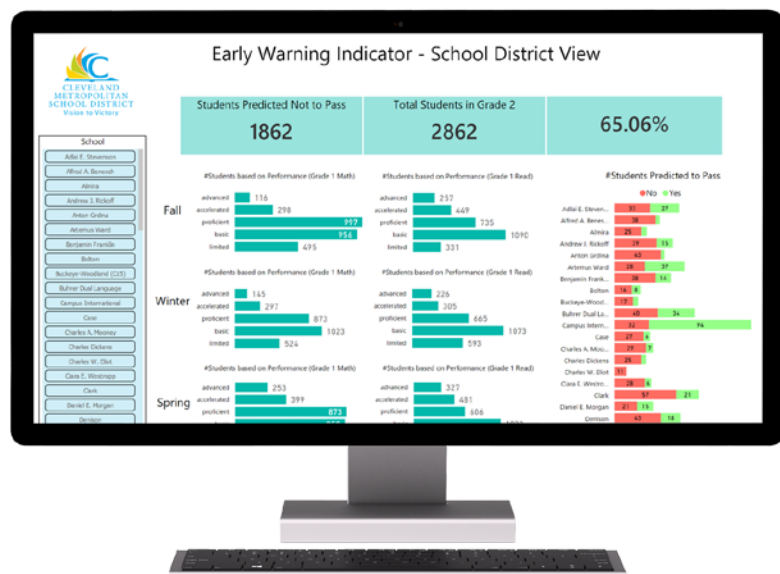


Neal Analytics and Microsoft understood the district’s vision, and according to Curtis Timmons, the Deputy Chief of Information Technology at CMSD, Neal Analytics had technology and solution expertise that meshed well with the district’s internal data-science expertise. “We listened closely to the district stakeholders,” says Mike Reese, Director of Engagement Management at Neal Analytics. “And we helped them refine a cloud-based data visualization and predictive-analysis solution using Microsoft Power BI and Azure Machine Learning that CMSD could use to monitor student and school performance.”

In November 2015, CMSD began two proof-of-concept (POC) studies and became one of the first school districts in the United States to use Power BI and Azure Machine Learning to support an Early Warning Indicator Program and a School Performance and Planning Framework. With Power BI, CMSD and Neal Analytics have a suite of business analytics tools to choose from, and Azure Machine Learning, a fully managed cloud service, makes it easy for them to build, deploy, and share predictive analytics solutions.

The district worked with Neal Analytics to design and execute the POCs. First they used Power BI to build an interactive School Performance and Planning Framework that teachers, administrators, and district leaders can access through a public-facing website. Each stakeholder can sign in to Power BI and in just one click reach a custom dashboard that helps principals and other decision makers compare school performance data such as test scores, attendance, and/or graduation rates against other schools or historical averages. They can factor in environmental or demographic information, understand the strengths and weaknesses of individual schools, and take corrective steps as necessary.

CMSD and Neal Analytics also built early-prediction models in Azure Machine Learning to support the Early Warning Indicator. These models gather standardized test scores, attendance records, zip codes, other demographic data, and student survey results from the district’s student information system and other internal and external sources. The Early Warning Indicator uses the models to generate predictive analyses that CMSD can display with Power BI data visualizations in a dashboard with three views: district view for senior leadership, school view for principals, and classroom view for teachers.



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## Find the child who needs help—before she fails

By relying on the computing power, storage capacity, and instant scalability in the Microsoft cloud, CMSD analysts can provide faster insight for district leaders and educators. Now teachers in kindergarten and first, second, and third grade can monitor the young girl who may be falling behind in reading. They can identify the challenges she faces—health, attendance, behavior, or missed assignments—and help her, before she fails the third-grade assessment.

“We are using the Microsoft cloud to maximize the predictive potential of our data,” says Houpe. “Now district administrators, principals, and teachers can understand what’s going on in our schools and classrooms, make decisions, and intervene to help students in time.”

## Identify learning barriers and act quickly

After the successful POCs, CMSD immediately began to deploy, use, and expand the School Performance and Planning Framework, and expanded the Early Warning Indicator across the district. Now it can generate novel and powerful insights to improve academic performance at the district, school, and student level. District leaders see predictions and other analyses in real time, so they can make decisions early and act quickly.

“We’ve shown that we can use the Microsoft cloud to do these analyses faster and go a step further to identify learning barriers and take action,” says Nwaozuzu.

## Make accurate predictions

CMSD worked with a Microsoft Solution Architect to help build a modern data warehouse and data governance policies to support Power BI. The district issued dissemination and ownership rules, quality checks, and role-based access to help ensure data integrity and quality.

“Improving data quality helps us be more insightful as a district, discourages isolated decision making, and makes predictions more accurate,” says Timmons.

## Transform the future for every student—and every community

Because the Cleveland Metropolitan School District now has an easier, more accurate way to predict student performance for reading and other metrics such as persistence through high school and college, it can better serve its students and the community.

“We are using Power BI and Azure Machine Learning to transform education in Cleveland,” says Nwaozuzu. “When we can predict where kids will need help and where they’ll succeed, we can allocate resources where and when we need them.”

Then, every third-grader in a Cleveland public school will have a better chance to move on to the fourth grade with her friends, and she will be on a firmer road to graduate from high school, go on to college, and enjoy meaningful career opportunities.

## Product Solution Taxonomies

Microsoft Azure  
Microsoft Azure Machine Learning  
Microsoft Power BI