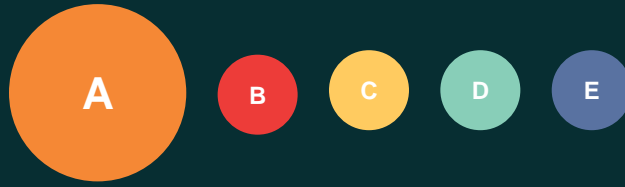# Improving Graduation Rates in West Virginia: Predictive Analytics in Action

September 9, 2016

Agenda

A   Welcome & Introductions

B   Shaping the Dropout Prevention Conversation in WV

C   Predictive Analytics vs. Threshold Early Warning Systems

D   Statewide Implementation & Results

E   Q&A

Join the backchannel conversation
#DropoutPrevention on Twitter

Welcome & Introductions

Presenters

Michele Blatt
Chief Accountability Officer, Division of School Effectiveness
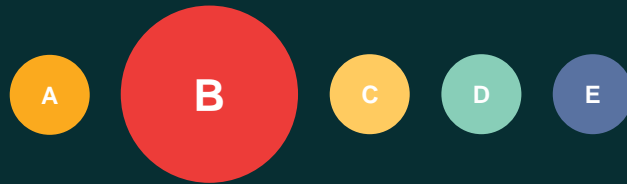**West Virginia**

- Twenty-two years in education
- Currently oversees Federal Programs, Student and School Support, and Educator Effectiveness
- Spearheaded efforts to increase graduation rates for West Virginia students
- Currently leading the transition to ESSA

Dr Kristal Ayres
Director of Professional Services, BrightBytes

- More than 27 years of educational experience within teaching and administration in K-12 districts
- Director of Professional Learning, built teacher and leader capacity using research-based best practices
- Keynote speaker leadership development, dropout prevention, early warning, student engagement, and data analysis

Shaping the Dropout Prevention Conversation in West Virginia

High School Graduation Rates Hit Record High

U.S. News & World report that high school graduation rates hit 82% (December 2015)

West Virginia recognized as one of the fastest moving states with a 86.4% graduation rate in 2014-2015.

How did Graduation Rates improve in West Virginia?

West Virginia Demographics
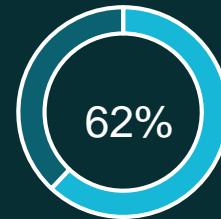
55
School Districts
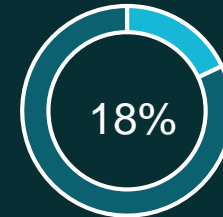
714
Schools

280,000
Students

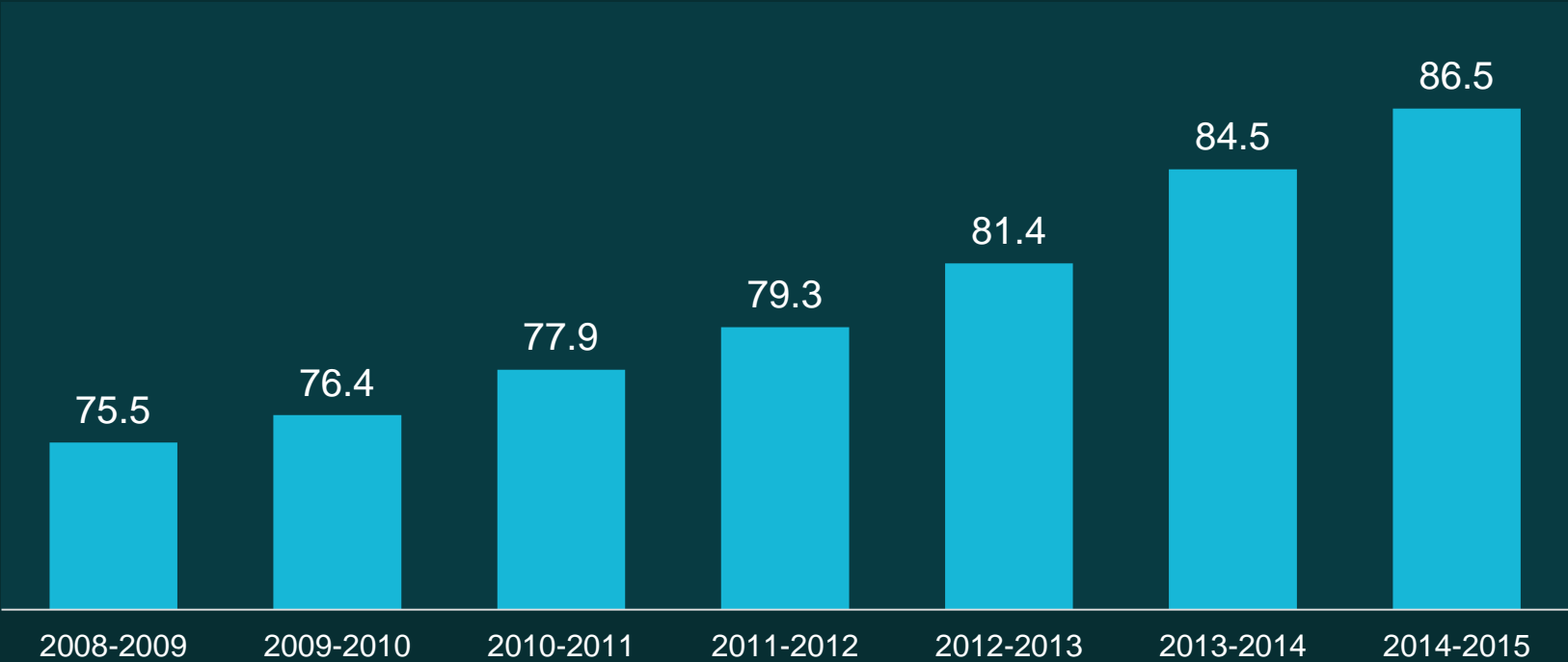**1,850,325**
State population

$41,576
Median household income

62%
Students qualify for free or reduced lunch

18%
Have attained a bachelor degree or higher

Graduation Rates

Dropout Rate

Year	Rate
2011-2012	1.7
2012-2013	1.5
2013-2014	1.3
2014-2015	1.1
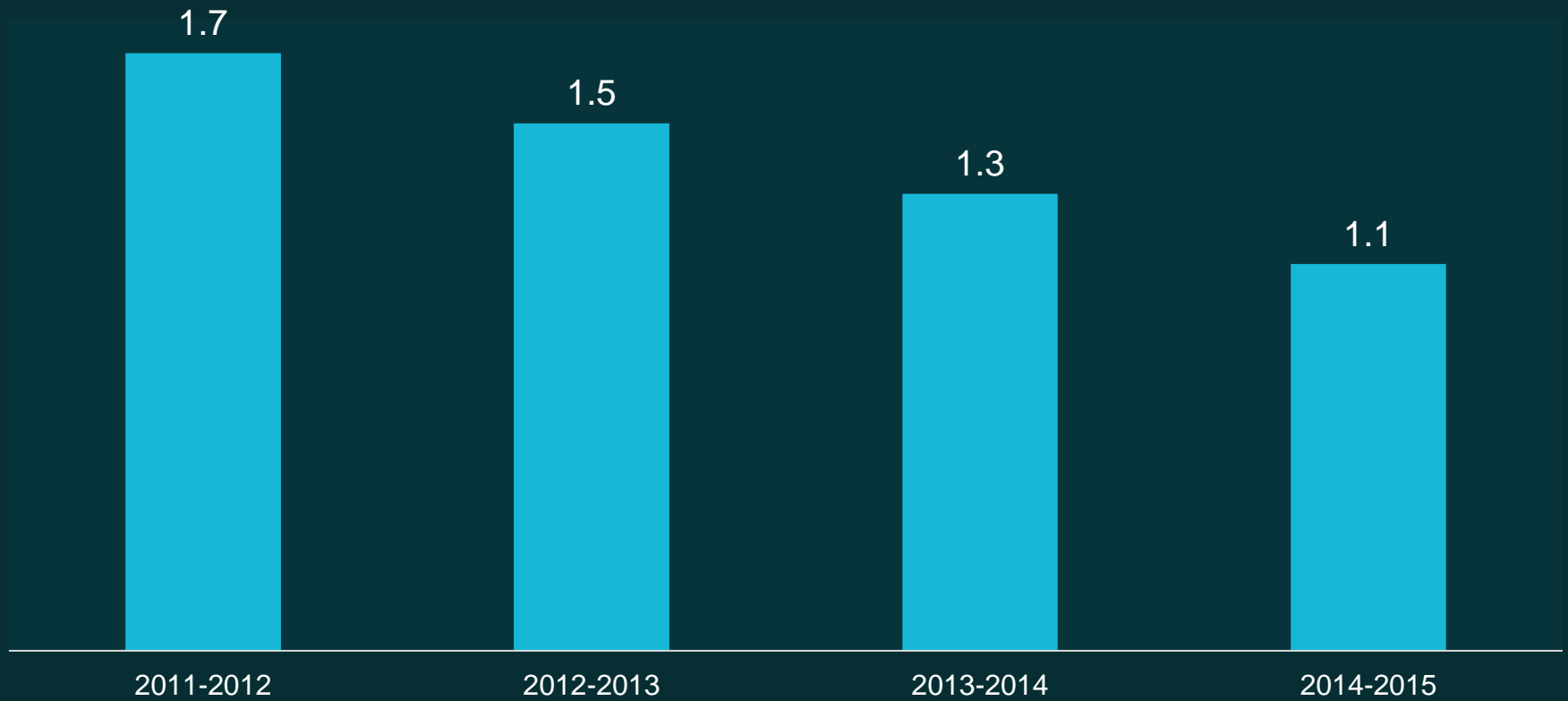
Our Journey to Improve Graduation Rates

- **2008: National Governor's Association called for all states to publish graduation rates using one calculation method**

- **Dr. Steven Paine, WV Superintendent, partnered with Robert Balfanz to determine at-risk high schools in WV**

- **Balfanz's research was based on the checklist/threshold model**

Early Efforts

- **Office of School Improvement worked to create state-wide awareness of the Balfanz district profiles and put structures in place**

- **Efforts to reduce dropout included the entire community**

- **Data collection and analysis was done manually at the school level**

West Virginia's First Statewide Early Warning System

- **2011: State legislature required WV to develop it's own early warning system as part of Local Solution and Dropout Prevention Innovation Zones**

- **Our first early warning system pre-populated an excel file which set threshold indicators on the ABC metrics.**

Making Progress

- **Graduation rates started to inch up**

- **State was pleased with the initial efforts, wanted to operationalize efforts to have a greater impact**

Making Data Accessible & Actionable

Goal:

Educators at all levels have easy access to comprehensive data and research-based information in order to be able to take effective action

- **More than a threshold system that only told us at risk/not at risk**

- **Earlier identification to allow us to act to change students' trajectory**

- **Improved efficiency of data collection**

- **Easier access to information**

- **Better understanding of information**

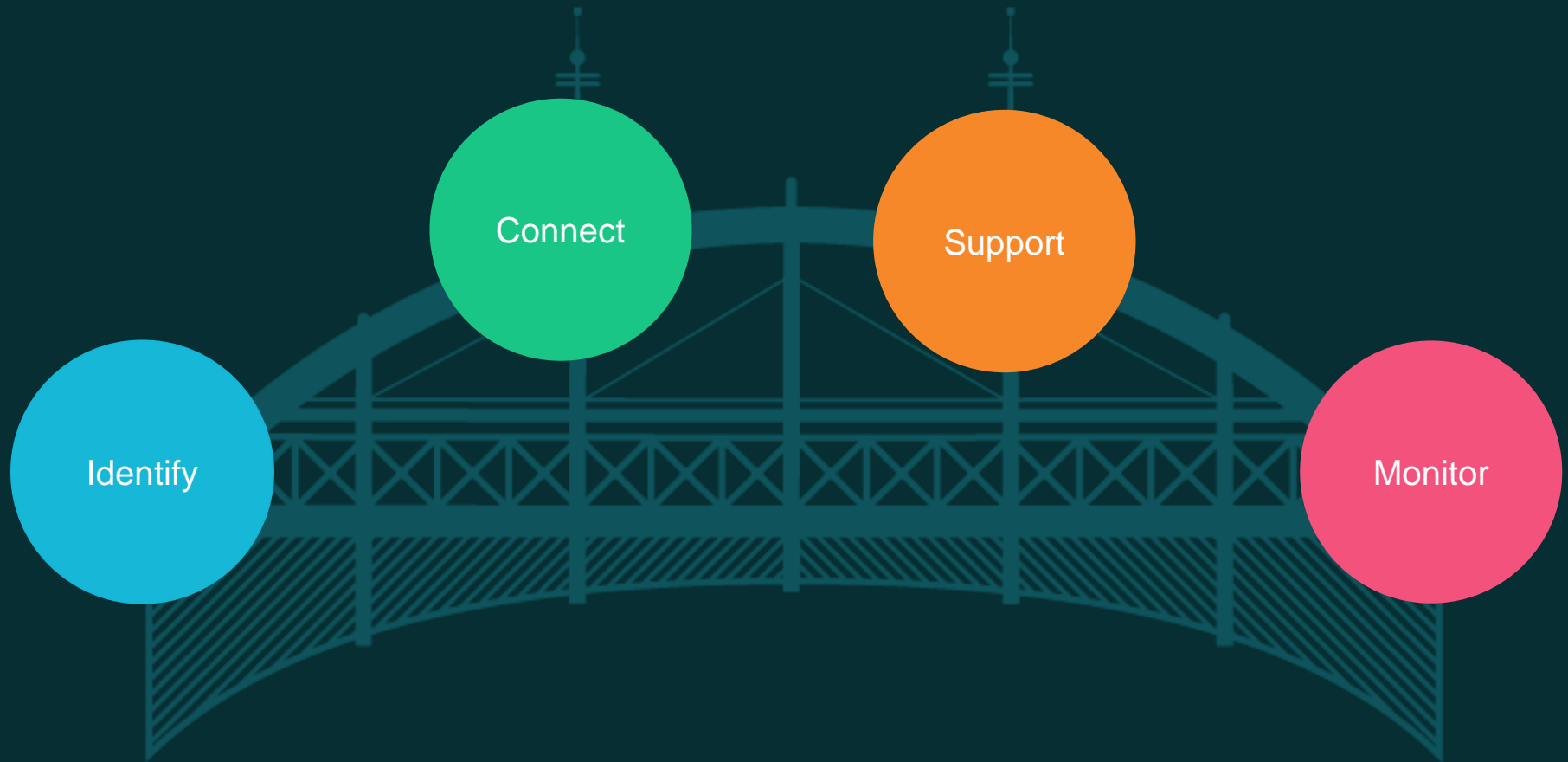# Predictive Analytics vs. Threshold Early Warning Systems

Predictive Analytics

Emotional

Social

Physical

Cognitive

Intellectual

THE WHOLE CHILD
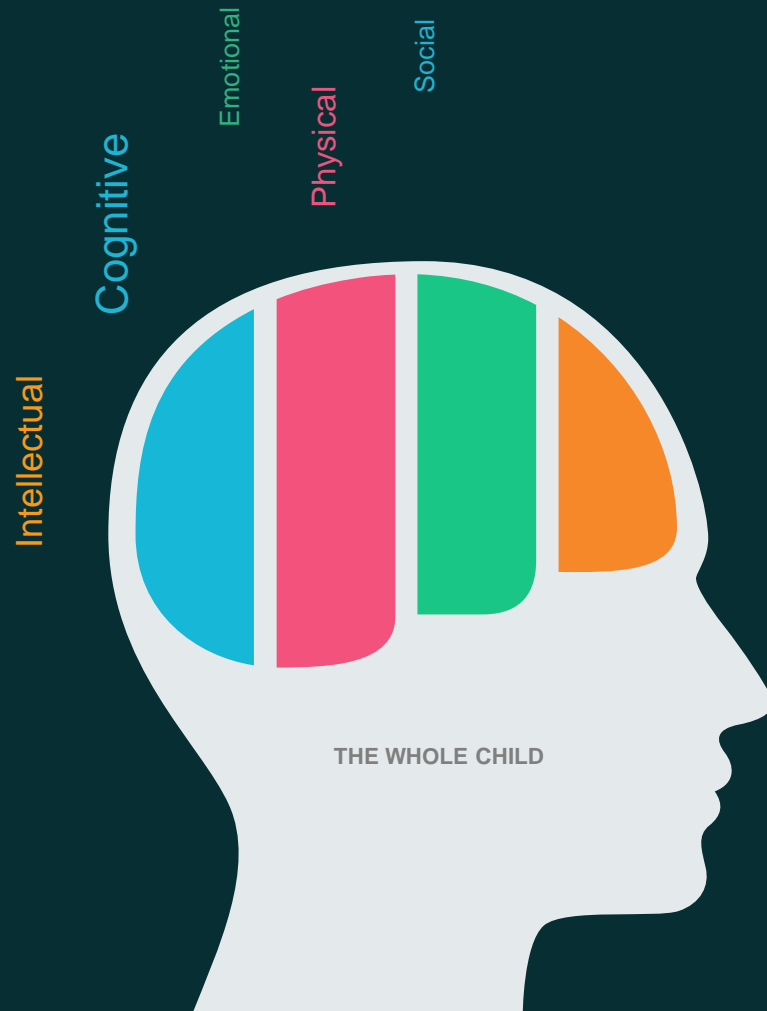
mazin™
E D U C A T I O N

Predictive algorithm based on building specific factors and historical data

Bridging the Gap

Identify

Connect

Support

Monitor

Evolution of Early Warning Systems

FIRST GENERATION
Traditional Checklist Model

Indicator	Value
First 20/30 days absence rate	10%
Grading period absense rate	10%
Annual absence rate	10%
GPA	2.00
# of course fails (per grading period)	1
# of fails (annual)	2
# of credits earned (annual)	4
Major behavioral incidents (per grading period)	
Major behavioral incidents (annual)	

CHARACTERISTICS

✓ Proactive rather than reactive

✓ Research-based, Balfanz, but one size fits all

✓ Systematic, consistent criteria

✗ Threshold-based (dichotomous yes/no)

✗ Primarily applicable to higher grade levels

✗ Limited to a few indicators

✗ One size fits all

✗ Communication – often spreadsheets

✗ Accuracy – better than before, but still limited (e.g., 'false positives')

Examples of Companies that use Predictive Analytics

Evolution of Early Warning
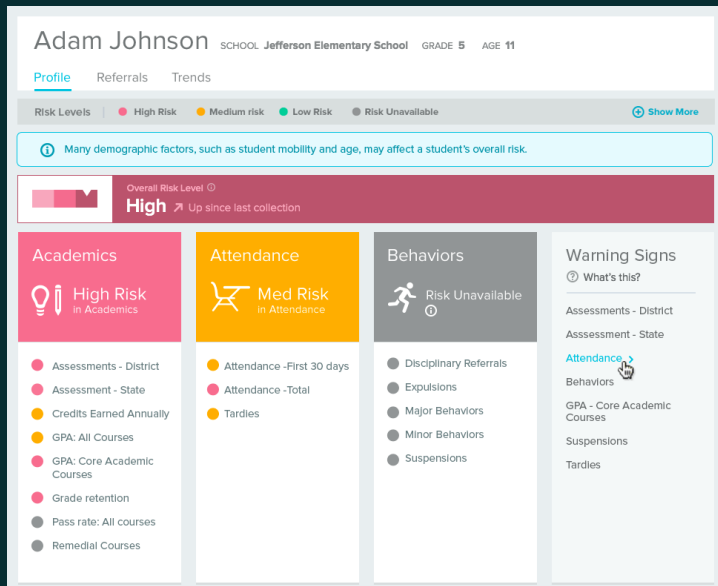
NEXT GENERATION
Predictive Analytics

FURTHER DEVELOPMENTS

- Research-based & data driven – based on patterns of risk that have historically been associated with an increased likelihood of dropping out in your setting

- Multiple indicators/multiple domains

- Greater accuracy

- Earlier identification

- Customized/flexible - takes into account differences across districts/grade spans

- Communicates:
  - Risk as a continuum
  - Different levels

How does Predictive Analytics Work?

State-of-the-art predictive analytics
Draws upon multiple data points spanning the domains of academics, attendance, behavior, and demographics

Customized to districts & grade levels
Analyzes actual historical dropouts in the district and uses available data across all domains to determine the best predictive models to predict those dropouts. Such predictive models are applied retroactively to active students in the district

Customized, flexible
Not one-size-fits-all

Earlier identification
Middle and elementary

Greater accuracy
Minimizes false positives/negatives

Timeliness
Real-time district data; promotes the effectiveness of existing services and supports

Early Warning Framework

ACADEMICS

- Assessments - District
- State Assessments – Math, Reading, Social Studies & Science
- Credits Earned Annually
- GPA - All Courses
- GPA - Core Academic Courses
- Grade Retention
- Pass Rate - All Courses
- Remedial Courses

DEMOGRAPHICS

- Age
- Ethnicity
- Gender
- Free & Reduced Lunch
- 504 Status
- Special Education (IEP)
- Limited English Proficiency
- Mobility

ATTENDANCE

- Attendance - First 30 Days
- Attendance – Total
- Tardies

BEHAVIORS

- Behaviors - Major
- Behaviors - Minor
- Disciplinary Referrals
- Expulsions
- Suspensions

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EARLY WARNING

ACADEMICS · ATTENDANCE · DEMOGRAPHICS · BEHAVIORS

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Checklist Model and Predictive Analytics Model

Jack
5th Grader

Overall Risk is High

NOTE: Jack would <u>not</u> have been identified using the Checklist System because:

1. **Jack is in 5th grade**
2. **Jack wouldn't have met the threshold on any of the checklist "flags."**

Indicators (Timeframe is Prior 12 months)	Student Data	Check-list	BB Predictive Analytics	
			Indicator Level	Overall Domain Risk
Attendance Rate	91.0%	Not Detected	Moderate	High
First 30 Day Attendance Rate	80.0%		High	
Tardy Rate	3.7%		High	
Suspensions	1	Not Detected	High	High
# of Major Behavioral Incidents	0		Low	
# of Minor Behavioral Incidents	2		Moderate	
Academic Indicator (GPA)	2.80	Not Detected	High	High
Courses Passed	100.0%		Low	
State Assessment: Math*	Slightly Below		Low	
State Assessment: Reading*	Far Below		High	
State Assessment: Science*	Below		High	
State Assessment: Social Studies*	Below		High	
Grade Retention (prior 12 months)	No		Low	

Aggregate Reports & Filter by Triggers
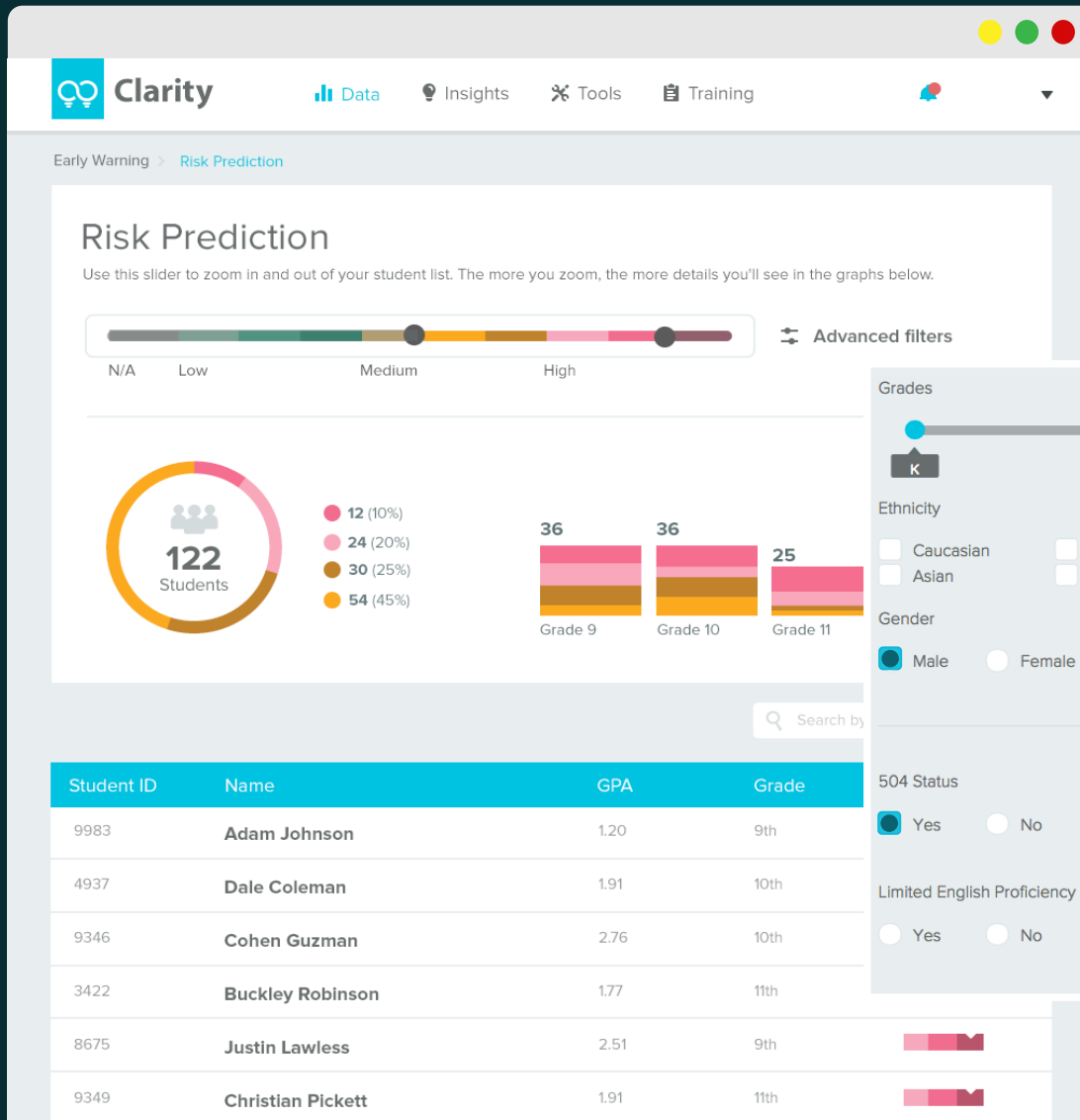
Connect to Services

IDENTIFY

CONNECT

MONITOR

The Pipeline: Ways of Falling through the Cracks
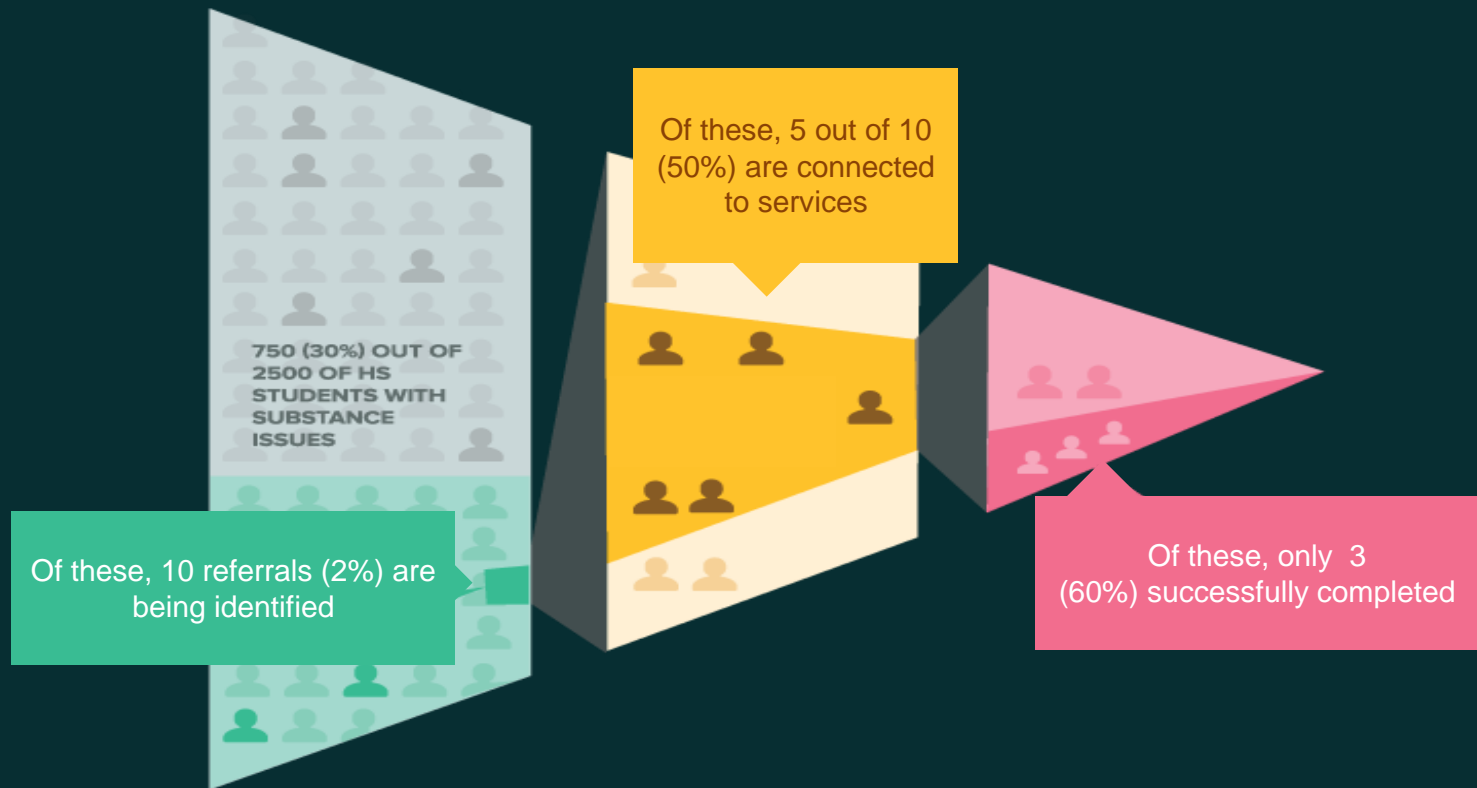
Ensure Students Are Connected to Support
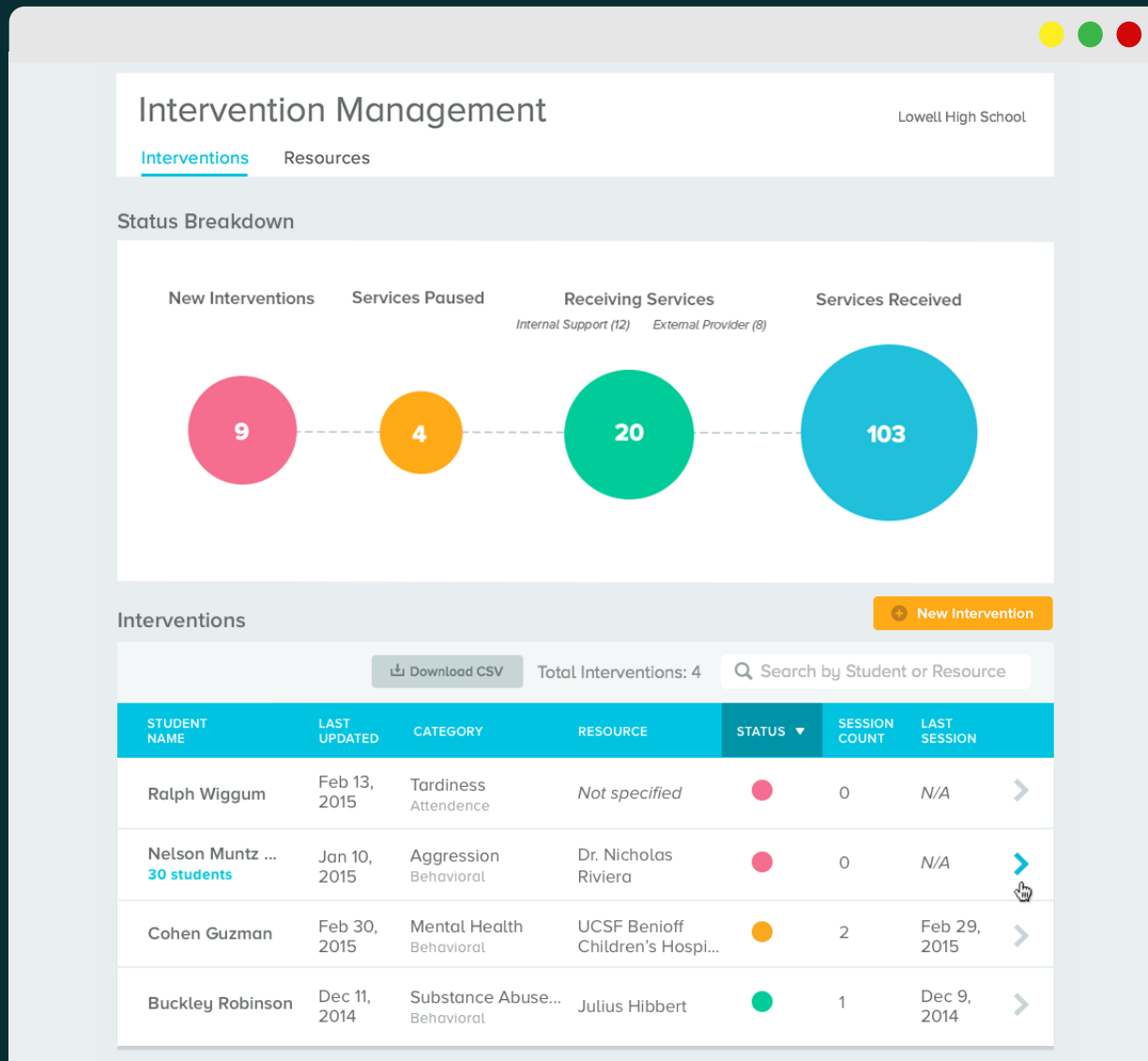
Resource Mapping
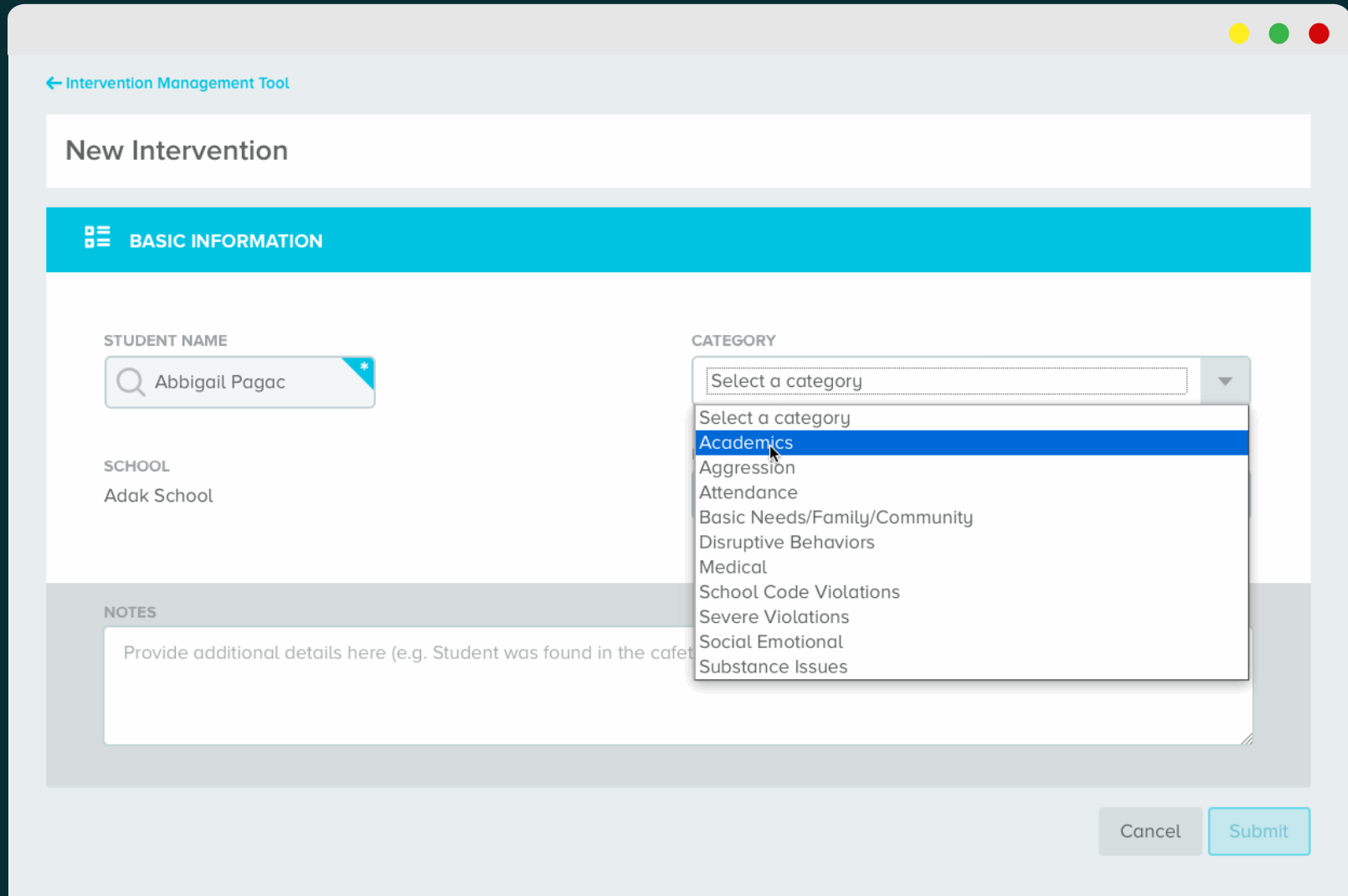
Assign Interventions to Students

Monitor Services and Support

IDENTIFY

CONNECT

MONITOR

Monitor Intervention Effectiveness
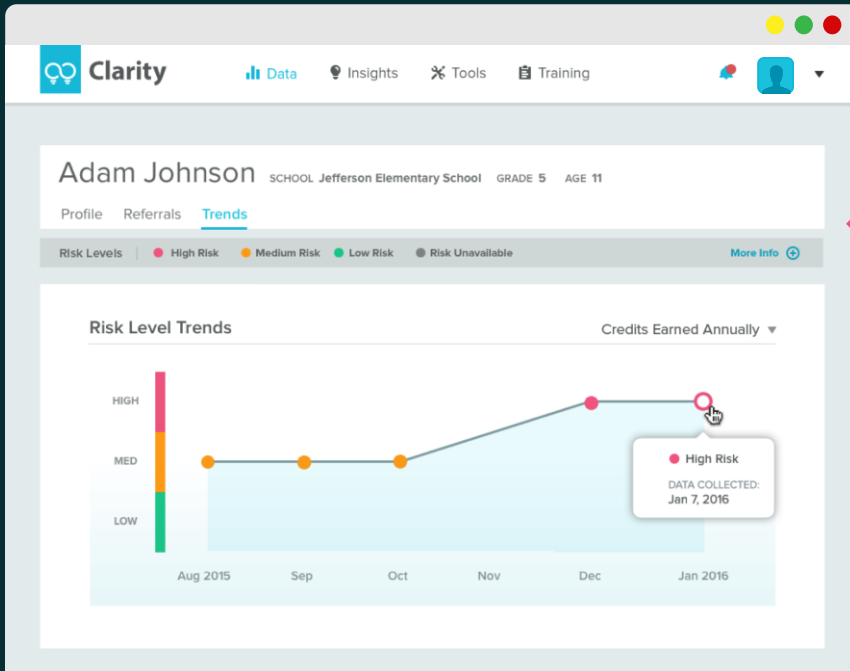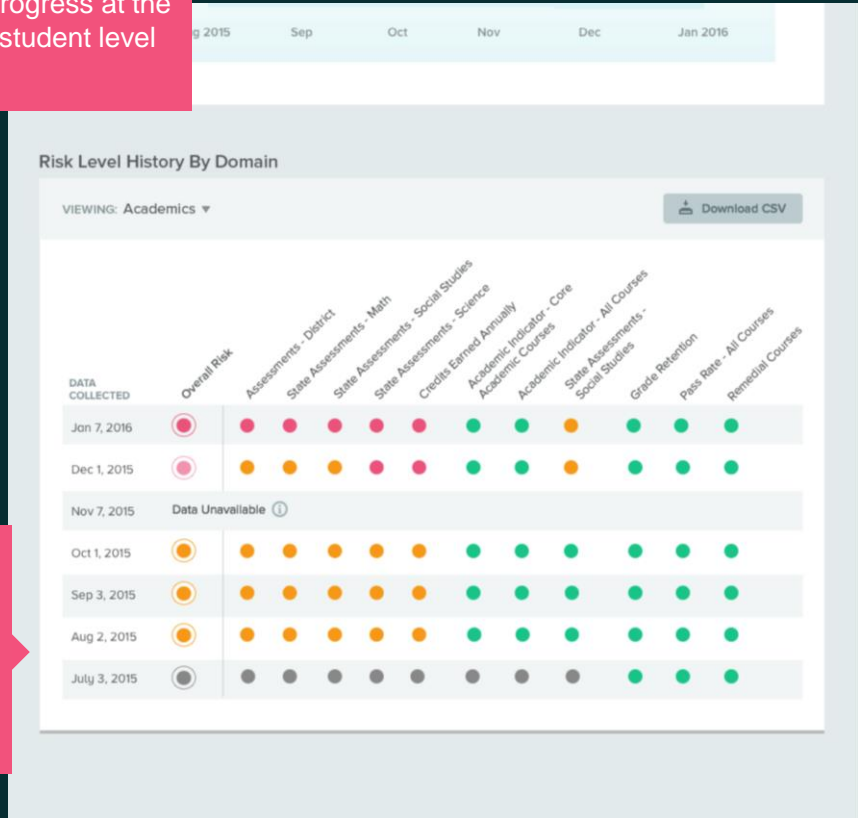
Diary of a Teenage Dropout: Summative Data

3
- 2.9 GPA
- 92% attendance rate
- No behavioral incidents

4
- 2.6 GPA
- 91% attendance rate
- No behavioral incidents

5
- 2.5 GPA
- 90.5% attendance rate
- No behavioral incidents

6
- 2.5 GPA
- 89.4% attendance rate
- Two behavioral incidents, one suspension

7
- 2.2 GPA
- 88.7% attendance rate
- Two behavioral incidents, two suspensions

8
- 2.0 GPA
- 83.6% attendance rate
- Two behavioral incidents, four suspensions

9
- 1.9 GPA
- 79% attendance rate
- Four behavioral incidents, two suspensions

10

Drops out of high school; before leaves has
- 0.9 GPA
- 78% attendance rate
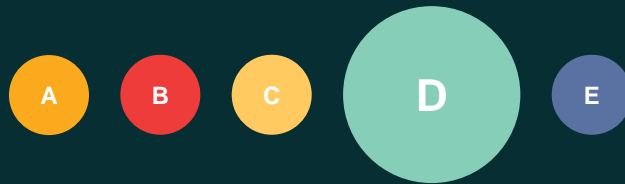
The data contained in this figure is based on analyses of 35,683 students and represents the profiles of students, at each grade level, who eventually dropped out in 10th grade.

West Virginia Early Warning System Dashboard

Statewide Implementation & Results

Rolling Out a State-Wide Early Warning System

A phased-in approach:

- Piloted in 4 counties
- Divided remainder of districts into three groups for implementation
- Process for scale-up to all districts
    - Asked all Superintendents to commit to a 25-minute meeting
    - Met with all Superintendents and asked them to designate a person to oversee the implementation with principals
    - Showed and discussed the data and the implications
    - Set a training date for all Principals

State-wide Implementation

Met with ALL Superintendents & Principals in the state

It was so powerful that the schedule for meeting with the various cohorts occurred sooner than expected because everyone was asking for immediate access

Results: Year Two

- ✓ West Virginia is now among the **top 5 states** in terms of improving graduation rates

- ✓ Graduation rates **increased 5%** in the past two school years

- ✓ Issues and trends are **easily identifiable**

- ✓ We can **intervene as early as first grade**

- ✓ All WV educators work toward **helping students graduate**

- ✓ From grade 1 through high school, **we all have the same mission**

Return on Investment

✓ Vastly **improved cost efficiency**

- Students used to be identified in high school (ineffective use of funds and resources)

- Now we can focus efforts early with targeted services and programs (intervene early and change trajectories)

Data-Driven Innovation

The school leadership team
- Early Warning data is shared and discussed
- Leadership Team works with grade level/content teams to share information and discuss strategies
- Continuous improvement strategic planning process

At the state level
- Early warning data is embedded in the school accountability measures
- Data source when reviewing strategic plans

LOOKING AHEAD:
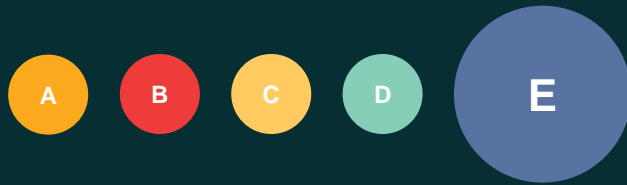
The future is bright for West Virginia students.

Learn More

Timely, Personalized Risk Prediction and Prevention

Identify at-risk students based on individualized and building-specific triggers, intervene early, and get the best tools for dropout prevention.

BrightBytes mazin EDUCATION

Q&A

Thank You!