Improving Graduation Rates
Predictive Analytics In Action

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#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

<table>
<thead>
<tr>
<th>Year Range</th>
<th>Graduation Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008-2009</td>
<td>75.5</td>
</tr>
<tr>
<td>2009-2010</td>
<td>76.4</td>
</tr>
<tr>
<td>2010-2011</td>
<td>77.9</td>
</tr>
<tr>
<td>2011-2012</td>
<td>79.3</td>
</tr>
<tr>
<td>2012-2013</td>
<td>81.4</td>
</tr>
<tr>
<td>2013-2014</td>
<td>84.5</td>
</tr>
<tr>
<td>2014-2015</td>
<td>86.5</td>
</tr>
</tbody>
</table>
Dropout Rate

- 2011-2012: 1.7
- 2012-2013: 1.5
- 2013-2014: 1.3
- 2014-2015: 1.1

Shaping the Dropout Prevention Conversation in WV
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 its 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.
• 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

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**Shaping the Dropout Prevention Conversation in WV**
Predictive Analytics vs. Threshold Early Warning Systems
Predictive Analytics

Predictive algorithm based on building specific factors and historical data

THE WHOLE CHILD

Predictive Analytics vs. Threshold Early Warning Systems

Intellectual

Cognitive

Emotional

Physical

Social
Bridging the Gap

Identify

Connect

Support

Monitor

Predictive Analytics vs. Threshold Early Warning Systems
## Evolution of Early Warning Systems

### First Generation

**Traditional Checklist Model**

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>First 20/30 days absence rate</td>
<td>10%</td>
</tr>
<tr>
<td>Grading period absence rate</td>
<td>10%</td>
</tr>
<tr>
<td>Annual absence rate</td>
<td>10%</td>
</tr>
<tr>
<td>GPA</td>
<td>2.00</td>
</tr>
<tr>
<td># of course fails (per grading period)</td>
<td>1</td>
</tr>
<tr>
<td># of fails (annual)</td>
<td>2</td>
</tr>
<tr>
<td># of credits earned (annual)</td>
<td>4</td>
</tr>
<tr>
<td>Major behavioral incidents (per grading period)</td>
<td></td>
</tr>
<tr>
<td>Major behavioral incidents (annual)</td>
<td></td>
</tr>
</tbody>
</table>

### 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’)

Predictive Analytics vs. Threshold Early Warning Systems
Examples of Companies that use Predictive Analytics

- Netflix
- Pandora
- IBM Watson
- FICO® Score

Predictive Analytics vs. Threshold Early Warning Systems
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

Predictive Analytics vs. Threshold Early Warning Systems
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

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

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

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

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Predictive Analytics vs. Threshold Early Warning Systems
## Checklist Model and Predictive Analytics Model

### Indicators (Timeframe is Prior 12 months)

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Student Data</th>
<th>Checklist</th>
<th>BB Predictive Analytics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attendance Rate</td>
<td>91.0%</td>
<td>Not Detected</td>
<td>Moderate</td>
</tr>
<tr>
<td>First 30 Day Attendance Rate</td>
<td>80.0%</td>
<td>Not Detected</td>
<td>High</td>
</tr>
<tr>
<td>Tardy Rate</td>
<td>3.7%</td>
<td>Not Detected</td>
<td>High</td>
</tr>
<tr>
<td>Suspensions</td>
<td>1</td>
<td>Not Detected</td>
<td>High</td>
</tr>
<tr>
<td># of Major Behavioral Incidents</td>
<td>0</td>
<td>Not Detected</td>
<td>Low</td>
</tr>
<tr>
<td># of Minor Behavioral Incidents</td>
<td>2</td>
<td>Not Detected</td>
<td>Moderate</td>
</tr>
<tr>
<td>Academic Indicator (GPA)</td>
<td>2.80</td>
<td>Not Detected</td>
<td>High</td>
</tr>
<tr>
<td>Courses Passed</td>
<td>100.0%</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>State Assessment: Math*</td>
<td>Slightly Below</td>
<td>Not Detected</td>
<td>Low</td>
</tr>
<tr>
<td>State Assessment: Reading*</td>
<td>Far Below</td>
<td>Not Detected</td>
<td>High</td>
</tr>
<tr>
<td>State Assessment: Science*</td>
<td>Below</td>
<td>Not Detected</td>
<td>High</td>
</tr>
<tr>
<td>State Assessment: Social Studies*</td>
<td>Below</td>
<td>Not Detected</td>
<td>High</td>
</tr>
<tr>
<td>Grade Retention (prior 12 months)</td>
<td>No</td>
<td>Low</td>
<td>Low</td>
</tr>
</tbody>
</table>

### Overall Domain Risk

- **Overall Risk is High**

### Notes

**NOTE:** Jack would not 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.”

**Predictive Analytics vs. Threshold Early Warning Systems**
Aggregate Reports & Filter by Triggers

Risk Prediction

Use this slider to zoom in and out of your student list. The more you zoom, the more details you’ll see in the graphs below.

122 Students

Filter by specific triggers

Predictive Analytics vs. Threshold Early Warning Systems
Connect to Services

 IDENTIFY

 CONNECT

 MONITOR

Predictive Analytics vs. Threshold Early Warning Systems
Of these, 10 referrals (2%) are being identified.

Of these, 5 out of 10 (50%) are connected to services.

Of these, only 3 (60%) successfully completed.
Ensure Students Are Connected to Support

Predictive Analytics vs. Threshold Early Warning Systems
Resource Mapping

New Resource

Basic Information
All information will be visible to all school leaders in your district.

RESOURCE NAME
Enter name

RESOURCE TYPE
- Internal Resource
- External Provider

CATEGORY
Enter one or more categories

Contacts
You may designate both Clarity team members and non-Clarity team members as contacts for this resource.

CLARITY TEAM MEMBERS Optional
Search by name or email

NON-CLARITY TEAM MEMBER Optional
Enter name

TITLE/ROLE Optional
Enter title/role of contact

EMAIL Optional
Enter email address

PHONE Optional
Enter phone number

Predictive Analytics vs. Threshold Early Warning Systems
Monitor Services and Support

- IDENTIFY
- CONNECT
- MONITOR

Predictive Analytics vs. Threshold Early Warning Systems
Monitor Intervention Effectiveness

Set goals and measure progress at the student level.

Drill down to change over time at the micro level.

Predictive Analytics vs. Threshold Early Warning Systems
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

**Early Warning**

Springfield Schools

**School Risk Prediction**

- **10 Schools**
  - 2 High Risk (17%)
  - 3 Medium Risk (24%)
  - 5 Low Risk (54%)
  - 1 Risk Unavailable (1%)

**Ordered by Risk**

- George Washington High
- Edison High
- Ellington High
- Marshall High
- Martin Luther King Jr Mid...

**Risk Prediction Tool**

**Graduation Rate**

- 93% of your students graduate

**Academics**

- 9% High Risk

**Attendance**

- 12% High Risk

**Behaviors**

- 15% High Risk

**GPA: All Courses**

- Suspensions
- Attendance - First 30 days
Statewide Implementation & Results
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
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.

www.brightbytes.net
Q&A
Thank You!