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Investing in Better Decisions: Doing Data Differently

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Session Objectives

- Uncover what you should be asking of your data
- Discover different ways of analyzing data to better inform decisions

The Role of Data

- After
- Evaluating
- Medical Examiner

- During
- Progress Monitoring
- Surgeon

- Before
- Data Mining
- Physician

TYPES OF DATA-DRIVEN DECISIONS (RAND, 2006)

- Set goals
- Assess progress toward goals
- Evaluate effectiveness of practices
- Assess whether client needs are being met
- Reallocate resources in reaction to outcomes
- Enhance processes to improve outcomes

Framework for Asking Questions of Your Data

- Who
- What
- When
- Where
- Why
- How

Framework for Asking Questions of Your Data

Who?	Who has access to the data? Who will compile the data? Who will analyze the data? Who will report about the data?
What?	What are the data elements we need to collect for each part of the goal? What format are the data in? What instruments will we use to collect the data?
When?	When should the data be available? When should they be collected?
Where?	Where are the data housed?
Why?	Why do we need to collect those data?
How?	How will we analyze the data to be able to evaluate goal? How will we report the results to others?

Barriers and Obstacles to Using Data Effectively

Who?	Expertise
What?	Data availability
When?	
Where?	
Why?	Tools and Expertise
How?	

Availability: WHAT, WHERE, WHEN

- Use of Multiple Measures
  - Demographic data
  - Perceptions data
  - Student learning data
  - School processes data

- Question: Are they clean?

Bernhardt, 1998

Data Tools: HOW
Available vs. Appropriate

- Data management (e.g., Excel, Access)
- Data mining (e.g., IBM SPSS Modeler)
- Data visualization (e.g., IBM ILOG, Tableau)
  - What about Tinkerplots or InspireData?
- Data reporting (e.g., COGNOS, Dashboards)
- Data analysis
  - Descriptive – Excel, IBM SPSS, SAS, R
  - Inferential – IBM SPSS, SAS, R

DO NOT limit your questions because you have limited analysis tools

Expertise:
Skills Needed for Analysis

- Analysis skills…
  - Descriptive vs. Inferential
  - Qualitative vs. Quantitative
  - Principles of measurement
- Vs. Skills Needed for
  - Data Management
  - Reporting Data

Descriptive Statistics

- Summarize and organize
- Tells you “what”
- Often univariate
  - Nominal
  - Ordinal
  - Interval
  - Ratio

Inferential Statistics

- Analyze and generalize
- Tell you “why”
- Bivariate or multivariate
  - Correlation – does X relate to Y?
  - Regression – does X predict Y?
  - Decision Trees – which subcategories predict outcome?

The Role of Data: Revisited

- After
- Evaluating
- Math program evaluation

- During
- Progress Monitoring
- Early literacy analysis

- Before
- Data Mining
- Dropout identification

Math Program Evaluation

- Multiple stakeholders
- Cross-sectional and longitudinal datasets
- Analyses conducted
- Limitations
- Conclusions
- Implications

Math Program Evaluation

- Multiple stakeholders
  - Students, staff, parents
- Cross-sectional and longitudinal datasets
  - Examined grade 6 and followed cohort
- Analyses conducted
- Limitations
- Conclusions
- Implications

Math Program Evaluation

- Multiple stakeholders
- Cross-sectional and longitudinal datasets
- Analyses conducted
  - Descriptive statistics, chi-square, qualitative
- Limitations
- Conclusions
- Implications

Math Program Evaluation Findings

- **Math program not implemented with fidelity**
  - **Teacher survey, parent focus groups**

Math Program Evaluation Findings

- **Math program not implemented with fidelity**
  - **Teacher survey, parent focus groups**

- **Math achievement significantly different among students with differing ability levels (cause of difference cannot be attributed to the program)**
  - **Teacher survey, parent focus groups, state assessment & Terra Nova data, demographics**
  - **Chi-squares significant for ability levels and special education status**

Math Program Evaluation Findings

- **Math program not implemented with fidelity**
  - Teacher survey, parent focus groups
- **Math achievement significantly different among students with differing ability levels (cause of difference cannot be attributed to the program)**
  - Teacher survey, parent focus groups, state assessment & Terra Nova data, demographics
  - Chi-squares significant for ability levels and special education status
- **Stakeholders had different perspectives about (and suggestions for improving) math instruction**
  - Teacher survey, student focus groups, parent focus groups

Math Program Evaluation

- Multiple stakeholders
- Cross-sectional and longitudinal datasets
- Analyses conducted
- Limitations
  - Use of data based on findings
  - Sampling not ideal
- Conclusions
- Implications

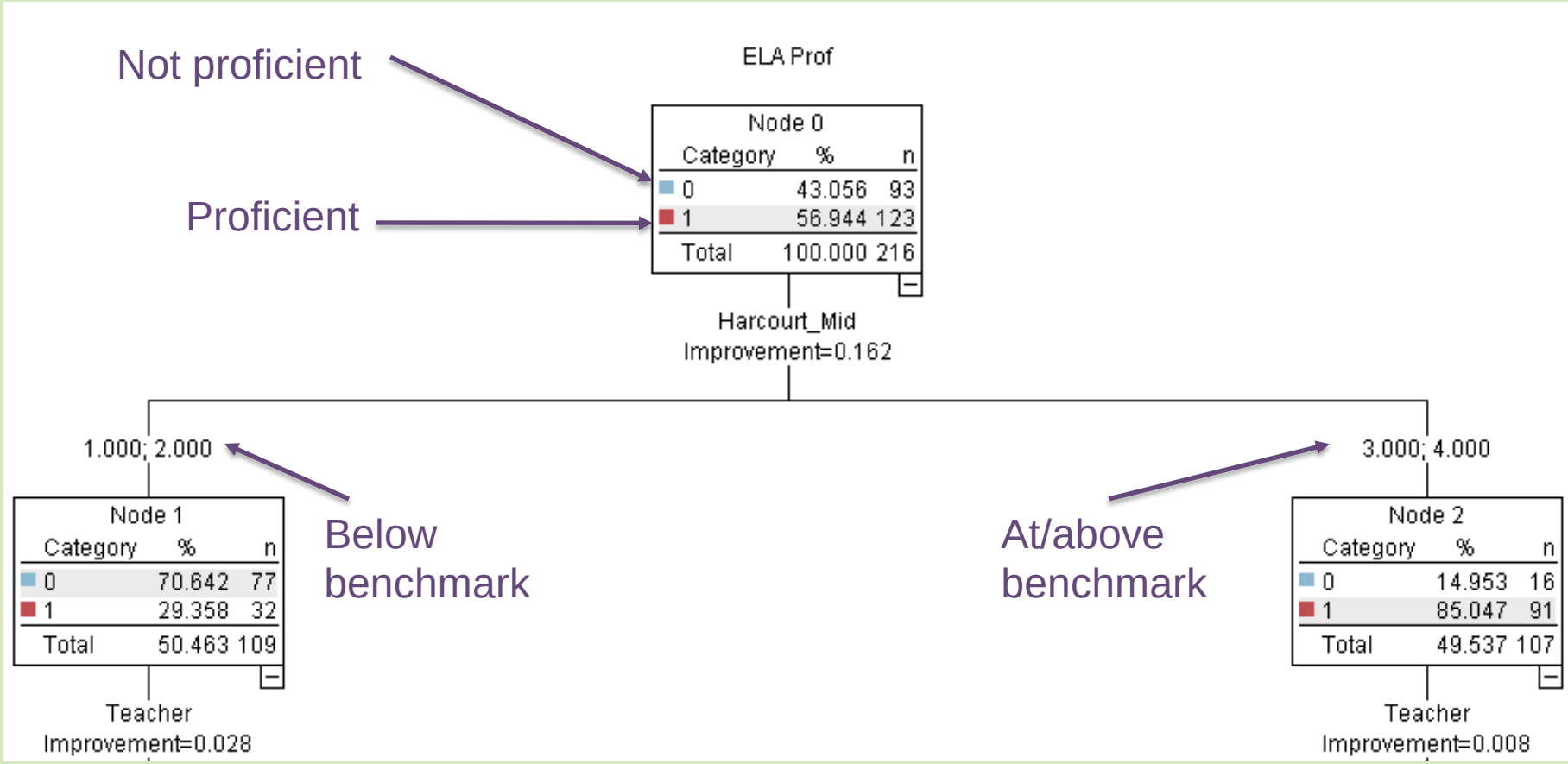
Early Literacy Achievement Review

- Longitudinal dataset
- Analyses conducted
- Limitations
- Conclusions
- Implications

Early Literacy Achievement Review

- Longitudinal dataset
  - Inputs: Demographics, literacy assessments
  - Target: ELA 3 proficiency
- Analyses conducted
  - C & RT
- Limitations
- Conclusions
- Implications

The most important predictor: Harcourt Mid-Year Assessment
Next most important: Teacher



Early Literacy Achievement Review

- Longitudinal dataset
- Analyses conducted
- Limitations
  - One year available
  - State assessment data
- Conclusions
  - Mid-year variable and teacher impact
- Implications

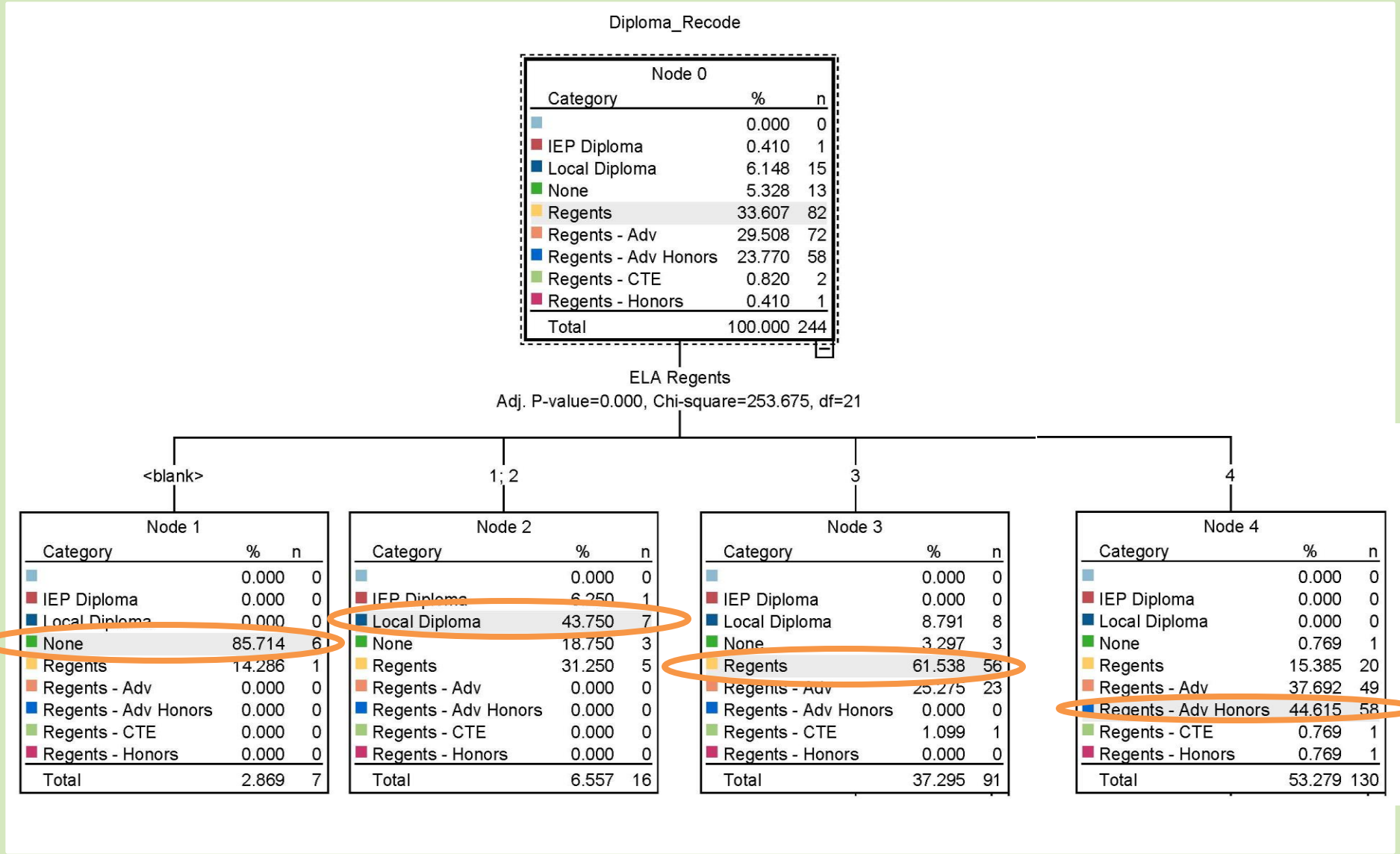
Dropout Identification

- Longitudinal dataset
- Analyses conducted
- Limitations
- Conclusions
- Implications

Dropout Identification

- Longitudinal dataset
  - Inputs: Gender, absences, Grade 8 assessments, English and Math Regents, completion data
  - Target: Diploma Type
- Analyses conducted
  - CHAID
- Limitations
- Conclusions
- Implications

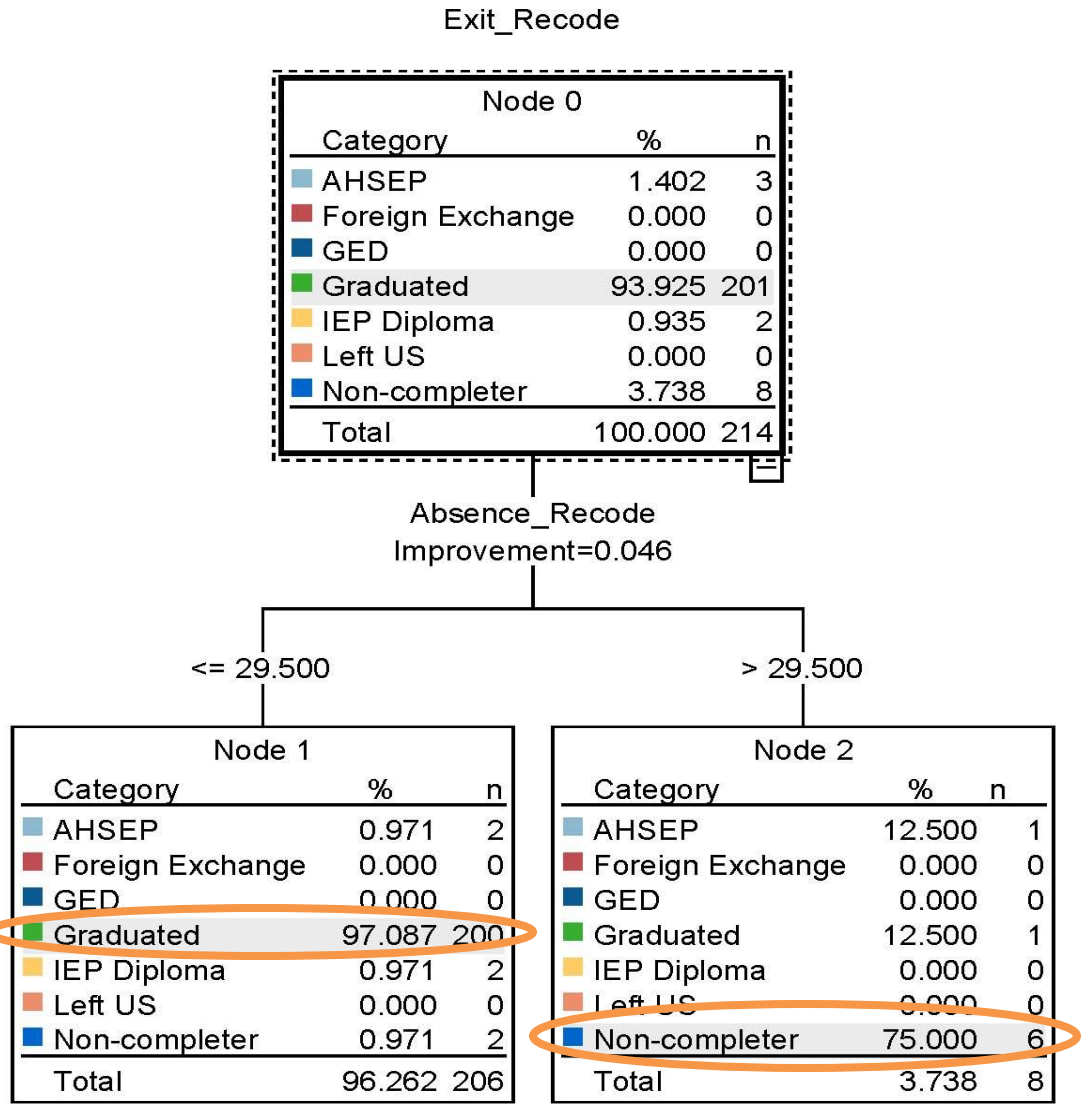
The most important predictor for type of Diploma earned: Performance on English Regents



Dropout Identification

- Longitudinal dataset
  - Inputs: Gender, absences, Grade 8 assessments, English and Math Regents, completion data
  - Target: Completer vs. Non-completer
- Analyses conducted
  - C&RT
- Limitations
- Conclusions
- Implications

The most important predictor for being a Non-completer: Number of Absences



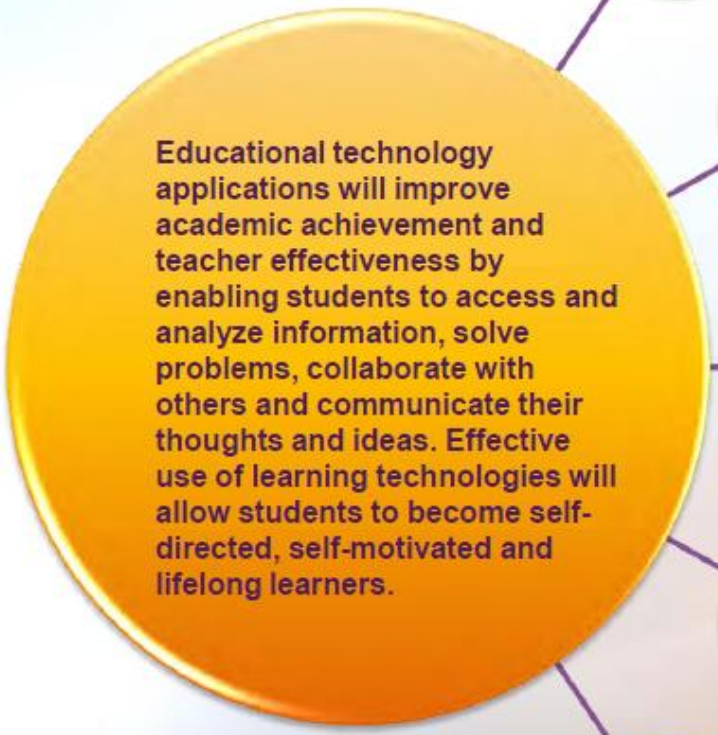
Dropout Identification

- Longitudinal dataset
- Analyses conducted
- Limitations
  - Lack full demographic, extracurricular, and post-graduate plan data
- Conclusions
  - Students who do not take or are not proficient on the English Regents, and who are absent in excess of 29 days are at-risk for not completing high school…
- Implications

One more topic! Quasi-experimental designs

- Evaluation models
  - Non-equivalent control groups design
  - Interrupted time series
  - Causal models
    - Ballston Spa CSD Technology Plan Example

Goal One



Objective
- Develop a repository of exemplars that model/present/inspire technology infusion.

Objective
- Implement performance-based ICT literacy standards for grades K-8.

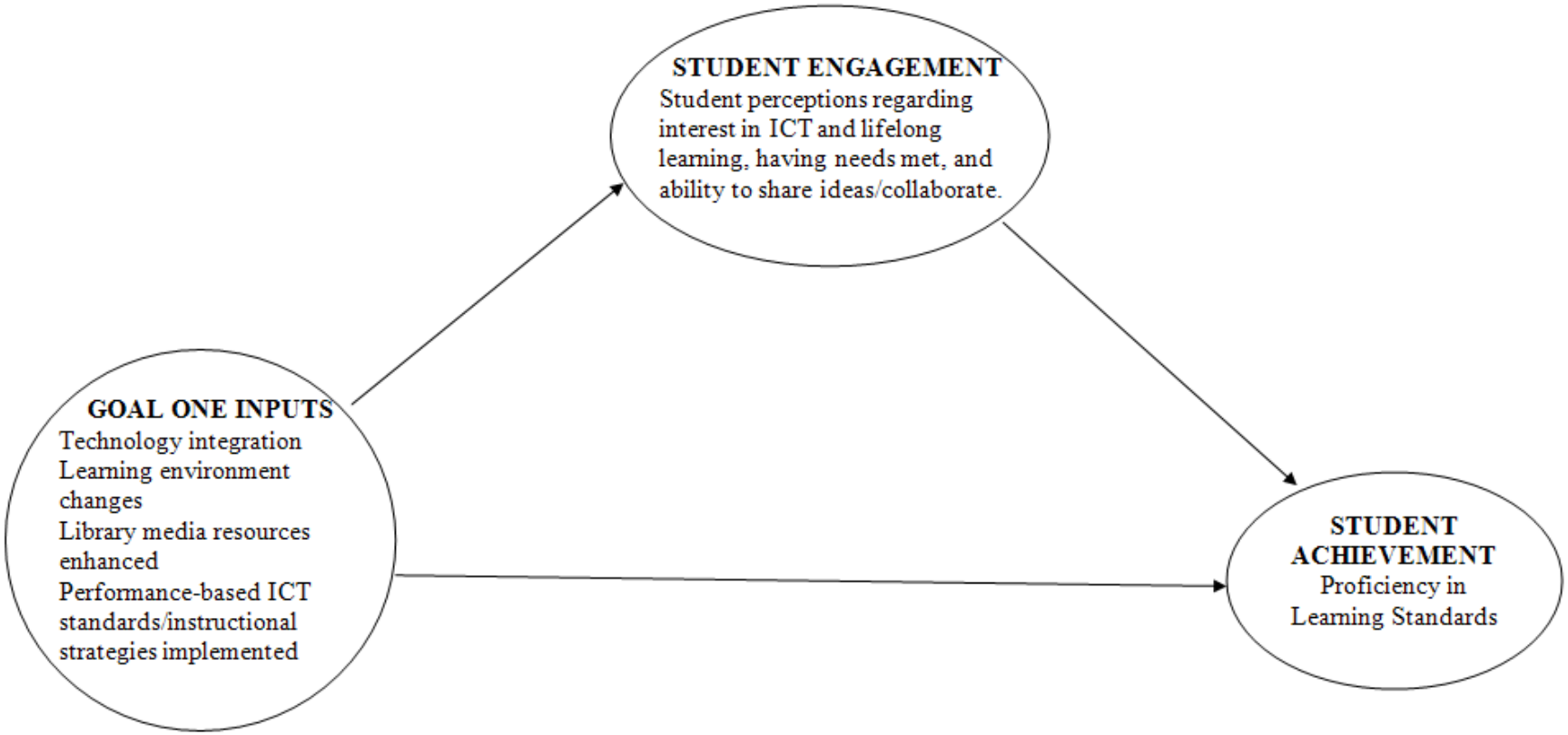
Objective
- Incorporate high quality information resources in instruction to address multiple learning styles, to motivate and engage students and to support student exploration and growth.

Objective
- Establish learning environments that will support student achievement of state academic performance standards and the district's school improvement plan.

Objective
- Enhance Library Media Center resources to provide access to a wide range of authentic information for students and educators.

Goal One -Outcomes

- Students will experience improved academic achievement as the result of engagement;
- Students will have their diverse needs met through a multi-modal approach based on technology;
- Students will be prepared to meet grade 8 technology literacy assessment standards.



BALLSTON SPA CSD TECHNOLOGY PLAN MODEL
GOAL ONE
Developed by WSWHE BOCES DAS

What is the top challenge for your district?

Who?	Expertise
What?	Data availability
When?	
Where?	
Why?	Tools and Expertise
How?	

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