

# Using Data Analytics to Personalize Teaching and Learning

CALIFORNIA LEAGUE OF SCHOOLS

SACRAMENTO, CALIFORNIA

FEBRUARY 27, 2016

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# Four Elements of Personalization

- ▶ Approach
- ▶ Pace
- ▶ Learners Interest and Experience
- ▶ Choice of What, When, How

# Approach

- ▶ Social Constructivism
- ▶ Anytime, Anywhere Learning
- ▶ Different Objectives for Each Learner
- ▶ Dialog, Debate
- ▶ All Dimensions of Learner-Social, Emotional, Cognitive
- ▶ Collaborative Learning
- ▶ Self Evaluation

# Pace

- ▶ Employment of Digital Tools
- ▶ Project Based
- ▶ Skill Acquisition Self Directed
- ▶ Competence Based Sequence

# Learner's Interest and Experience

- ▶ Credit for Prior Knowledge
- ▶ Integration of Life and Work Skill
- ▶ Longitudinal Views of Strengths
- ▶ Promotion of Personal Potential
- ▶ Informal Learning
- ▶ Active Participation in Construction of Own Curriculum

# Choice of What, When, How

- ▶ Learner Selects Project
- ▶ Teacher as Tutor, Coach, Facilitator
- ▶ Community as Resource
- ▶ Individual and or Group Work
- ▶ Multiple Tools Support Inquiry

# Traditional Data of Districts and Schools

- ▶ Data Warehouse
- ▶ Student Information Systems
- ▶ Flat Files
- ▶ Data in Aggregate Reports
- ▶ Annualized Data
- ▶ Disparate Data
- ▶ Managed by Information Technology Professional

# Data Warehouse

- ▶ Repository for Student Information
- ▶ Compliance Oriented
- ▶ Report Factory
- ▶ Static Data
- ▶ No Analyses
- ▶ Not Friendly to School Leadership or Teachers



# Student Information Systems

- ▶ Extension of Data Warehouse
- ▶ Some Disaggregation
- ▶ No Longitudinal Views
- ▶ Report Oriented
- ▶ Static Data

# Flat Files

- ▶ Excel Spreadsheets
- ▶ Static Reports
- ▶ No Analyses
- ▶ No Trend
- ▶ No Inquiry

# Data in Aggregate Reports

- ▶ Reports with Limited Distinctions
- ▶ No Sub-Groups
- ▶ Trends and Patterns Must be Calculated
- ▶ No Student Engagement and Activity Data
- ▶ No Strand Data from Assessments

# Annualized Data

- ▶ Data Provided on Annual Basis
- ▶ Reports are Prioritized
- ▶ Limited Consequences for Teaching and Learning
- ▶ Aggregate not Personalized Data
- ▶ Limited Utility for School Leadership or Classroom Practitioners

# Disparate Data

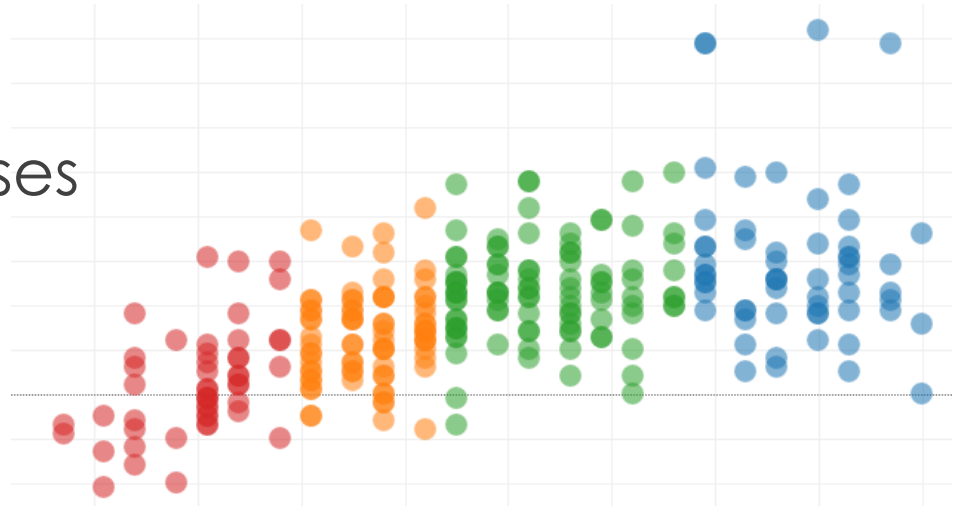
- ▶ Data on Desktops
- ▶ Spreadsheet Data not in Data Warehouse
- ▶ Classroom Data not Shared
- ▶ Student Engagement Data Not Integrated
- ▶ Health and Nutrition Data Separate
- ▶ Teacher Observation and Evaluation Data Isolated
- ▶ Intervention and Assessment Data Segregated

# Managed by Information Technology Professionals

- ▶ Data Warehouse Managed by IT
- ▶ Student Information System Managed by IT
- ▶ Reports Generated by IT
- ▶ Data Managed as Though in Factory
- ▶ Classrooms at Bottom of Data Hierarchy
- ▶ Personalization not Priority Data Managers
- ▶ Data not End User Friendly

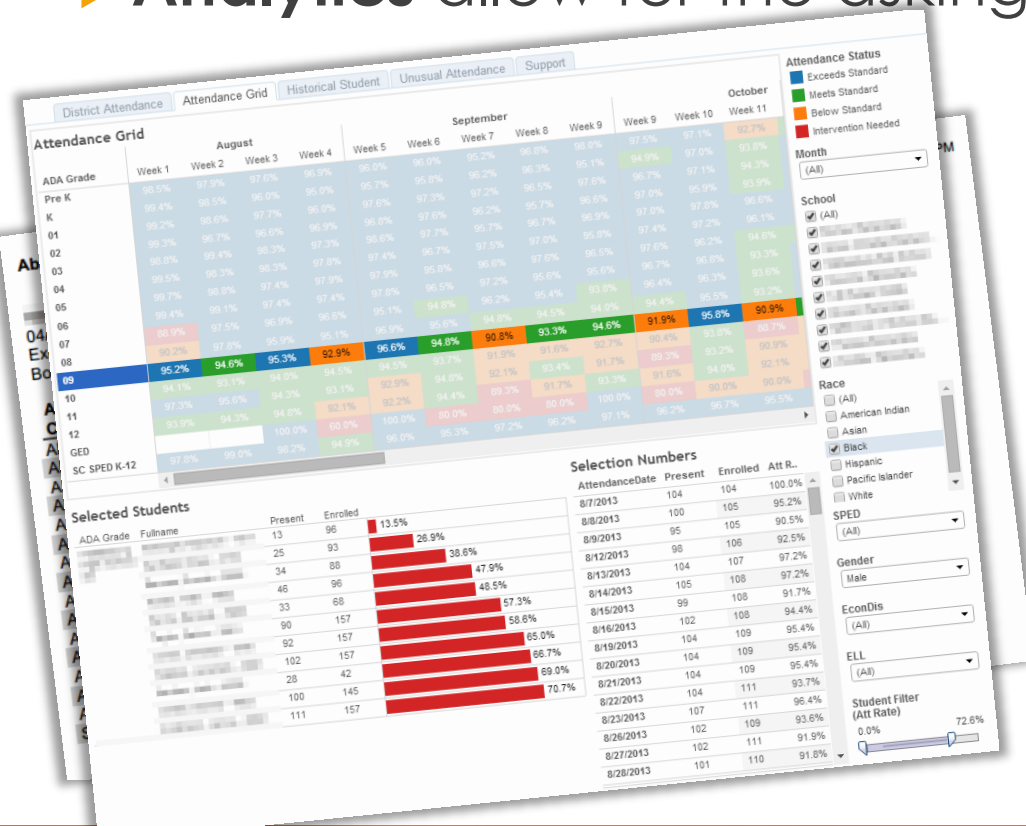
# Characteristics of Data Analytics

- ▶ Real Time
- ▶ Inquiry Based Analyses
- ▶ Dynamic
- ▶ Visualized
- ▶ Longitudinal Views
- ▶ Cross Reference and or Correlational
- ▶ Single Source Integration
- ▶ Comprehensive



# Reports vs. Analytics

- ▶ **Reports** are static views
- ▶ **Analytics** allow for the asking of questions



- Filter on all data questions
- Refreshing the data
- No historical data
- Self-serve analytics
- Auditing

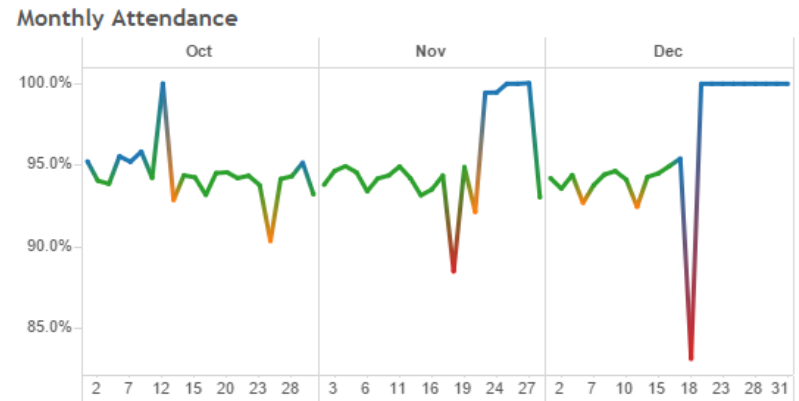


# Real Time

- ▶ Data Uploaded as Generated
- ▶ New Accessible Within 24 Hours of Input
- ▶ Automatic Population of Digital Data
- ▶ Unlimited Access for Authorized User
- ▶ Immediate Report Generation
- ▶ Anytime, Anywhere Access

# Inquiry Based Analyses

- ▶ End User Queries
- ▶ Analysis of Data
- ▶ Group, Sub-Group, and or Individual Analysis
- ▶ Historic Views for Trends and Patterns
- ▶ Identification of Strengths and Challenges



# Dynamic

- ▶ Data Adjusts via Query
- ▶ Automatic Updates with Data Inputs
- ▶ All Data Visualized
- ▶ Aggregated and Disaggregated Views
- ▶ Data Supports Personalization
- ▶ Data Supports Professional and Student Collaboration

# Visualized

- ▶ Data Displayed in Multiple Formats
- ▶ Color Coded for Rapid Identification
- ▶ Sub-Groups Easily Extracted
- ▶ Individual Students Identified
- ▶ Rapid Response to Queries
- ▶ Notification of Changes in Data

# Analytic Data Can Lead the Way

**Anthony is a 7<sup>th</sup> grader at risk because**

▶ His historical attendance is

## Total Days Missed


2006-2007	2007-2008	2008-2009	2009-2010	2010-2011	2011-2012	2012-2013	Total	☰
15	15	13	8	31	38	71	191	

# Analytic Data Can Lead the Way

## George is at risk because

- ▶ He is failing Algebra I as a 11<sup>th</sup> grader

### Historical Grades (TERM 3)

SY	Course Name	Teacher	T1	T2	T4	T3	S1	T3	S1	T3	FAV
2007-2008	Mathematics	 C ( 79 )	C ( 76 )	C ( 78 )	B ( 85 )	B ( 85 )	B ( 85 )	B ( 85 )	B ( 85 )	B ( 85 )	C ( 82 )
2008-2009	Mathematics	D ( 72 )	C ( 76 )	D ( 74 )	D ( 74 )	F ( 66 )	D ( 70 )	D ( 72 )	D ( 72 )	D ( 72 )	D ( 72 )
2009-2010	Gen Math 7	D ( 65 )	C ( 73 )	D ( 69 )	D ( 60 )	B ( 83 )	C ( 72 )	C ( 71 )	C ( 71 )	C ( 71 )	C ( 71 )
	Gen Math 7 RU	D ( 61 )	B ( 85 )	C ( 73 )	B ( 83 )	D ( 68 )	C ( 76 )	C ( 75 )	C ( 75 )	C ( 75 )	C ( 75 )
2010-2011	Gen Math 8 RU	C ( 76 )	F ( 52 )	D ( 64 )	D ( 63 )	C ( 76 )	C ( 70 )	D ( 67 )	D ( 67 )	D ( 67 )	D ( 67 )
	Pre Algebra	C ( 76 )	C ( 71 )	C ( 74 )	F ( 57 )	F ( 51 )	F ( 54 )	D ( 64 )	D ( 64 )	D ( 64 )	D ( 64 )
2011-2012	Tran To Algebra	C ( 75 )	D ( 60 )	D ( 68 )	D ( 63 )	D ( 60 )	D ( 62 )	D ( 65 )	D ( 65 )	D ( 65 )	D ( 65 )
2012-2013	Algebra I 9	F ( 55 )	F ( 57 )	F ( 56 )	F ( 52 )	F ( 19 )	F ( 36 )	F ( 46 )	F ( 46 )	F ( 46 )	F ( 46 )
U S history			F ( 48.9 )	B ( 80.8 )	D ( 65.0 )	F ( 44.7 )					

# Cross Reference and Correlations

- ▶ Recognition Between Attendance and Achievement
- ▶ Strength and Challenges are Discernible
- ▶ Relation Between Intervention and Achievement
- ▶ Comprehensive Early Warning System
- ▶ Identification of Effective Teachers

# Single Source

- ▶ Interface with Data Warehouse
- ▶ Interacts with Student Information System
- ▶ All Mobile Devices
- ▶ Common Views for Team Members
- ▶ Customized Analytics
- ▶ Individual and Collaborative Authorship of Queries



# Comprehensive

- ▶ Student Data Profile in Single View
- ▶ Tracking and Monitoring of Student Progress
- ▶ Teacher-Student Transactions
- ▶ Complement to Student Progress Reports
- ▶ Views of District, Schools, Classrooms
- ▶ All Relevant Data Integrated into Profile

# Student Profile Example

- ▶ Comprehensive Profiles
- ▶ Inform judgments
- ▶ Change the conversation
- ▶ Demand action

## Student Profile

StateCode	Full Name	Grade Level	Gender	Race	ELL	Migrant	Sped Status	LunchStatus	DOB	Age	Transportation
		06	Male	Black	N	N	Yes	Free	8/30/2001	13	NONE

### Historical Attendance (days missed)

Full Name	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	Total
	6	1	4	12	9	40	49	121

### Current Attendance

Full Name	Intervention Needed
	55

### Historical Behavior Incidents

Full Name	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	Total
	2	1	1	10	41	55

### Current Behavior

Full Name	Current Behavior
	33

### MCT2 Assessments

Full Name	Year of Test Date	GRADE	Lang Prof Level	Math Prof Level
	2011	3	1	1
	2012	4	1	1
	2013	5	1	1

### MAP Assessments

Full Name	Discipline	Null
	Null	

### Current Grades

Full Name	Course Name	Teacher	T1	T2	S1	AY	S2	T3	T4
	Inclusion Elementary		NA	NA	NA	NA	NA	X	NA
	Language Arts		NA	NA	NA	NA	NA	F	NA
	Mathematics		NA	NA	NA	NA	NA	F	NA
	Phy Education		NA	NA	NA	NA	NA	E	NA
	Reading		NA	NA	NA	NA	NA	F	NA
	Science		NA	NA	NA	NA	NA	F	NA
	Soc Studies		NA	NA	NA	NA	NA	F	NA

# Alignment Between Personalization and Student Data

Approach Aligned With:

- ▶ Student Profile Data
- ▶ Intervention Data
- ▶ Behavior Data
- ▶ Assessment Data
- ▶ Student Engagement Data

# Alignment Between Personalization and Student Data

Pace Aligned with:

- ▶ Attendance Data
- ▶ Assessment Data
- ▶ Health and Nutrition Data
- ▶ Teacher Observation and Evaluation Data

# Alignment Between Personalization and Student Data

## Learners Interest and Experience

- ▶ Student Engagement Data
- ▶ Student Profile Data
- ▶ Intervention Data
- ▶ Longitudinal Grade Data

# Alignment Between Personalization and Student Data

## Choice of What, When, How

- ▶ Assessment Data
- ▶ Intervention Data
- ▶ Student Engagement Data
- ▶ Behavior Data
- ▶ Health and Nutrition Data

# Examples – Teacher Observation

School Name: (All) | Observation Type: (All) | Observer Audit: (All) | Indicator: (All) | Obs Count: 6-100 | Indicator Rating: 1.0-4.0

**All Teacher Ratings**

- Exceeds Expectations
- Meets Expectations
- Inconsistently Meets Expectations
- Does Not Meet Expectations

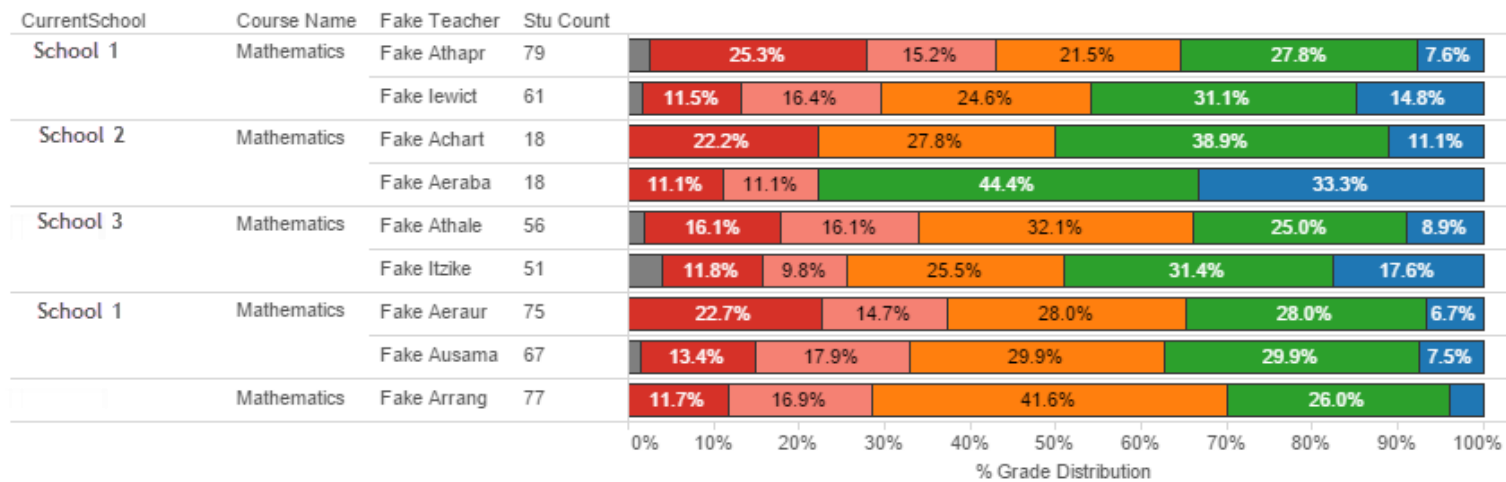
School Name	Fake Teacher	Obs Count	7. Demonstrates deep knowledge of content during instruction	8. Actively engages students in the learning process	9. Uses questioning and discussion techniques to promote higher order thinking skills	10. Brings multiple perspectives to the delivery of content	11. Communicates clearly and effectively	12. Manages classroom space and resources effectively for student learning	13. Creates and maintains a climate of safety, respect, and support for all students	14. Maximizes time available for instruction	15. Establishes and maintains a culture of learning to high expectations	16. Manages student behavior to provide productive learning opportunities for all students
School 1	Fake Teacher erkersha	6	3.3	3.3	3.2	3.3	3.2	3.5	3.5	3.3	3.3	3.3
	Fake Teacher okookfre	7	3.2	3.1	3.2	3.0	3.3	3.3	2.7	3.2	3.2	3.2
	Fake Teacher anmanurt	7	3.0	3.1	2.7	3.0	3.3	3.0	3.0	3.2	3.0	2.8
	Fake Teacher rdordndr	6	3.0	3.0	3.0	3.0	3.0	2.5	3.0	3.0	3.0	3.0
	Fake Teacher hmrmhche	6	3.0	3.0	2.5	3.0	3.0	3.0	3.3	3.0	3.0	2.8
	Fake Teacher esnesbri	6	2.8	2.7	2.4	2.7	3.0	3.0	3.0	2.7	3.0	2.8
	Fake Teacher onsonist	7	3.0	2.9	2.3	3.0	3.0	2.6	2.8	2.8	2.7	2.8
	Fake Teacher ontonily	7	3.0	2.4	2.3	2.8	2.8	2.7	3.0	2.8	2.4	3.0
School 2	Fake Teacher msmsron	7	4.0	3.3	2.5	3.0	3.0	3.5	3.0	3.0	3.0	3.3
	Fake Teacher endencob	7	3.3	3.0	2.3	3.0	3.3	3.0	3.3	3.3	3.3	3.0
	Fake Teacher ininila	7	3.3	2.8	2.0	2.5	3.0	3.0	2.5	3.0	2.5	3.5
	Fake Teacher llellili	10	3.0	2.6	2.7	2.8	2.7	3.0	2.9	2.9	3.0	2.9
	Fake Teacher erkerssh	6	3.0	2.8	2.3	2.7	3.0	3.0	2.3	3.3	2.8	2.8
	Fake Teacher msamsrni	13	3.2	2.6	2.3	2.3	2.7	3.0	2.6	2.9	2.8	2.8
	Fake Teacher erferren	6	3.0	2.4	2.3	3.0	3.0	2.6	3.0	2.8	2.8	2.3





# Examples – Student Grades

**Student T1 Grades** - select to view students  
 click + sign on Teacher to view by grade level



Term Name  
 T1

Current School  
 (All)

Course Subject  
 Math

Course Name  
 (All)

ADA Grade  
 (All)

Stu Count  
 1 1,000

D/F %  
 21% 100%

A%  
 0% 100%

**Students** - hover over grades to access historical grades

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