



ALBUQUERQUE
PUBLIC SCHOOLS

Accelerate Progress for Students

A CASE STUDY

To determine if improving certain district operational activities correlates with improved student achievement

Presented to
Council of the Great City Schools
October 26-30, 2011
Boston, Massachusetts

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PRESENTATION TOPICS

Study Background

- **APS Maintenance and Operations Demographics**
- **Significance of Study**

Study Details

- **Study Format**
- **Research Review**
- **Key Performance Indicators (KPIs)**
- **Raw Data Input**

Study Conduct

- **Preliminary Timeline**
- **Analysis Approach**

Study Results

- **Presentation of Results at Future CGCS Conference**
- **Can improvement in CGCS KPIs be correlated to improved student achievement?**



STUDY BACKGROUND

APS Maintenance and Operations Structure

- **Employees** ~265
- **Students served** ~89,000
- **Schools served** 141 traditional plus 4 charters
- **Square feet schools served** ~14.5 Million square feet
- **Square miles served** 123
- **Budget**



Past 3 Years - APS:
Cut: ~\$100M; Lost: ~ 1,000 positions
⇒ Lots in M&O area

STUDY BACKGROUND, *con't*

Maintenance and Operations Trends

- Positions cut
- Square footage to maintain increased
- Number of work orders increased
- Available dollars focused in classrooms
- Food Service has more federal mandates
- Fewer buses to transport students

M&O Past 5 Years:
 New Schools: 5ES, 1MS, 2HS
 Replacements: 2ES
 New Sq Ft: 2.5M
 Renovated Sq Ft: 5M



Georgia O'Keefe ES

Fiscal Years	Work Orders	Square Feet	M & O Budget	Operational	SB-9	Salaries OT & Benfits	School Sites	FTE's
2007	57,760	12,003,465	\$ 48,342,400.00	\$ 2,903,213.00	\$ 31,393,556.00	\$ 14,045,631.00	136	330.5
2008	63,476	12,008,841	\$ 55,391,208.00	\$ 2,629,799.00	\$ 37,165,908.00	\$ 15,595,501.00	137	320.5
2009	68,155	12,703,152	\$ 48,564,786.00	\$ 2,066,226.00	\$ 30,832,290.00	\$ 15,666,270.00	139	310
2010	68,372	14,207,533	\$ 41,227,836.00	\$ 1,329,653.00	\$ 25,350,736.00	\$ 14,547,447.00	141	285.5
2011	74,546	14,207,533	\$ 30,237,780.00	\$ 909,154.00	\$ 14,776,670.00	\$ 14,551,956.00	142	265

**If M&O operations correlate with improved student achievement
 – why cut?**

SIGNIFICANCE OF THE STUDY

Hypothesis

- **Certain Maintenance and Operations functions directly correlate with student achievement**

Study Significance

- **By provided research evidence of whether (and by how much) certain M&O improvements (or cuts) impact student achievement, a more realistic approach to prioritizing and funding M&O functions can be achieved**

If M&O operations do correlate with student achievement, then we may be indirectly reducing student achievement by cutting M&O functions, or perhaps by distributing our limited M&O funding in a non-optimum way.

STUDY DETAILS

How the study will be formulated

- **Use CGCS KPIs as a basis for potential Maintenance and Operations areas of improvement**
- **Obtain raw input suggestions from Maintenance and Operations staff – what activities do staff feel directly affect student achievement?**
- **Select certain areas (Maintenance and Operations KPIs and student achievement) where a controlled design of experiment can be conducted**
- **Establish a controlled design of experiment to determine if improved effectiveness and/or efficiency of the selected areas has any correlation to improvement in selected student achievement areas**

STUDY DETAILS, *con't*

Research review

- **Preliminary review indicates there is only limited research**
- **Some research results do show positive correlation between school facilities and student achievement and to some extent transportation funding and student success on SATs**
- **Additional research will be conducted to determine what research evidence may be available in any of the study selected areas**



STUDY DETAILS, *con't*

Key Performance Indicators (KPIs) and M&O Relationships

APS M&O Divisions	APS M& O activities	CGCS Business Functions
Mechanical	Metal Ship, Locker Repair, HVAC, Plumbing	M&O
Grounds	Equipment Operators, Landscaping, Irrigation, Playground Repair, Playground Maintenance & Fix Portables	M&O
Structural	Furniture Repair, Glaziers, Locksmiths, Masons, Paint Ship, Welding, Roofing Repair	M&O
Electrical	Electricians, Audio Visual, Fire Ext Service, Telecommunications	M&O
Building Services	Custodian Supervisors, Interior Pest Control, Carpet Cleaners, Specialty Cleaning, Small Appliance Repair, Procurement Specialist, M&O Warehouse	M&O
Fleet Maintenance	Tire Shop, Specialty Equipment Maintenance, Vehicle Maintenance, Fueling Station	Transportation
Environmental	Environmental Inspectors	M&O
Support Services	Utilities, Wireless	M&O
Computer Network	Central Office Network; District-wide Network	Information Technology
Energy Conservation	Energy Efficiency; LEEDS Certification	M&O
Technology Support	Technology Repair & Service	Information Technology
Food Services	FRL; Breakfast, Lunch	Food Services
Safety and Security	School Resource Officers, APS Police Officers	Safety and Security

Potential Study Parameters

- **Current APS KPI Ranking**
- **Description of Key KPI Activities to Consider**
- **Pilot Program Key Focus Areas**
- **Expected Outcomes Influencing Student Achievement**

STUDY DETAILS, *con't*

Input (the raw data – already initiated)

- **Operations department**
- **Managers and staff**
- **Areas and activities that staff believe might directly impact student achievement – and how!**



Link to matrix of potential Maintenance and Operations activities as defined by M&O staff.

Examples from Transportation:

- **Buses late to school in morning**
- **Buses not showing up in morning**
- **Bus driver attitude**
- **Bullying on bus**
- **Overcrowded buses**
- **Lack of special education equipment on buses**

STUDY CONDUCT

Design of Experiment (DOE)

What is DOE?

- DOE refers to an experiment where one or more variables believed to have an effect on an experimental outcome are identified and manipulated according to a plan.

How would DOE be used?

The key elements of the experiment are:

1. *Response Variable*: The outcome variable being investigated. Also called independent variable.
2. *Primary Variables*: The controlled variables believed most likely to have an effect on the response variable.
3. *Background Variables*: Variables which may have an effect but cannot or will not be deliberately manipulated or held constant.
4. Common causes or experimental error: This is the “noise” measurement for the experiment.
5. Interaction: A condition where the effect of one factor depends on the level of another factor.

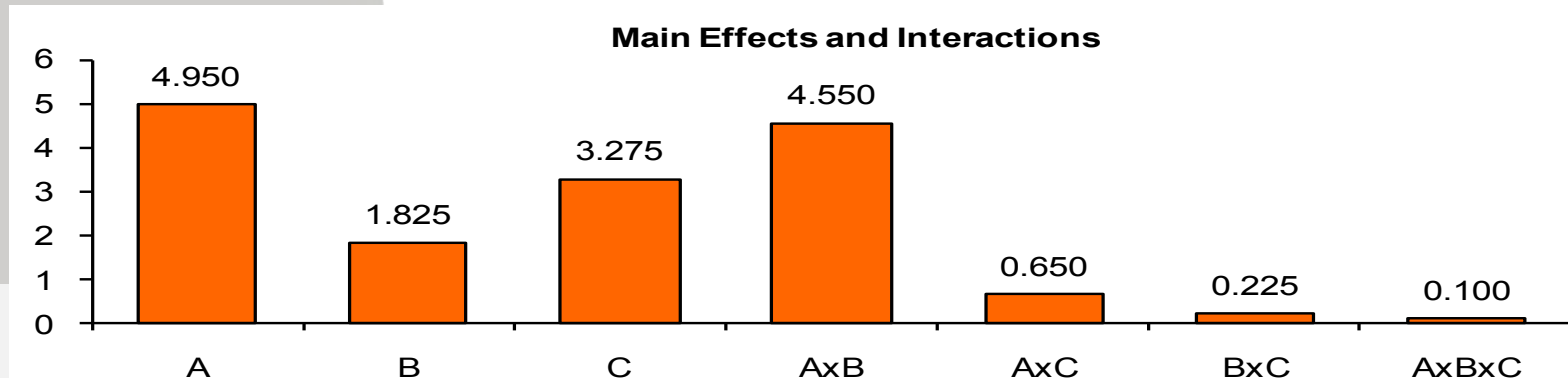
Some thoughts on the APS DOE strategy

The APS DOE strategy would be to select student achievement parameter(s) as the *Response Variable(s)*; specify M&O area KPI/activities as *Primary Variables*; define student/school socioeconomic/disaggregated information as *Background Variables*. Data collected in accordance with the DOE model would then be analyzed for statistical significance, interaction, and effects of the *Primary Variables* on the *Response Variable(s)*. In addition, analysis to understand the “unknown” error in the experiment and whether that is significant is important.

ANALYZING THE FINDINGS

Analysis Expectations Using DOE

- DOE Model dictates whether replication or randomization is appropriate
- Potential Experimental Models and Analysis
 - Fixed effects model; random effects model; mixed model
 - Completely randomized design; balanced design; unbalanced design
 - **Randomized block design (probably more suitable for APS DOE effects)**
- Expected Results of Analysis
 - There will be statistical correlation between selected Maintenance and Operations activities and specified student achievement parameters
 - The block effects of socioeconomic/disaggregated groups (e.g., race, ELL, poverty, statistical peer groups) will be *Background Variables* that are influential in the correlation results.



PRELIMINARY TIMELINE

- **11/30/11: Research Review**
 - Literature
 - Raw data staff input
- **01/31/12: Selection of DOE parameters**
 - Select Maintenance and Operations parameters
 - Select student achievement parameters
- **02/29/12: Define expected outcomes and relationship to the CGCS KPIs**
 - Yes, it is Leap Year!
- **07/31/12: Gather Maintenance and Operations and student achievement parameter data**
- **08/31/12: Conduct DOE analysis of the data**
- **09/30/12: Write preliminary report of results**
 - Prepare presentation for future CGCS conference
- **10/31/12: Define follow-on strategy**



FUTURE PRESENTATION OF THE RESULTS

CGCS Fall 2012 – Indianapolis
Preliminary Results

CGCS Fall 2013 – Albuquerque!
More detailed results



THANK YOU!

For more information, visit www.aps.edu

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