LANDSCAPE REVIEW: EDUCATION DATA

This presentation was prepared by an independent consulting firm for the Bill & Melinda Gates Foundation. While the data and analysis contained in this document were used to inform the foundation, it is not a representation of the current grantmaking strategy.

For more information on the foundation's education strategy, please visit: **www.gatesfoundation.org/education**

Landscape Review: Education Data

10/22/07

Ideal State Requires Key Systems to Link With Data Warehouse

State Data Warehouse

Business Intelligence Tools

■ System Required for AIS

▨ Partly encompassed in AIS

District Data System Requirements

District Data Warehouse

Business Intelligence Tools

District & School Interface for Administrators and Teachers

Public Interface

Student Interface

New Learning Delivery Systems

Functionality

Key Data Items

Functionality	Key Data Items
Student Information	• Student demographic information, attendance, and transcripts
Formative Assessment Tools	• Assessment results
Instructional Management	• Lessons plans, mapped curriculum support, professional development, and grade book
Human Resources	• Teacher information
Finance	• Instructional and supplementary spending
SPED	• Program enrollment, IEPs
Other Functionality	• Food service, health, transportation, library systems, college planning tools
External Systems	• Social services, juvenile justice, PSE

Note: SIS, Formative Assessment, and Instructional Management systems can have overlapping functionality and data elements

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Accountability Movement Has Driven Focus On Data At District

NCLB and increased State accountability measures have put a laser focus on student performance at the local level . .

- With greater transparency, parents are now finding out that their local school is not as strong as they may have believed it to be, and demands for improvement and greater accountability have become a common part of America's dialogue

- "High stakes accountability measures have resulted in demands for more robust and interactive solutions"

- "As part of a gradual industry wide transition from a compliance orientation towards a performance orientation, school districts are under increasing pressure to efficiently link student information directly to assessment outcomes and other types of academic and administrative data"

. . . and, as a byproduct, have exposed deficiencies in the way education data have been collected, analyzed, reported and used to date . . .

- "Driven in large measure by the complex testing and reporting requirements of the No Child Left Behind (NCLB) legislation . . . the ability to accurately collect, manage and report against various data streams is of paramount importance to states and K-12 school districts"

- "High stakes accountability measures have resulted in demands for more robust and interactive solutions"

- "As part of a gradual industry wide transition from a compliance orientation towards a performance orientation, school districts are under increasing pressure to efficiently link student information directly to assessment outcomes and other types of academic and administrative data"

. . . resulting in States and Districts making more deliberate demands of their administrators, teachers and data system vendors

- "In the past 3-4 years, the market has changed significantly; the assessment market has grown quickly in size, and schools have made it a point to replace older systems"

- "The K-12 market for SIS now demands enterprise solutions that are Web-based, available to a wider range of stakeholders, and comprehensive enough to satisfy specific program area requirements (e.g. special education administration)"

- "There are a lot of RFP's coming out now asking for integrated curriculum management, formative assessment and data warehousing capability"

- "Most Districts are over specifying their system needs"

- Many school districts are looking for a complete, one-stop-shop solution that integrates a SIS

- Plato representatives estimated that 40% of schools have an IMS and 30% are currently looking for one

Classroom Reform Data Use

In order to make progress towards more effective data usage at the classroom level, districts must …

- **Recognize the need and ability to drive behavior change**
- **Have technology supportive of analysis**
- **Identify, implement and train on necessary systems**
- **Pay for the system**

Schools Report Difficulty Answering Core Questions

- Most who report ability to answer questions lack the necessary data in "electronic and easily accessible form", suggesting this is an optimistic view of their capabilities

Q: On a scale of 1 to 7, where 1 indicates "extremely difficult" and 7 indicates "extremely easy," how easy is it for your district to answer the following questions using the data that is collected electronically today?
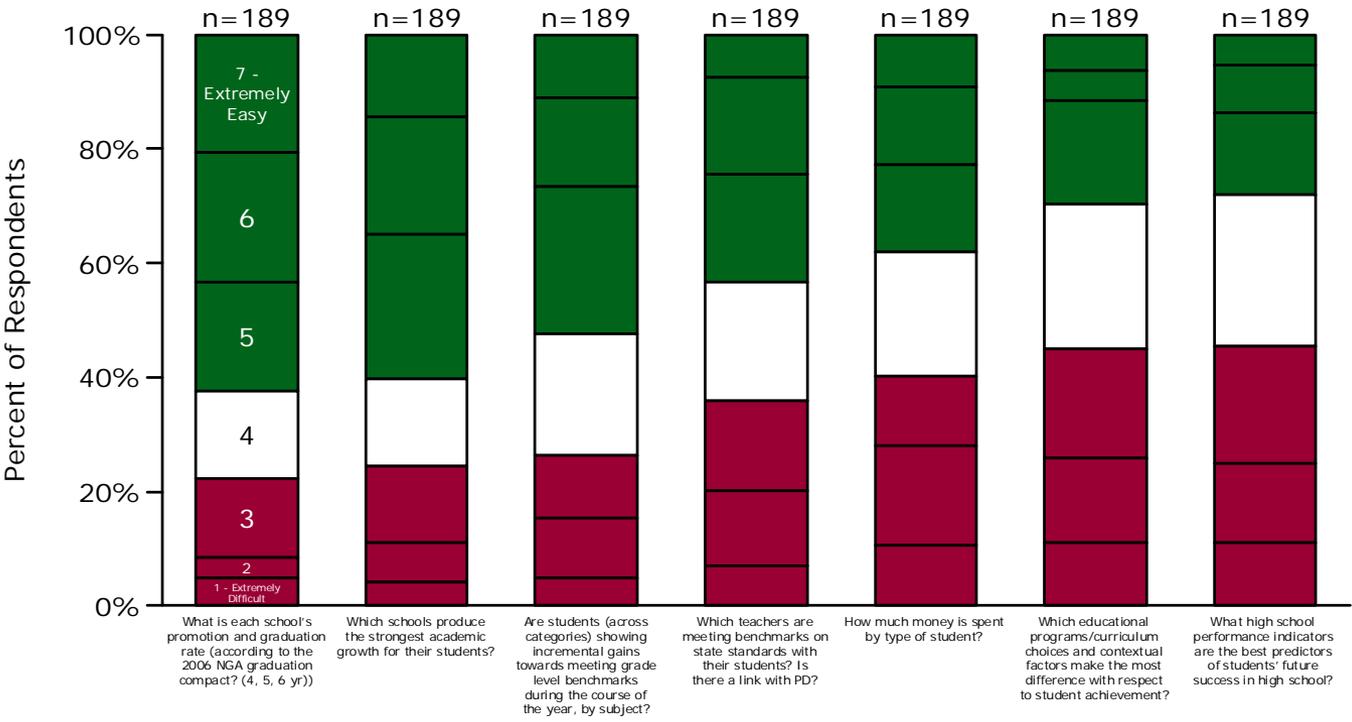
"Poor data quality is more of a school district problem than data systems being integrated. The data-entry clerk is often one of the lower paid employees in the district, and their training is not the best. There's also not a lot of error checking embedded in each of the data system silos"

— CPSI

| % "Easy" Respondents Who Cannot Answer Question [1]	78%	85%	73%	29%	24%	48%	55%

[1] Calculated by comparing the data elements non-superintendents collected with the elements required to answer specific question

Source: Parthenon District Data System Survey (n=189)

And Far Fewer Districts Report Active Investment

- Large districts are more likely to indicate a willingness and ability to invest in an "enterprise management approach" to data

Q: Please indicate your level of agreement with the following statement:

My school district possesses a willingness to invest in a K-12 enterprise management approach to academic and administrative data.

Q: Please indicate your level of agreement with the following statement:

My school district has the ability to invest in a K-12 enterprise management approach to academic and administrative data.
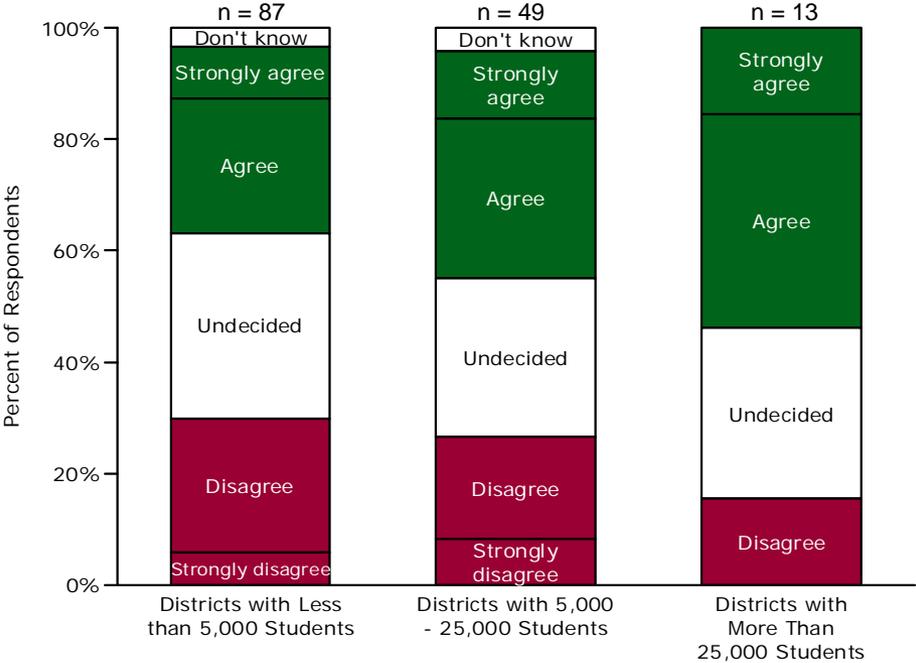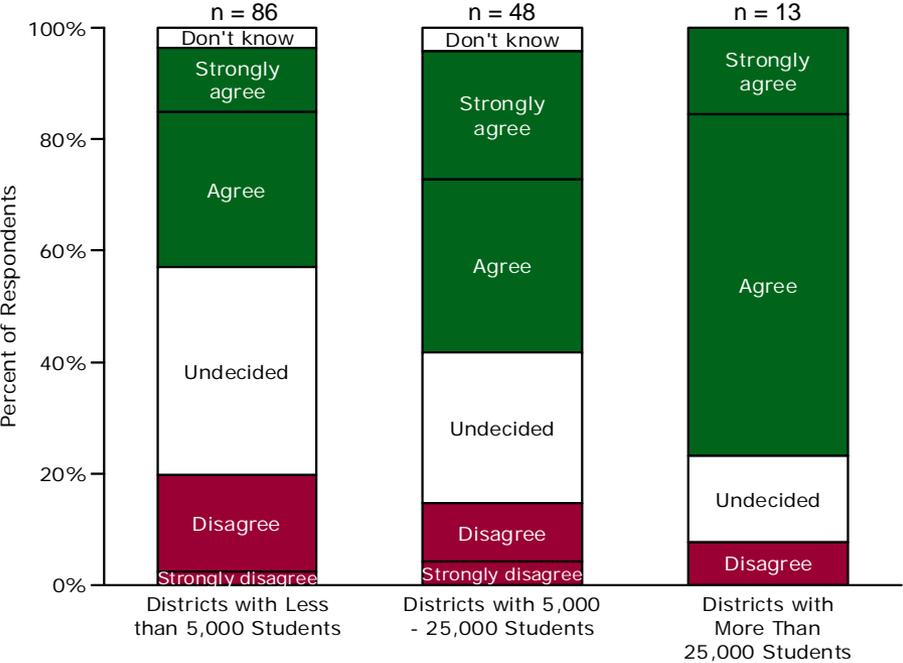
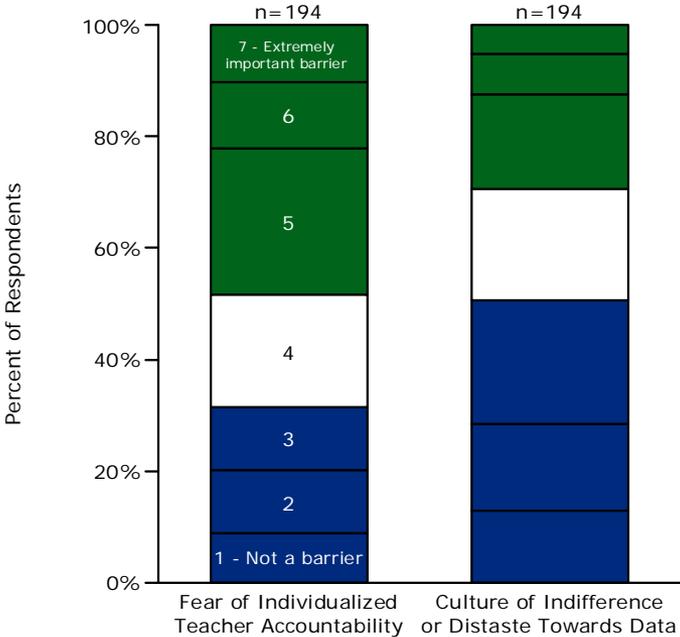Note: An "enterprise management approach" refers to "districts' efforts to integrate and manage multiple products within and across one or more of the three business segments" (SIS, IMS, BMS) and was defined during interviews
Source: Eduventures K-12 Trends in Enterprise Management Follow-Up, September 2007
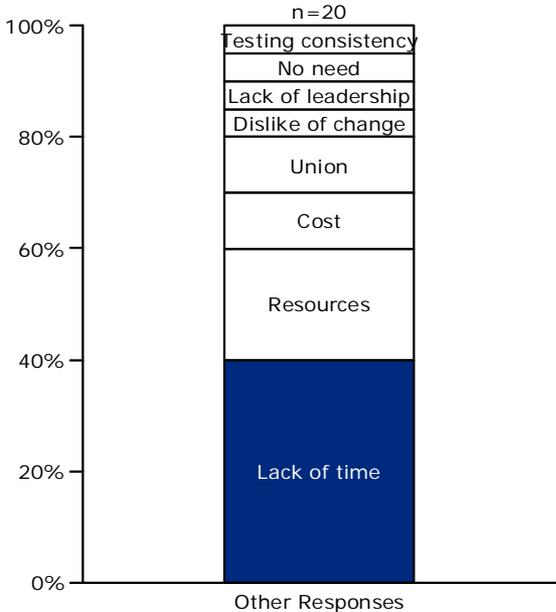
Cultural Indifference and Time Are Barriers, but Fear of Punitive Uses of Data Intensifies Opposition

- "Some people will not accept change and are still afraid of technology"

Q: On a scale of 1 to 7, where 1 indicates "not a barrier" and 7 indicates "extremely important barrier to overcome," what are the factors that limit data usage?

n=194

Chart 1 categories:
- 7 - Extremely important barrier
- 6
- 5
- 4
- 3
- 2
- 1 - Not a barrier

X-axis: Fear of Individualized Teacher Accountability / Culture of Indifference or Distaste Towards Data

Y-axis: Percent of Respondents

Other Responses

n=20

- Testing consistency
- No need
- Lack of leadership
- Dislike of change
- Union
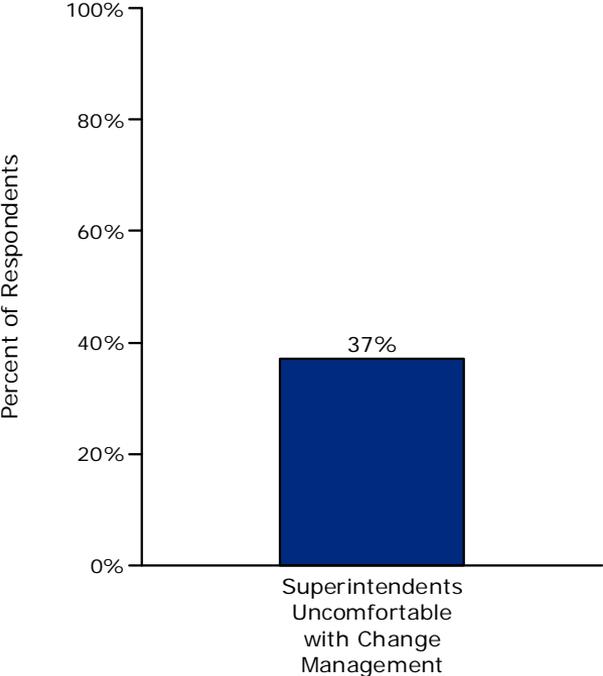- Cost
- Resources
- Lack of time

X-axis: Other Responses

Commentary About Time

- "We need to dedicate more time to having these professional conversations about student assessment data. **Sometimes it is difficult to "find" the time** to do this"

- "I think that most users are pretty overwhelmed with keeping up with the day-to-day job. **There is insufficient time for staff development in these areas**"

- "Data is very beneficial but it often seems to be pretty complex to access it. Secondly, there is always an issue of time. **We have limited time to have all staff together for training.** Train the trainer model works in theory but, again, it is a challenge to get people time for the training"

- "**People find it difficult to find time** to use the data."

Change Management Is a Major Concern for School Leaders

- "I can't get teachers to attend trainings even when I pay them overtime"

Superintendents Are Uncertain of Change Management Techniques	**Educators Report Ongoing Challenge of Data Usage**	**Existing Education-Specific Resources Are Limited**

Educators Report Ongoing Challenge of Data Usage

- "We only do what is required with the data"

- "Our staff who need to have the data in their hands to use for instructional decision making still do not do this in any meaningful way after 2 years of training investment"

- "Training got them going, but we still need to push employees internally"

- "[There is] not enough usage. People forget what to do from one year to the next"

- "We have not even begun to scratch the surface of collecting data using our current system"

Existing Education-Specific Resources Are Limited

A limited number of templates exist to accelerate efforts of districts

- Datawise
  - Framework that guides districts to prepare, inquire, and act in order to learn from student achievement information

- NCREST
  - Gates-funded intermediary researching many of the fundamental and comprehensive changes that successful education restructuring demands

- Best Practices Framework (NCEA)
  - Framework that identifies themes (i.e. staff selection, compilation of data, academic goals), organizational levels (i.e. district, school, classroom), and the practices that lead to improved education

- Achieving with Data (New Schools)
  - Gates-funded study of four schools with effective data strategies that identifies the key strategies of performance-driven schools (building a foundation, establishing a culture, investing in an IMS, selecting the right data, and using the data to improve performance)

Chart: Superintendents Are Uncertain of Change Management Techniques

Percent of Respondents (y-axis: 0% to 100%)

- Superintendents Uncomfortable with Change Management: 37%

Change Management Is a Broadly Understood Topic

- Outside of the education space change management has been handled successfully through vendor-implemented, internal, and outside hired solutions

Numerous Examples Exist of Organizations Who Have Succeeded

The Private Sector (Catholic Healthcare West)

- CHW is the nation's 8th largest hospital system and installed new enterprise resource planning (ERP) software in 2006

- Successfully approached change management issue by focusing on communication

  - Held meetings with top management in each hospital before creating communications plan

  - Designed communication to come directly from on-site management and not representatives from headquarters

  - Took customized change management approach to each of the 40 hospitals

  - Created "change champion" position at each hospital

  - Trained employees for 2 weeks leading up to product launch

The Public Sector (OSHA)

- Redefined its mission and enacted new ways to achieve it

- Achieved goals by listening to employee suggestions and visiting other successful organizations

  - Convened a change team consisting of members from all agency functions and levels

  - Brought employees who opposed change to visit successful organizations to soften their stance

  - Chose pilot offices based on receptiveness to change

  - Gradual rollout enabled future rollout offices to be on-site and observe implementation

Specialists Exist to Help

Consulting Firms Focused Only on Change Management

- Change Management Innovation Company

- Options For Change

- Managing Change

General Consulting Firms with Change Management Focus

- McKinsey

- Bain & Co.

- Accenture

- Aon

Classroom Reform Data Use

In order to make progress towards more effective data usage at the classroom level, districts must …

Recognize the need and ability to drive behavior change	Have technology supportive of analysis	Identify, implement and train on necessary systems	Pay for the system

- Districts struggle to answer essential questions today

- Willingness and ability to execute lag intentions

- The ability to enact important culture change is a concern of many school leaders

- Change management is broadly understood and can be tailored to education

Districts

- There is a need to increase the urgency at the district level to adopt data systems
  - Linked to clear evidence that doing so will improve outcomes or provide ancillary benefits

Vendors

- Change management models specific to education may be lacking or would benefit from wider visibility

Districts Today Tend Not to Have All of the Essential Tools…

- Significant percentages of the installed base are more than five years old

Q: What data systems does your district currently have, and, if applicable, how satisfied are you with each existing data system?
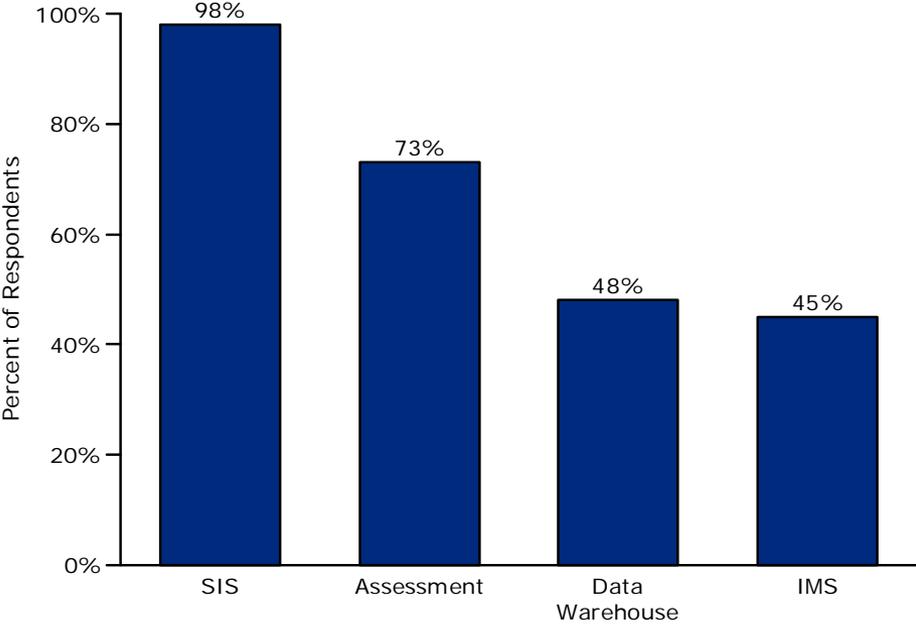
Q: Please indicate which (if any) of the following data system purchases you have participated in for your district over the last five years:
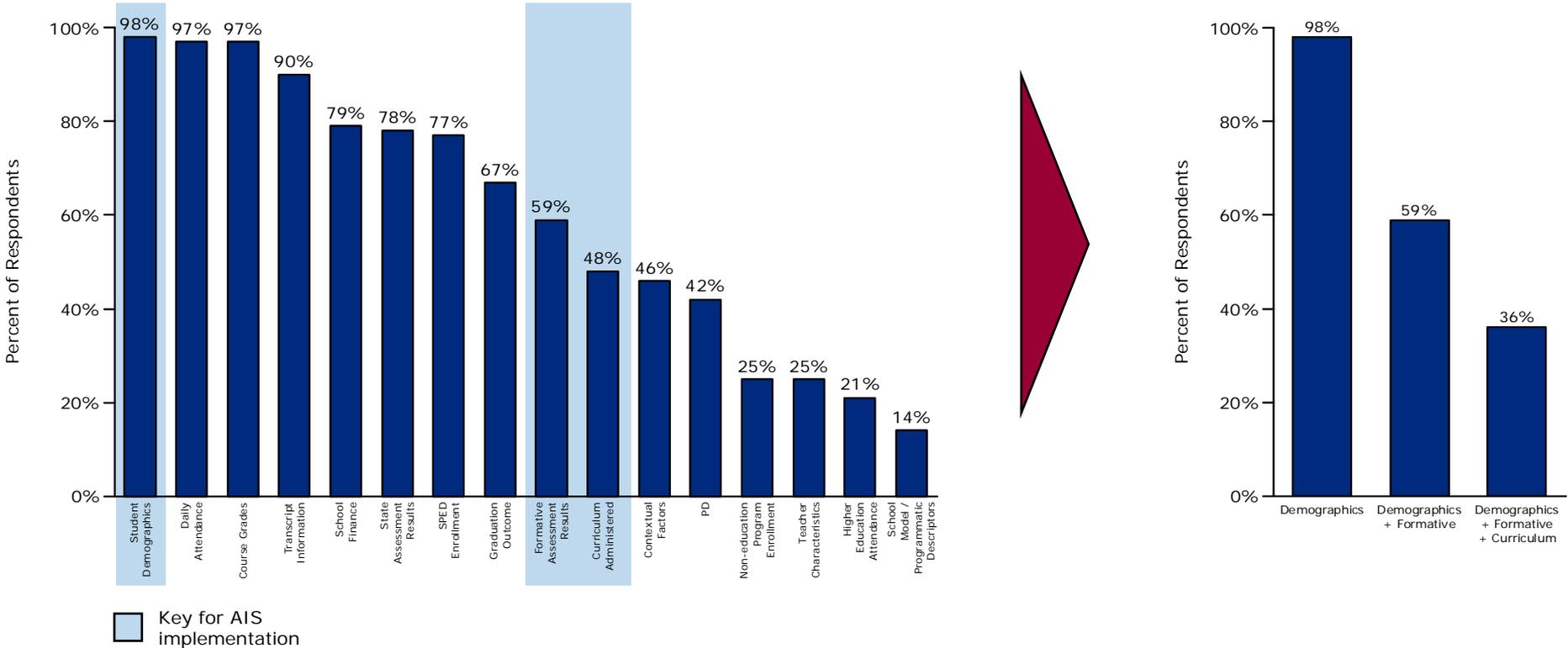

Left chart — Percent of Respondents:
- SIS: 98%
- Assessment: 73%
- Data Warehouse: 48%
- IMS: 45%
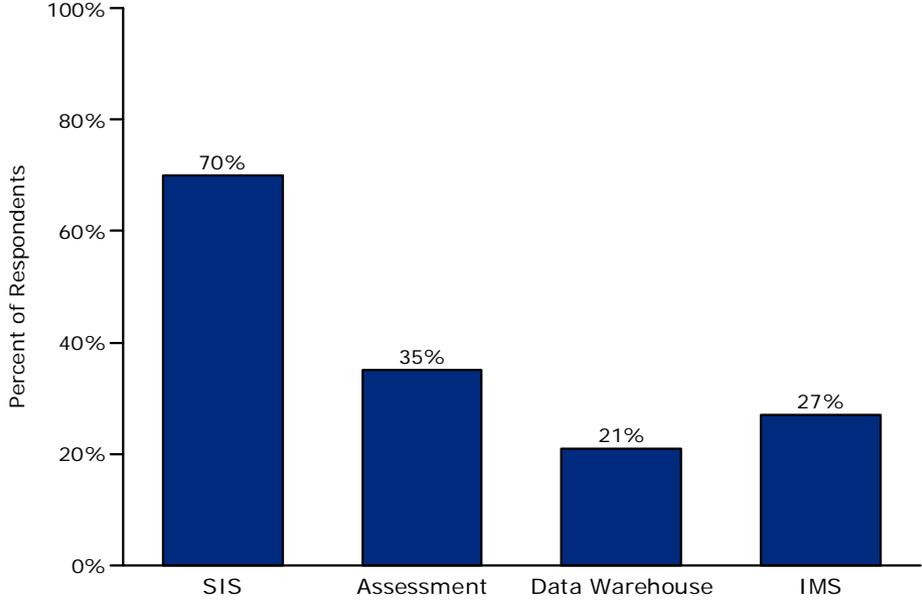
% Satisfied (5 to 7)	76%	53%	47%	65%

Right chart — Percent of Respondents:
- SIS: 70%
- Assessment: 35%
- Data Warehouse: 21%
- IMS: 27%

And Don't Collect the Requisite Data for AIS Analysis

- At most, 36% of districts have the full set of necessary data available to them in an electronic, easily retrievable format

Q: Which of the following data elements does your district collect in an electronic, easily retrievable format? *Please check all that apply.*

Left chart — Percent of Respondents:

Category	Percent
Student Demographics	98%
Daily Attendance	97%
Course Grades	97%
Transcript Information	90%
School Finance	79%
State Assessment Results	78%
SPED Enrollment	77%
Graduation Outcome	67%
Formative Assessment Results	59%
Curriculum Administered	48%
Contextual Factors	46%
PD	42%
Non-education Program Enrollment	25%
Teacher Characteristics	25%
Higher Education Attendance	21%
School Model / Programmatic Descriptors	14%

Key for AIS implementation

Right chart — Percent of Respondents:

Category	Percent
Demographics	98%
Demographics + Formative	59%
Demographics + Formative + Curriculum	36%

Educational Software Market Is $1.2B

- SIF compliance is increasing, which will enable interoperability between disparate solutions

- Many K-12 school applications, particularly SIS and back-office enterprise systems, also offer data warehousing

K-12 Educational Software Market, (2005)
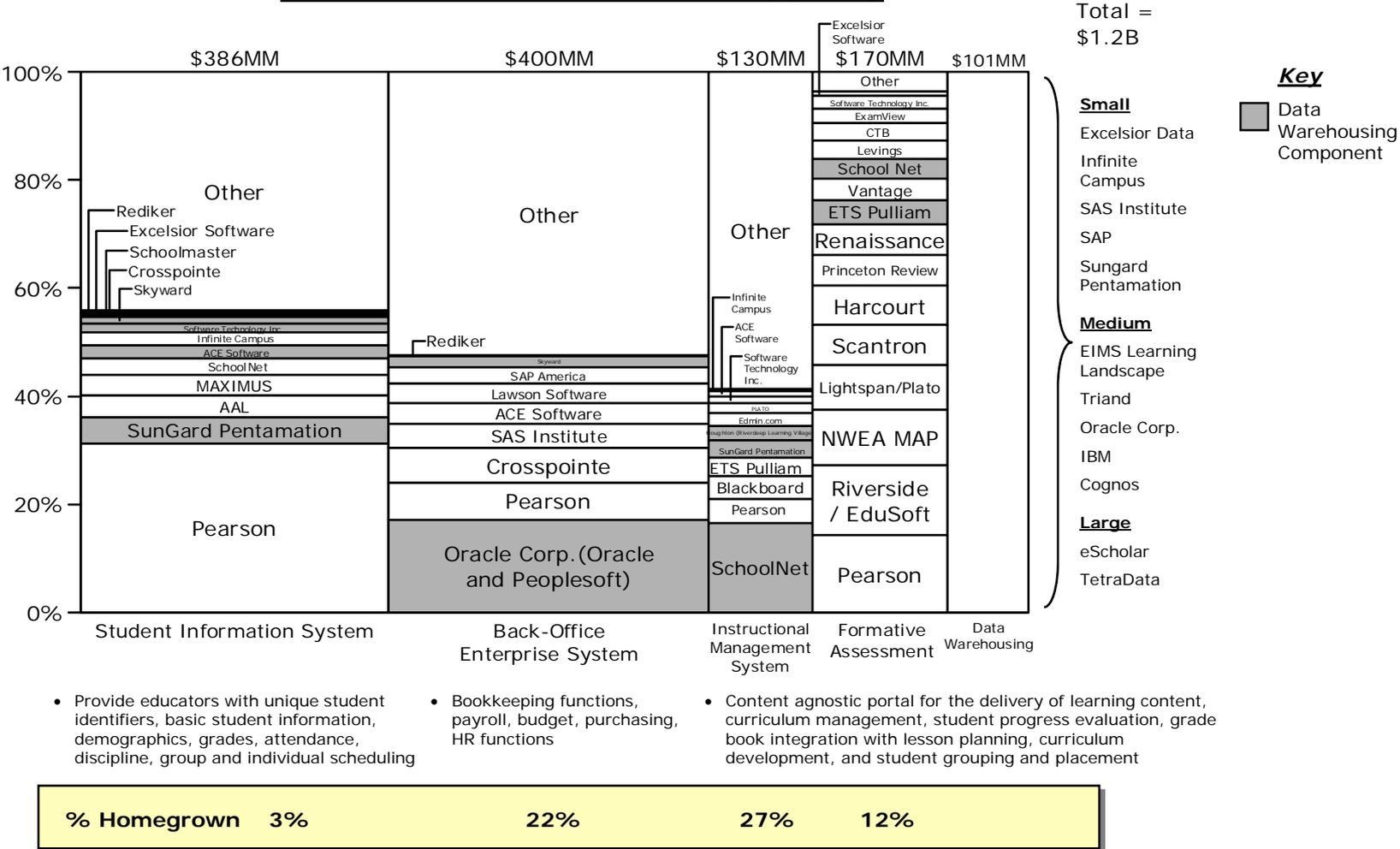
- Provide educators with unique student identifiers, basic student information, demographics, grades, attendance, discipline, group and individual scheduling
- Bookkeeping functions, payroll, budget, purchasing, HR functions
- Content agnostic portal for the delivery of learning content, curriculum management, student progress evaluation, grade book integration with lesson planning, curriculum development, and student grouping and placement

% Homegrown	3%	22%	27%	12%

The Market Is Now Largely Vendor-Based

- New systems are predominantly purchased from vendors and not developed internally

- Internal development spans size of district, but is more likely in large districts

Q: **Was the new (last five years) data system purchased from a vendor or developed in-house?**

Chart: Percent of Respondents

	Student Information System	Assessment System	Instructional Management System	Data Warehouse	Administrative System
n	n=44	n=43	n=28	n=24	n=10

Legend: Developed in-house (green), Purchased from a vendor (blue)
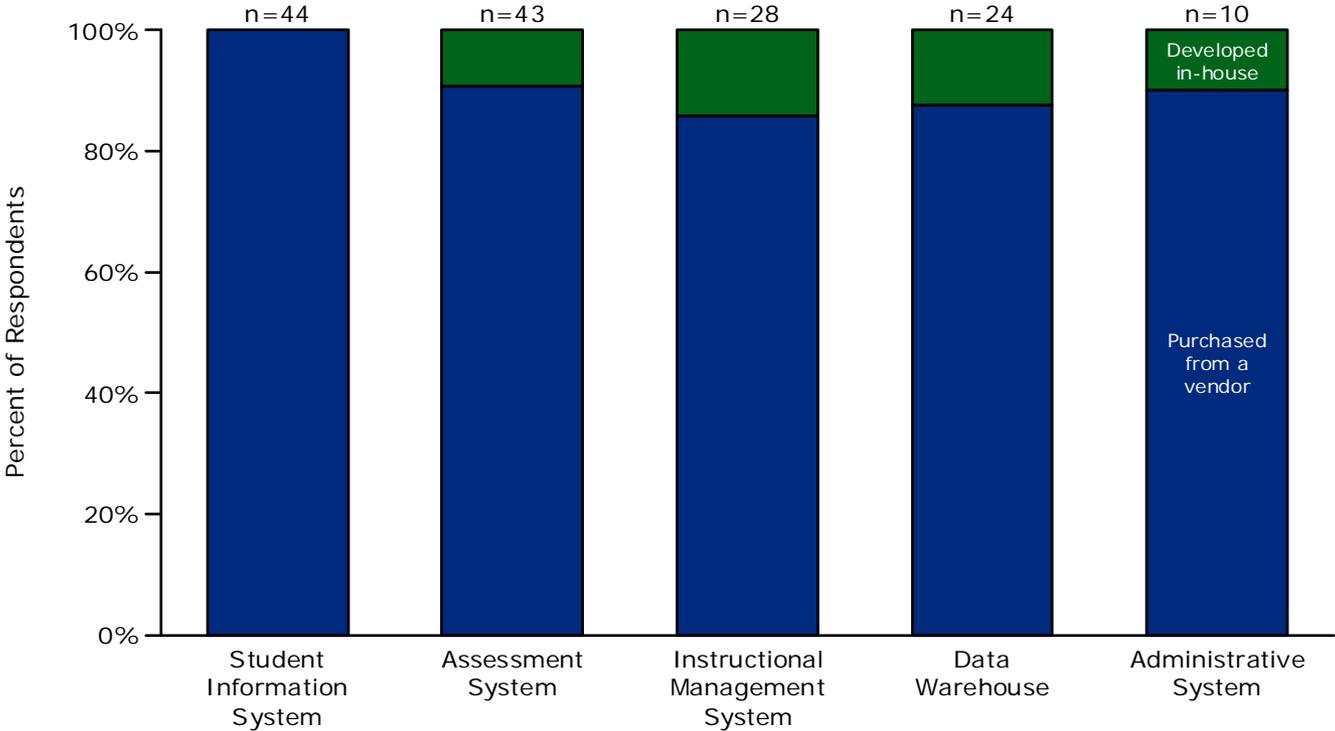
% Overall Vendor Installations	100%	91%	86%	88%	90%

Educational Data Systems' Market Is Active and Maturing

The market has responded to this renewed demand through active consolidation and improved offerings. . .

- "Competition among at least five major [SIS] players will provide choices within the market and continue to drive providers to align their offerings with school district needs"

  - "Infinite Campus has reported strong growth in market share during the past three years, with an expected increase of nearly 400% since 2004"

- Consolidation has occurred as vendors try to expand market share and add functionality to their own product lines

  - Pearson added to its SIS market share by acquiring Chancery and PowerSchool SIS companies in mid-2006

- Vendor offerings have improved in quality and number from 4-5 years ago, when there were few options for curriculum management and assessment systems

- Web-based models also have the advantage of being able to quickly adapt to technology; Infinite Campus and SchoolMaster both offer products that can be accessed via PDA, to improve ease of use for principals and administrators on the go

- "One vendor that has chosen to expand via acquisitions estimates that there are more than 100 small players in the SIS market with revenues below $5MM; many of them started in the 1980s and are now looking to exit the market"

. . . which is blurring the conventional functional boundaries between the various school systems . . .

- Edmin.com and Infinite Campus offer monolith products that combine SIS with limited finance, HR, assessment and curriculum functionality

- "There are vendors out there offering monolith products, like Infinite Campus and Skyward, but there will always be a demand for the best in breed systems, especially among larger districts"

- "The SIS and FMS K-12 market is very fragmented with many regional or state-specific players. However, consolidation is a key trend as both SIS and FMS vendors are looking to expand market share and add functionality to their current product lines"

. . . and should make it easier for Districts to answer their student data questions with far fewer system solutions

- This convergence often makes it easy to purchase fewer solution to achieve its desired functions

- "Many school district are looking for a complete, one-stop-shop solution that integrates student information and back-office functions"

- "Chancery and SASI are has-beens; many customers will convert to something else eventually, most likely to a product along the lines of Infinite Campus, which offers a centralized, web-based solution"

Source: Parthenon vendor interviews; Gartner; Eduventures

Though Districts Complain That Usability Tools Lag

Existing usability and reporting tools are inadequate...

- "I would like to see a greater degree of custom data mining to develop reports vertically for the organization"
- "It is hard to put all of the data together to get a complete report
- "Some reports seem difficult to retrieve. Not everyone has access to the information. A single person is responsible and requests need to flow through that person"

... and require analytical capabilities at the district level that are not always available...

- "[Reporting] requires too many specialized technical people to operate and support"
- "Takes an IT person to understand the queries and reports that need to be created"
- "Still require technical skills not possessed by most staff members"
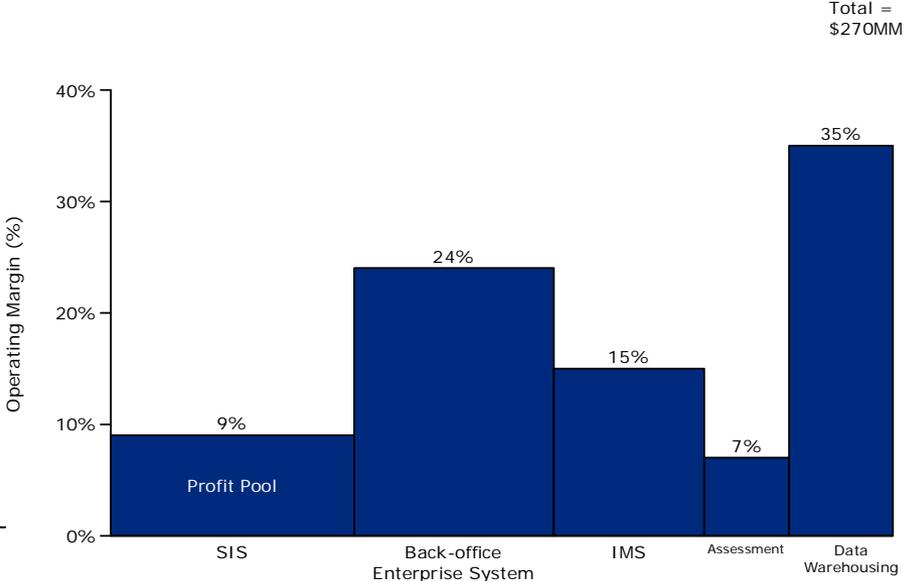
... but the tools themselves are improving

- "I think the tools are making strides in providing more detailed usable information to staff and teachers and parents"
- "Things we have purchased and in place are working well, and solutions are being continually tweaked and upgraded for the better"
- "We have everything we need. When we come up with a new need, they make it happen"
- "Major strides have been made in the systems available today over what was available in the past and I am seeing companies constantly innovating and improving. Our student information systems provider, for example, actively seeks our input on enhancements and upgrades"

School Data Systems and Technology Service Market Growth

Market Segment Growth Rates

Percent CAGR ('03-'06)

- SIS: 9%
- Back-office Enterprise System: 6%
- IMS: 2%
- Formative Assessment: 6%
- Tech Services: 3%

Growth is occurring in 2 of 3 segments necessary to support AIS. Encouraging adoption of IMS may be a need

Estimated Profit Pool
by Data System Segment, (2005)

Total = $270MM

Operating Margin (%)

- SIS: 9% (Profit Pool)
- Back-office Enterprise System: 24%
- IMS: 15%
- Assessment: 7%
- Data Warehousing: 35%

**Total profit pool is ~$200MM and the distinction between product segments is blurring**

~80% of Respondents Indicate Desire for Integrated Solutions

- While there is some variation how important stakeholders view the importance of comprehensive data systems, most districts, regardless of size, see some value in an comprehensive solution

Q: On a scale of 1 to 7, where 1 indicates "not at all important" and 7 indicates "extremely important," how important is having a comprehensive data system (i.e., all key systems offered by a single vendor) in your district?

By Respondent Title

By District Size

Source: Parthenon District Data System Survey (n=194)
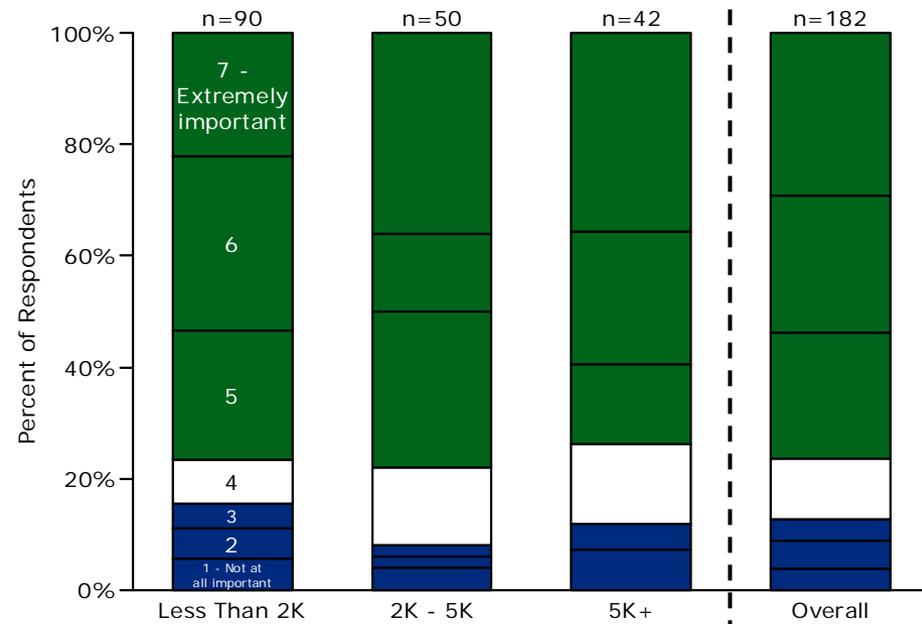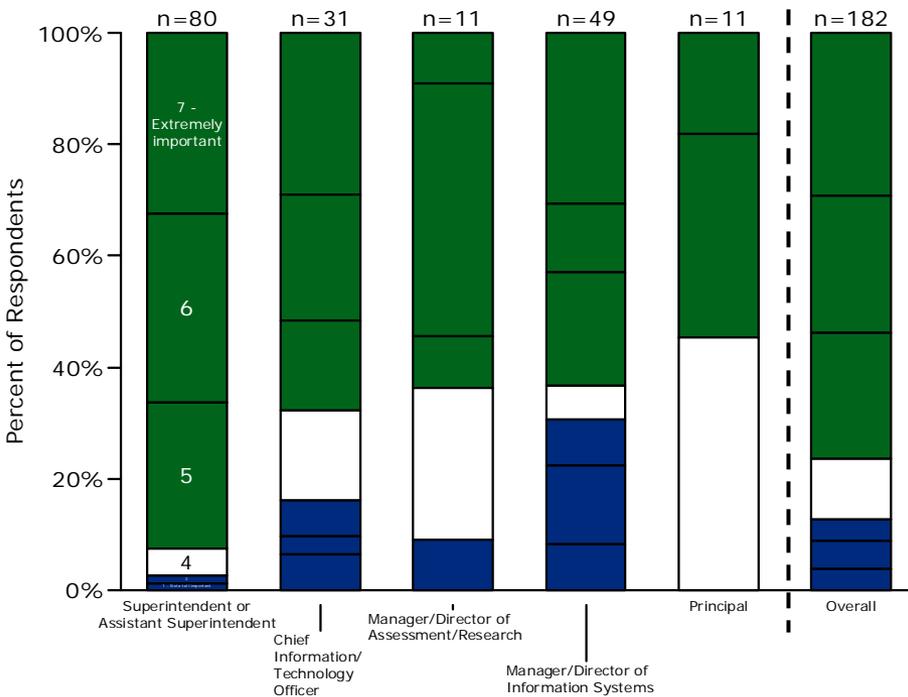
Classroom Reform Data Use

What barriers impede the effective use of data systems at the classroom level?

| **Recognize the need and ability to drive behavior change** | **Have technology supportive of analysis** | **Identify, implement and train on necessary systems** | **Pay for the system** |

Recognize the need and ability to drive behavior change
- Districts struggle to answer essential questions today
- Willingness and ability to execute lag intentions
- The ability to enact important culture change is a concern of many school leaders
- Change management is broadly understood and can be tailored to education

Have technology supportive of analysis
- Most districts lack the full suite of required tools and don't collect the necessary data in "electronic and accessible" form
- Market for tools is large
- Growth in certain categories is strong and the total profit pool is ~$200MM, though IMS is a concern
- Trends are positive – interoperability, consolidation, improving functionality, cross functionality
- Usability may lag, but vendors are responsive

Districts
- There is a need to increase the urgency at the district level to adopt data systems
  - Linked to clear evidence that doing so will improve outcomes or provide ancillary benefits
- Districts need to upgrade their systems to enable more sophisticated analysis

Vendors
- Change management models specific to education may be lacking or would benefit from wider visibility
- Potential IMS and usability tool deficiencies, but vendors are responsive to market requests – likely solution is to "shape the ask"

Execution of Systems Projects Is a Concern

- Superintendents view internal capabilities less favorably than other respondents

Q: On a scale of 1 to 7, where 1 indicates "extremely uncomfortable" and 7 indicates "extremely comfortable," How comfortable is your district with the following components of the district data system process?
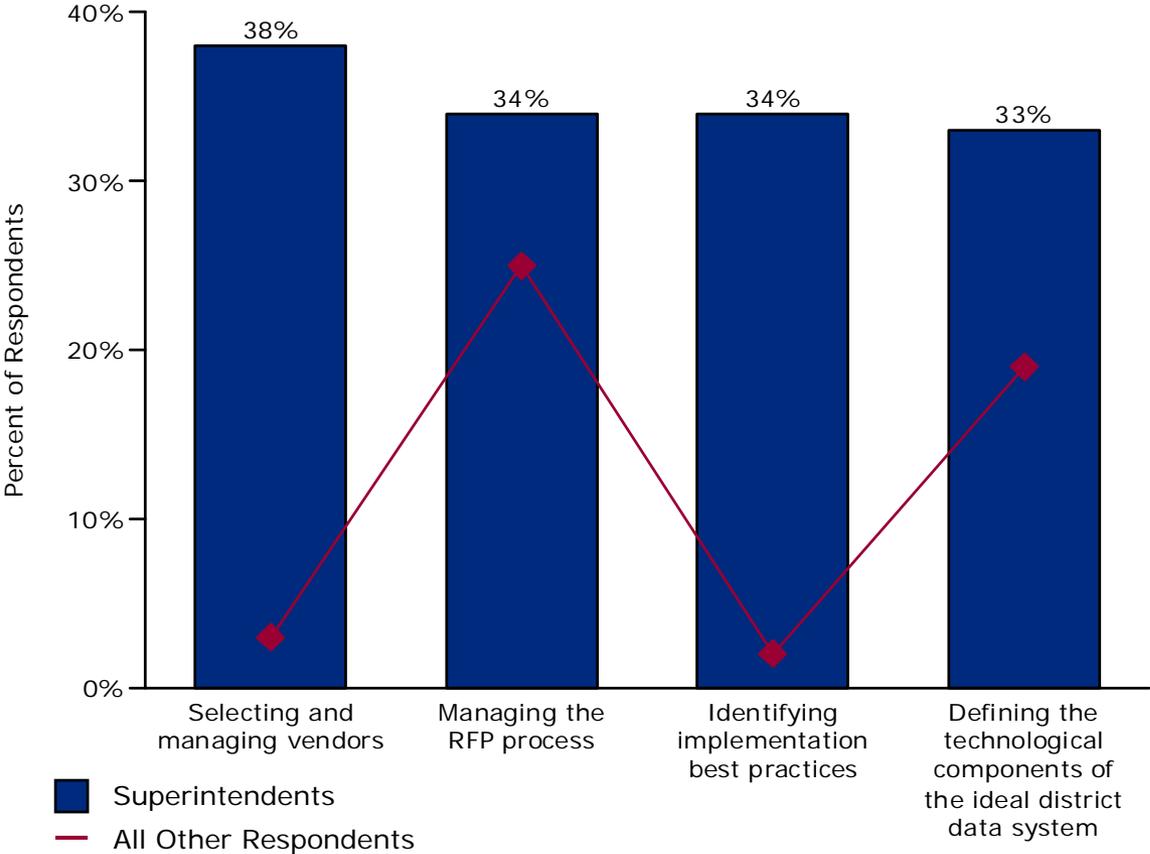

"Even in the cases where leadership may recognize the value/importance of an integrated enterprise approach, there are few districts (other than the largest) that appear to have the technically sophisticated staff necessary to implement and manage. This leads to the choice as above to either bring that staff on board (which they typically cannot afford) or outsource to third parties (which is either prohibitively expensive and/or about which they feel uncomfortable)."

- Eduventures

Percent of Respondents

- Selecting and managing vendors — 38%
- Managing the RFP process — 34%
- Identifying implementation best practices — 34%
- Defining the technological components of the ideal district data system — 33%

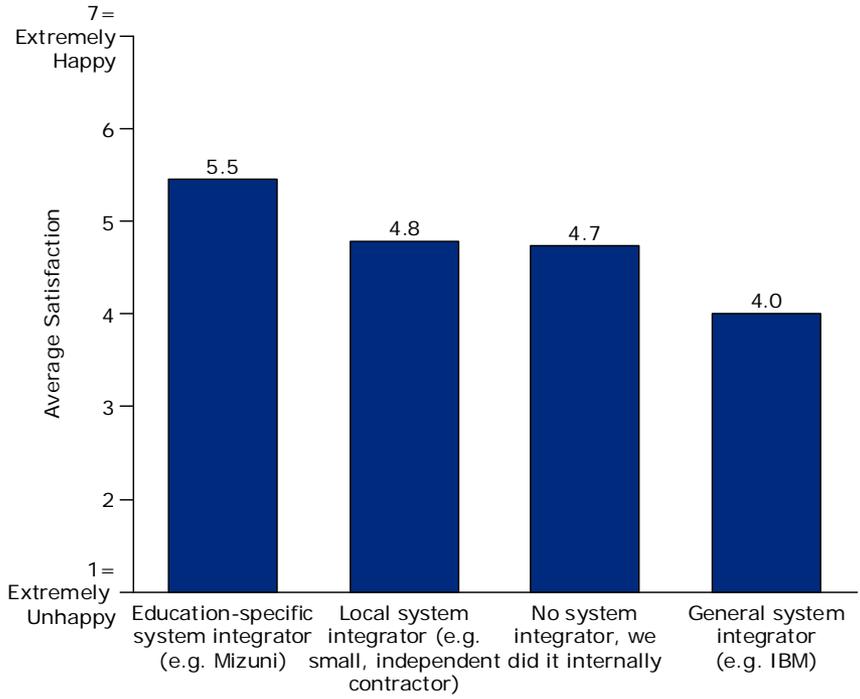■ Superintendents
— All Other Respondents

Most Districts Implement Themselves With Mixed Results

- Districts rated their satisfaction with education-specific system integrators higher than their satisfaction with local or general system integrators or internal efforts

Q: How did your district implement your current data system?
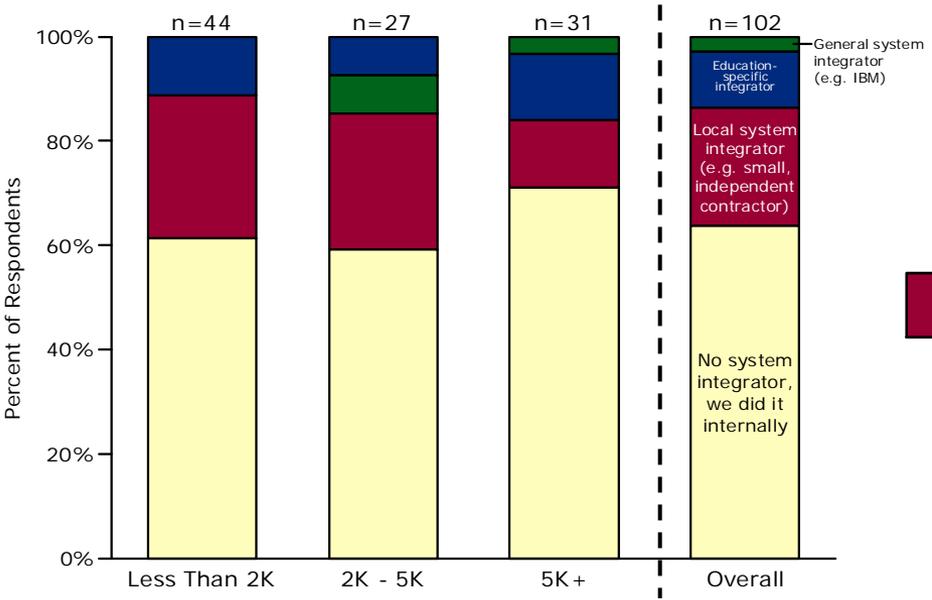
Q: On a scale of 1 to 7, where 1 indicates "extremely unhappy" and 7 indicates "extremely happy," how happy are you with the system integration method you chose?

Left chart categories: Less Than 2K (n=44), 2K - 5K (n=27), 5K+ (n=31), Overall (n=102)

Segments: General system integrator (e.g. IBM), Education-specific integrator, Local system integrator (e.g. small, independent contractor), No system integrator, we did it internally

% Used Integrator: Less Than 2K 39%, 2K - 5K 41%, 5K+ 29%, Overall 36%

Right chart (Average Satisfaction):
- Education-specific system integrator (e.g. Mizuni): 5.5
- Local system integrator (e.g. small, independent contractor): 4.8
- No system integrator, we did it internally: 4.7
- General system integrator (e.g. IBM): 4.0

Source: Parthenon District Data System Survey (n=194)

Dedicated Education Integrators Offer Districts Significant Advantages and Are Growing to Meet Demand

Districts are generally more satisfied when using a dedicated education integrator

- Districts surveyed by Parthenon reported higher integrator satisfaction scores when using education-specific integrators than when using large or small general integrators
- "It's hard for districts to differentiate one data warehouse from another, but they range greatly in their ability to clean and validate data. Set-up of the system can either be performed by the schools internal staff, in which case the data is not collected or maintained in good condition, or by the vendor, which is expensive but leads to much better system functionality" (SchoolNet)
- "Market awareness would help make the market work more efficiently: large districts have the internal expertise as guidance, but small districts need to be aware of common mistakes made in implanting a data system and how to avoid them, the importance of change management and defining data objects that should be collected and processes for their collection, and specifications of what districts need demand in a data system" (SchoolNet)

Integrators who are education specific seem to be in relatively short supply, but they don't report being over-whelmed by demand

- District system integrators indicated that they did not receive requests for business that they could not meet, and that districts are not being underserved
- Vendors and districts reported that districts have access to many mom-and-pop and state-specific integrators; while these may be education-focused, they remain below our radar because they are regional and very small, or because they are a jack-of-all-trades business (not education-specific)
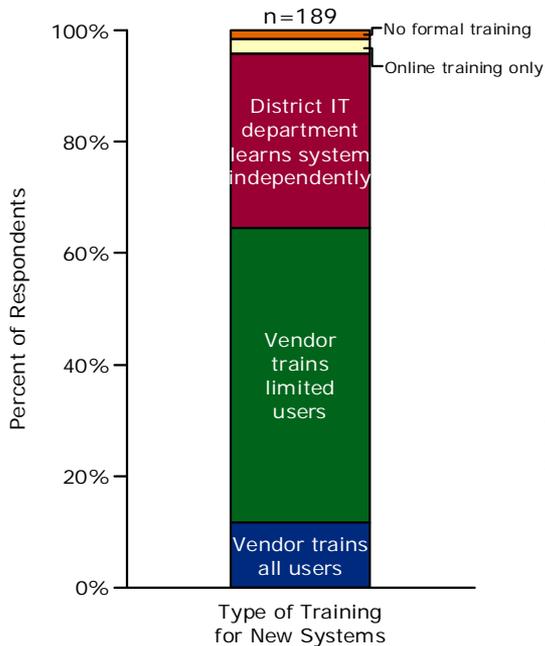
In response to increased demand, we believe that they can scale to meet it

- Mizuni, an education-specific integrator, has plans to increase its capacity in the next year; though growth until now has been fueled organically, the company plans to make its first sales and marketing push this year, in addition to expanding its staff of integrators
- Education-specific integrators also reported efforts to expand ability to serve large districts
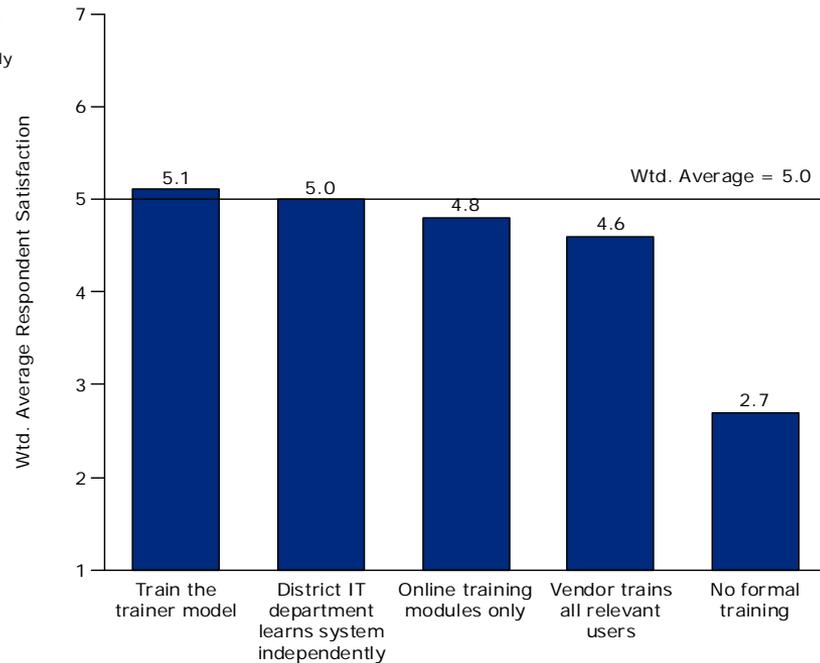
Training Is Often Viewed as Satisfactory…

- "When staff are trained properly, usage skyrockets"

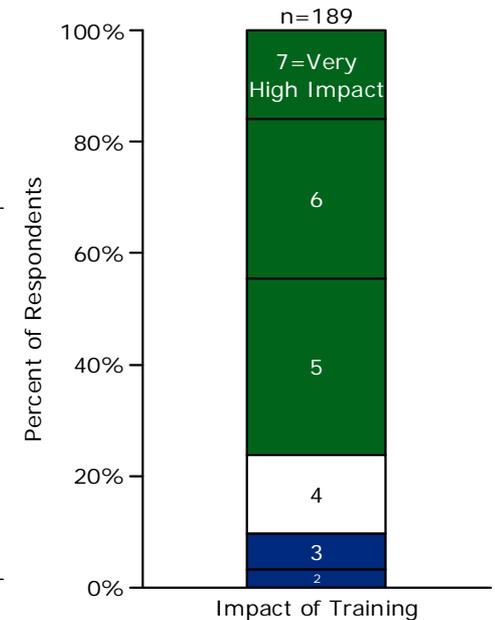**Q: What form of training is typically utilized when implementing a new data system in your district?**

Q: On a scale of 1 to 7, where 1 indicates "Extremely unhappy" and 7 indicates "Extremely happy," How happy were you with the training your district received from the perspective of using the technology? (i.e. people who have access to the data system are familiar with its functionality and comfortable with the interface)

Q: On a scale of 1-7, where 1 indicates "very low impact" and 7 indicates "very high impact," how much impact did the training have on actual data system usage?

n=189

Percent of Respondents

- No formal training
- Online training only
- District IT department learns system independently
- Vendor trains limited users
- Vendor trains all users

Type of Training for New Systems

Wtd. Average Respondent Satisfaction

Wtd. Average = 5.0

Train the trainer model	District IT department learns system independently	Online training modules only	Vendor trains all relevant users	No formal training
5.1	5.0	4.8	4.6	2.7

n=189

Percent of Respondents

- 7=Very High Impact
- 6
- 5
- 4
- 3
- 2

Impact of Training

Internal trainers is the predominate method

Most indicate a relatively high level of satisfaction with the training that they conducted
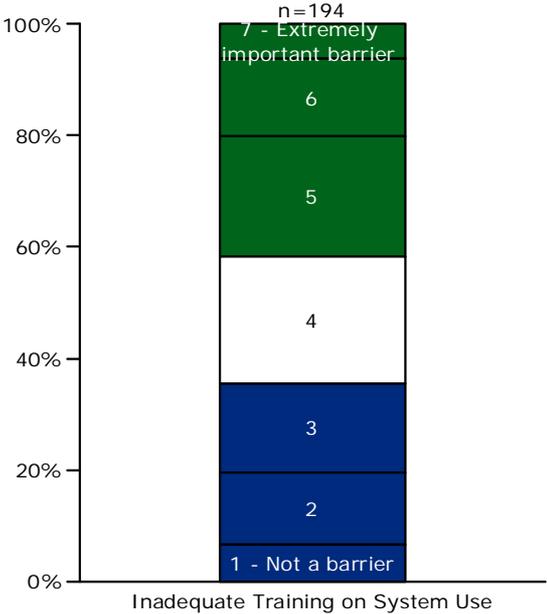
Training is viewed as having had an impact

But Commentary Reflects Underlying Frustration That Training Doesn't Yield Reflection and Sustained Usage

Training levels are often inadequate to drive sustained usage

n=194

Percent of Respondents

- 100%
- 80%
- 60%
- 40%
- 20%
- 0%

7 - Extremely important barrier

6

5

4

3

2

1 - Not a barrier

Inadequate Training on System Use

- "Administrative training was OK for getting started but lacked follow-up for more efficient use at later stages of implementation"

- "Without training, use is sporadic at best. Only a few people with required job descriptions to analyze data know how to do it; others would like to do it, but don't know how"

- "We have found that we need to follow-up with more support through the use of peer support. Our teachers are using "whole class" data to guide instruction, but they are not implementing data for one-on-one remediation"

- "Our problem is a 25% turnover in staff yearly! Our department does not have a dedicated person to train personnel in the use of our terrific resources - this is our greatest need but funding is so limited"

And Vendors Reflect Similar Themes

Vendor training program quality varies, but is generally adequate for product introduction . . .

- "There is no market consensus just yet of what teaching and training is required in a successful district; some vendors only train IT staff, but we believe it needs to be extended to teachers and system users"

- Some vendors are more willing than others to invest in training; Rediker Software maintains a training staff of over 10 FTE's comprised of former principals and teachers

- Training offered by SIS vendors is usually insufficient"

- "Vendors do not like to stress how hard of an obstacle change management is because it may scare districts off of a purchase"

. . . these differences in vendor training quality are reflected in price points

- Vendor district training and change management prices range from $30/hour to $197/hour, and required hours of training range from 8 to 40 hours

- Rediker [SIS] charges $4750 for 3 days of onsite training, and $6K for a week

- SchoolMaster [SIS] charges $30/hour for a recommended 8-hour package for a total of $240, with lessons spread over an entire quarter

- Plato charges $1500 for 1 day of onsite training, $1K per day if a district purchases a 150-day project manager, and offers electronic training and professional development for $750 to $1K per day

- Infinite Campus' recommended ongoing online training costs $0.50 per year per student

The primary issue is that Districts rarely prioritize training enough

- "Bad training is a school issue, not a vendor issue; they need to make it a priority"

- "There will always be clients that don't see the value in training"

- "For software, you can use value-based pricing. For training services, however, Districts don't value it as much. They think they can always hire someone to train them"

- "Schools are sophisticated enough to know that a software purchase has ongoing costs associated with it; the biggest gap in budgeting is training and awareness"

Classroom Reform Data Use

In order to make progress towards more effective data usage at the classroom level, districts must …

Recognize the need and ability to drive behavior change	Have technology supportive of analysis	Identify, implement and train on necessary systems	Pay for the system

- Districts struggle to answer essential questions today
- Willingness and ability to execute lag intentions
- The ability to enact important culture change is a concern of many school leaders
- Change management is broadly understood and can be tailored to education

- Most districts lack the full suite of required tools and don't collect the necessary data in "electronic and accessible" form
- Market for tools is large
- Growth in certain categories is strong and the total profit pool is ~$200MM, though IMS is a concern
- Trends are positive – interoperability, consolidation, improving functionality, cross functionality
- Usability may lag, but vendors are responsive

- Superintendents are not confident in their abilities to define and implement data systems
- The majority of districts implement systems using internal resources, but the highest satisfaction scores come from using dedicated education providers
- Supply of those integrators is likely very limited (we have identified 4)
- Training is a mixed story, but it appears that overall quality is low because districts don't value and pay for it
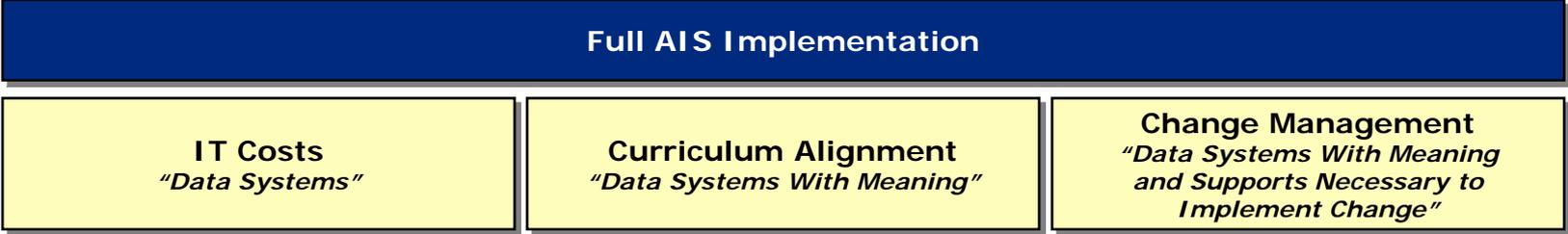
Districts

- There is a need to increase the urgency at the district level to adopt data systems
  - Linked to clear evidence that doing so will improve outcomes or provide ancillary benefits

- Districts need to upgrade their systems to enable more sophisticated analysis

- Districts would benefit from more detailed models of systems and how to implement
- Districts do not appropriately value training and therefore do not budget

Vendors

- Change management models specific to education may be lacking or would benefit from wider visibility

- Potential IMS and usability tool deficiencies, but vendors are responsive to market requests – likely solution is to "shape the ask"

- Potential shortage of high quality integrators
- Quality shortcomings in training can be overcome through more demand

Full AIS Implementation Requires Coordinated Investments
Across Data Systems, Alignment, and Change Management

Full AIS Implementation		
IT Costs *"Data Systems"*	**Curriculum Alignment** *"Data Systems With Meaning"*	**Change Management** *"Data Systems With Meaning and Supports Necessary to Implement Change"*

Definition:

Three IT Cost Components:

- **Upfront:** Hardware costs and software licensing

- **Implementation / Transition:** Data integration, process redesign, and training

- **Ongoing:** Annual system maintenance and human resource costs

Curriculum Alignment:

- Resources required to ensure curriculum is aligned across and within grade levels and with district and state standards

Change Management:

- Process of defining and instilling new values, attitudes, norms, and behaviors within an organization to drive sustained usage of the system

Inputs / Sources:

- Parthenon District IT Survey

- ERS

- Scholastic (QED)

- Past Parthenon AIS Work (Chicago estimates)

- Past Parthenon AIS Work (Chicago estimates)

Districts IT Spending per Student Is Modest...

- ERS data from Boston Public Schools and data from Quality Education Data suggest that IT costs per student are roughly $140-$220, representing about 2% of total district budgets

- QED projects that district IT budgets are at best flat and may in fact be declining

District IT Spending per Student

Chart: District IT Spending per Student (Spending per Student, $0–$300)

- 2006 BPS IT Spending per Student (ERS) [1]: $220 — Overall
- Average: $180 (dashed line)
- 2005 Avg. District Tech Spending per Student (QED) [2]: $140, broken down into:
  - Other
  - Servers (HW & SW)
  - Services & Training
  - Desktop Software
  - Network & Infrastructure
  - Desktops, Laptops & Handhelds

... And District Data System Development Is Costly

- New tools, such as Infinite Campus and SchoolNet, are pricing aggressively as comprehensive platforms

Q: What was the approximate cost associated with the new system?

Vendor System Cost Estimates
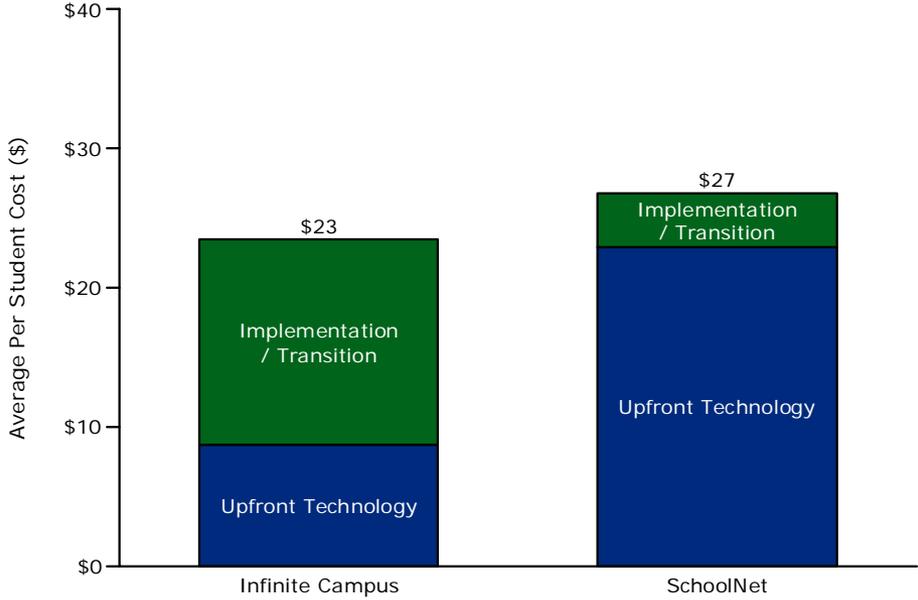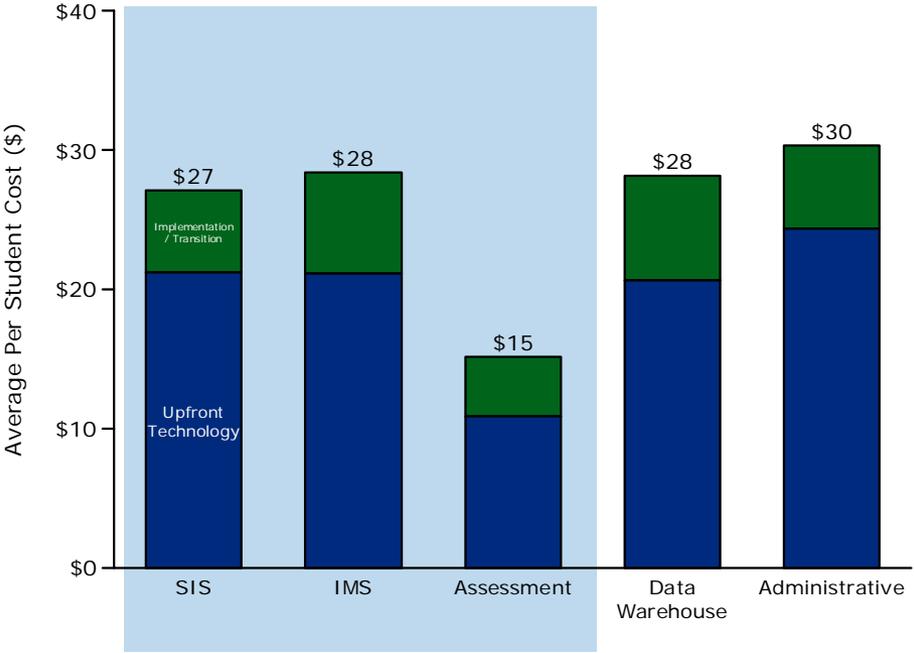
In order to implement an AIS from the ground up, a district with no usable infrastructure would need to invest ~$70 - $128 per student

Note: Infinite Campus does not have an 'upfront technology' cost as it charges districts an annual subscription fee for software
Source: Parthenon District Data System Survey (n=194); Vendor Interviews

GATES037_102207 30

Most Districts Will Leverage Existing Infrastructure, Reducing the Up-Front Investment Burden

Upfront and Implementation / Transition System Costs vs. Installed Base

System	Total Cost per Student	% Districts Likely to Invest	Est. Average Cost per Student
SIS	$27	24%	$7
IMS	$28	65%	$18
Assessment	$15	61%	$9
Integration Est.	$13	100%	$13
Administrative	$14	61%	$8
Data Warehouse	$45	49%	$22
TOTAL			$47-$77

Upfront and Implementation /Transition Costs: $47-$77 per Student

Q: What was the approximate ongoing cost associated with the new system?


Bar chart — Average Per Student Cost ($):
- SIS: $7
- IMS: $11
- Assessment: $3
- Data Warehouse: $5
- Administrative: $6
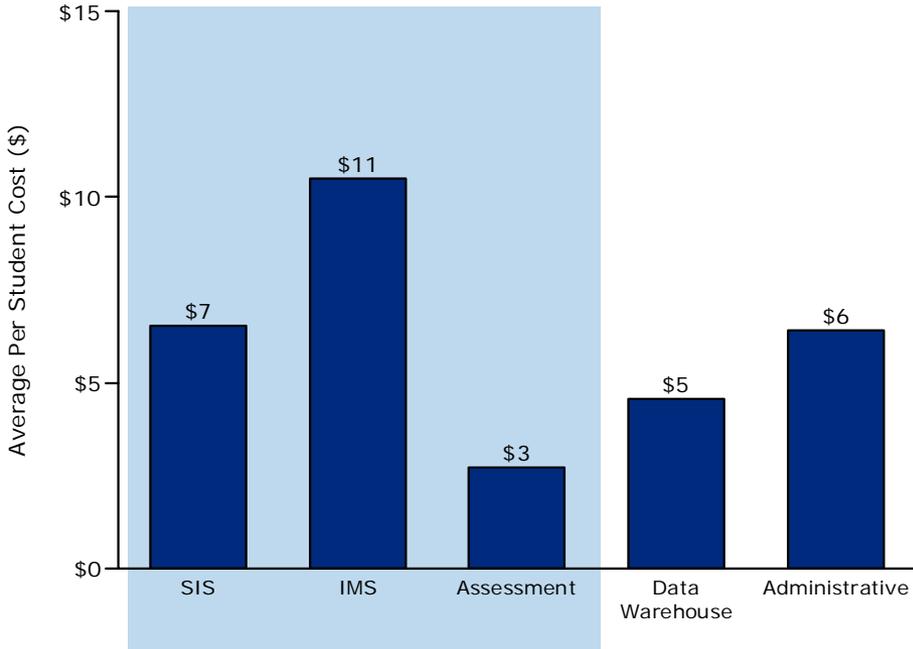
Ongoing Costs: $21-$32 per Student

[1] $47 per student estimate includes average district cost to implement SIS, IMS, and assessment systems with a fee included to integrate the systems
Note: Infinite Campus does not have an 'upfront technology' cost as it charges districts an annual subscription fee for software
Source: Parthenon District Data System Survey (n=194); Vendor Interviews

AIS Systems Investment Is 35-60% of the IT Budget

- AIS data system costs represent ~35%-60% of the estimated average district IT budget suggesting districts would need to reallocate a significant portion of their existing resources or receive additional funding to implement an AIS from a technology standpoint
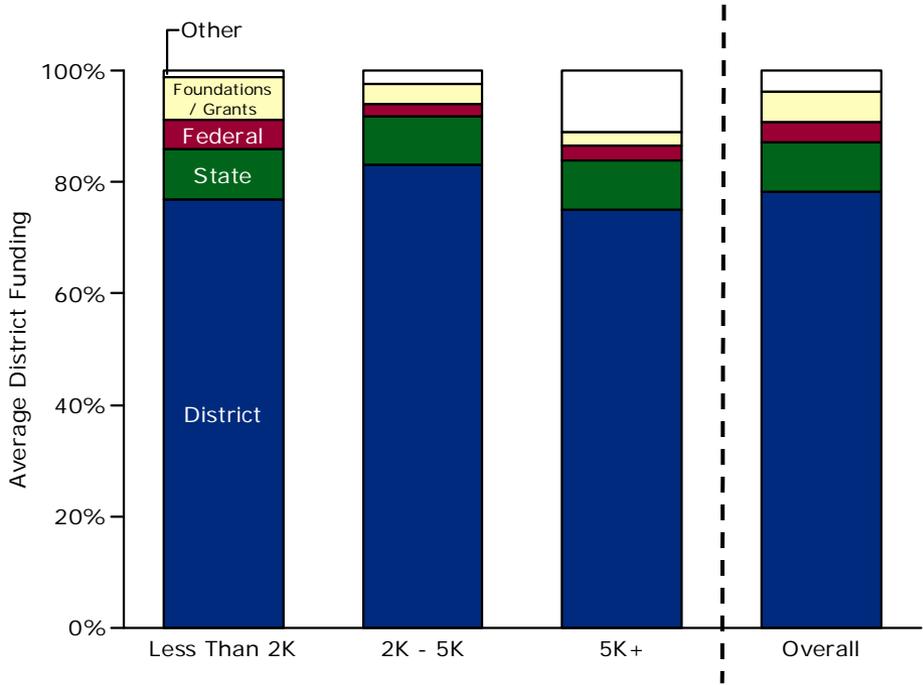
Comparison of District IT Budget Costs to AIS Data System Costs

Source: Parthenon District Data System Survey (n=194); Vendor Interviews; Past Parthenon AIS Work
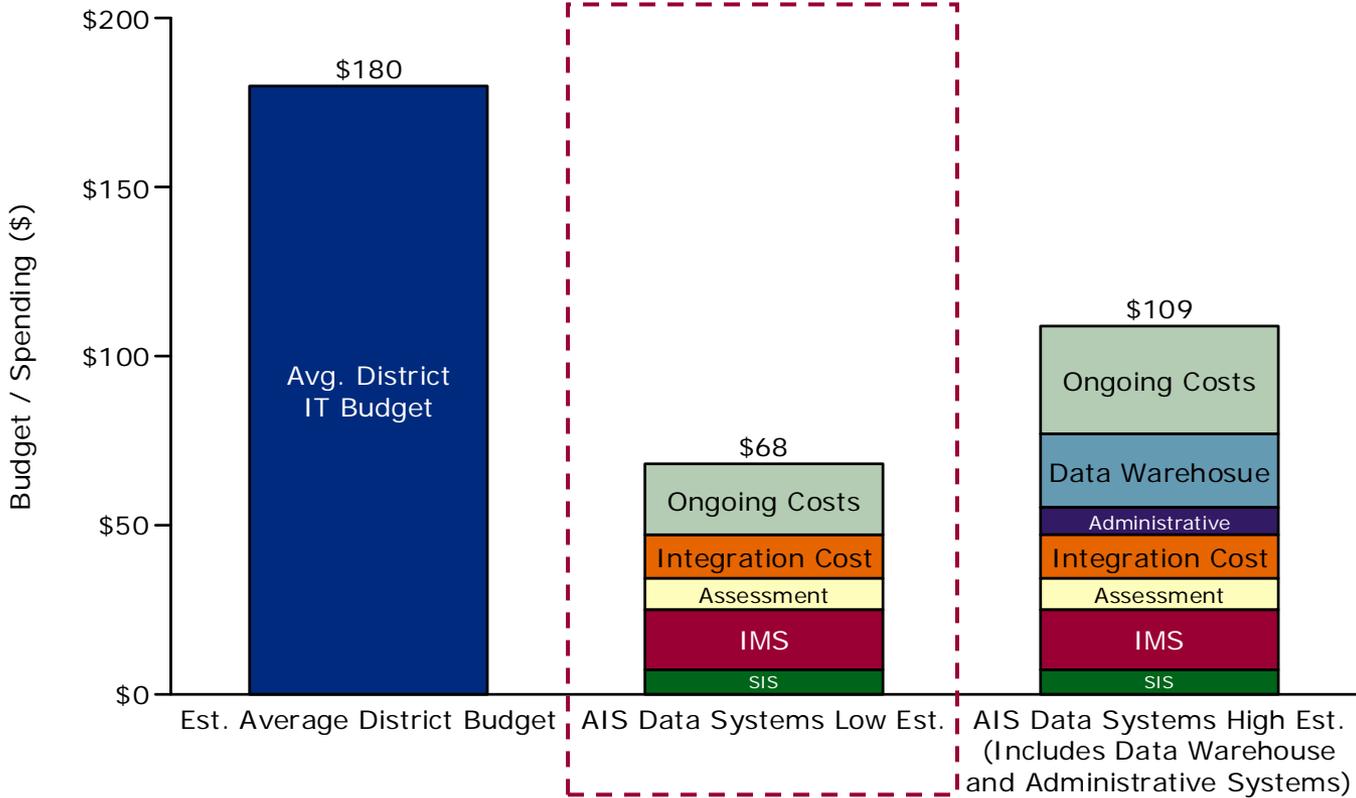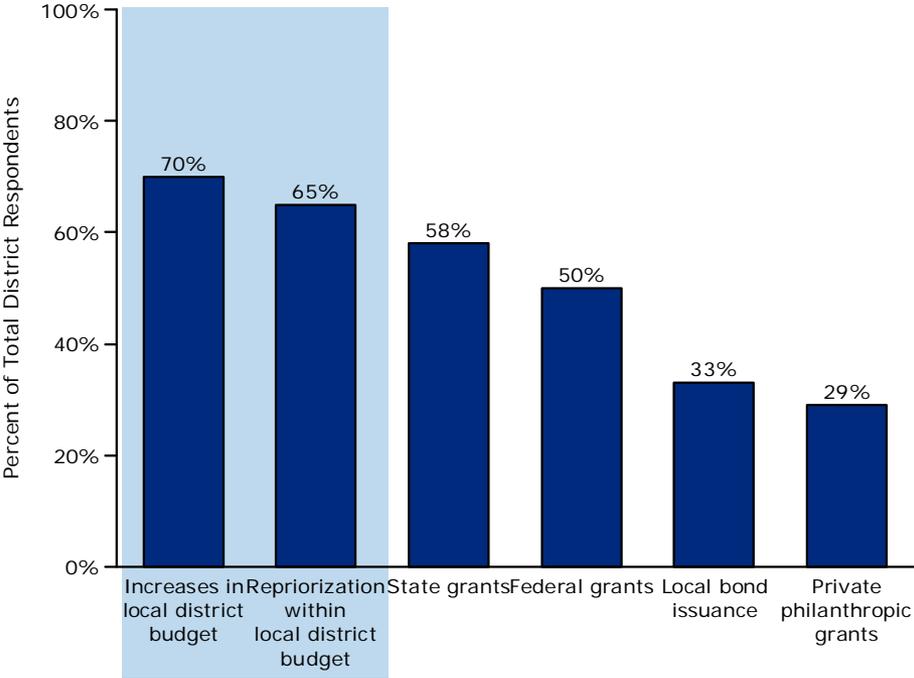
District Budgets Would Be Called Upon to Fund Technology

- Districts on average cover 80% of their new data systems and increases in local district budget or reprioritization of existing district budget are the most likely sources of funding for technology investments

- Process redesign components of the effort should uncover inefficiency and provide opportunities to offset the costs

Q: How does your district typically fund expenditures for new data systems?
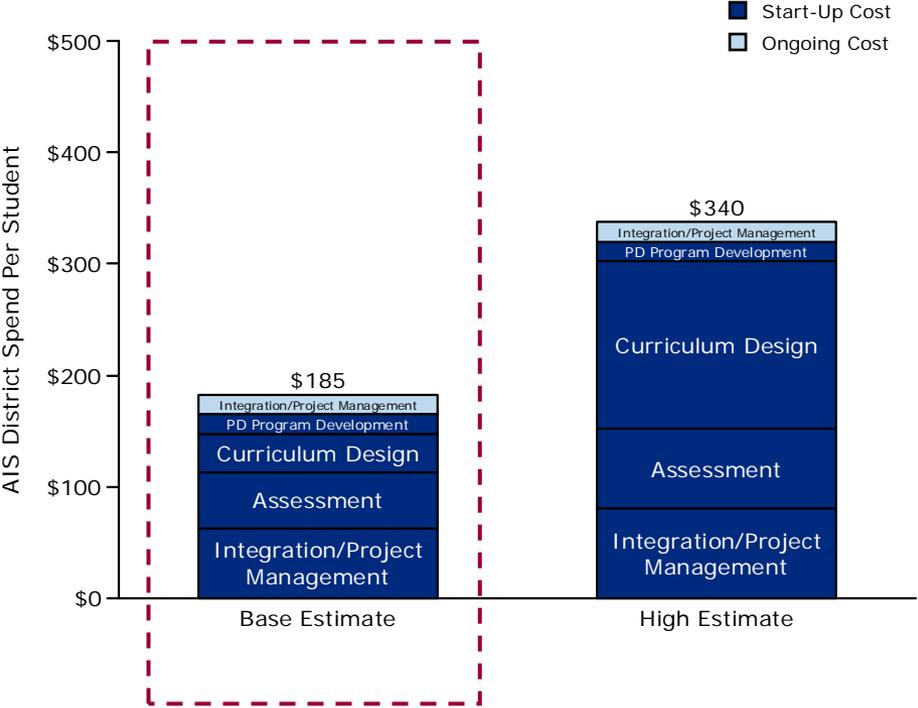
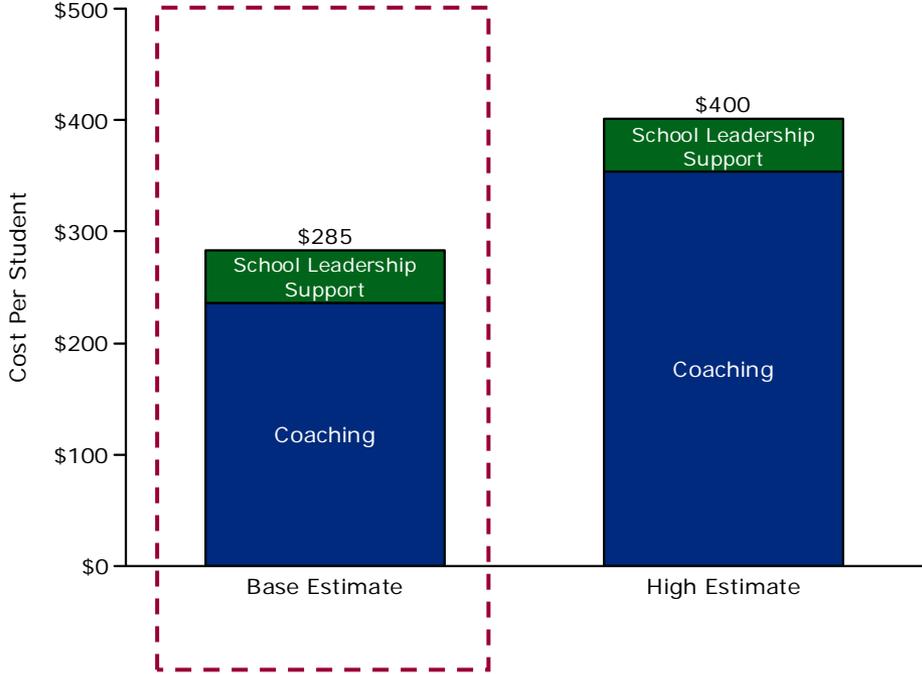**Sources of Funding to Support District Technology Investments, 2007**

Left chart — Average District Funding (stacked bar by district size: Less Than 2K, 2K - 5K, 5K+, Overall) with categories: District, State, Federal, Foundations / Grants, Other.

Right chart — Percent of Total District Respondents:
- Increases in local district budget: 70%
- Repriorization within local district budget: 65%
- State grants: 58%
- Federal grants: 50%
- Local bond issuance: 33%
- Private philanthropic grants: 29%

Alignment and Change Management Necessary for
Successful AIS Implementations Adds to the True Cost

- Chicago serves as the benchmark for alignment and ongoing change management costs

Fixed Costs to Design and Align Curriculum, Per Student

Legend:
- Start-Up Cost
- Ongoing Cost

Base Estimate: $185
- Integration/Project Management
- PD Program Development
- Curriculum Design
- Assessment
- Integration/Project Management

High Estimate: $340
- Integration/Project Management
- PD Program Development
- Curriculum Design
- Assessment
- Integration/Project Management

Annual Change Management Costs, Per Student

Base Estimate: $285
- School Leadership Support
- Coaching

High Estimate: $400
- School Leadership Support
- Coaching

Note: Assumes 40K students in the district

Source: SchoolNet; Chicago Public Schools; Parthenon analysis

Full AIS Implementation Requires ~$540 per Student

- The bulk of the costs comes from change management and curriculum alignment, which would likely be paid for outside of district IT budgets

Estimated Full AIS Implementation per Student Cost
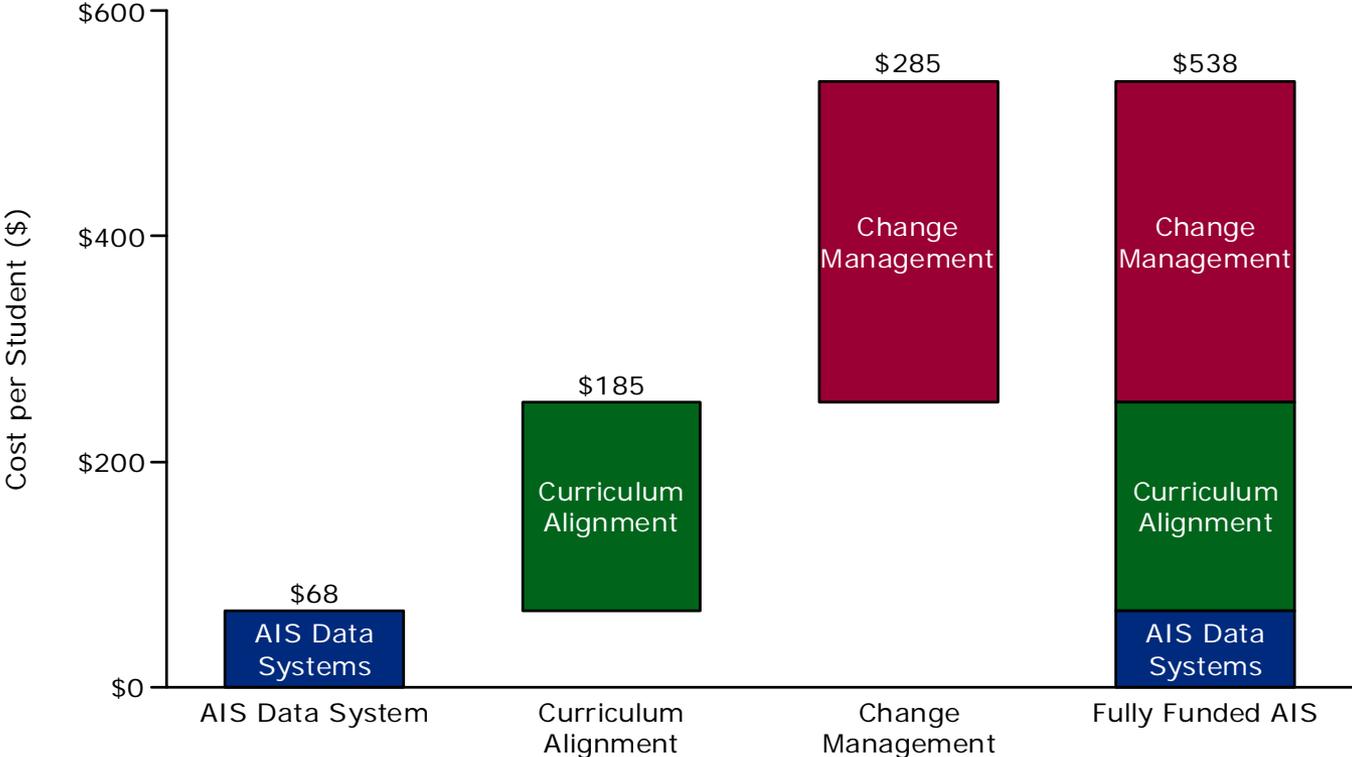
What sources of funding can we leverage (reallocation, federal, private or foundation)?

Classroom Reform Data Use

In order to make progress towards more effective data usage at the classroom level, districts must …

Recognize the need and ability to drive behavior change	Have technology supportive of analysis	Identify, implement and train on necessary systems	Pay for the system
• Districts struggle to answer essential questions today • Willingness and ability to execute lag intentions • The ability to enact important culture change is a concern of many school leaders • Change management is broadly understood and can be tailored to education	• Most districts lack the full suite of required tools and don't collect the necessary data in "electronic and accessible" form • Market for tools is large • Growth in certain categories is strong and the total profit pool is ~$200MM, though IMS is a concern • Trends are positive – interoperability, consolidation, improving functionality, cross functionality • Usability may lag, but vendors are responsive	• Superintendents are not confident in their abilities to define and implement data systems • The majority of districts implement systems using internal resources, but the highest satisfaction scores come from using dedicated education providers • Supply of those integrators is likely very limited (we have identified 4) • Training is a mixed story, but it appears that overall quality is low because districts don't value and pay for it	• District IT budgets are modest and these investments are outside of operating budgets • Data system projects are expensive, estimated at ~$70 / student • Most projects are funded by districts themselves • Alignment and change management add greatly to the total cost of successful AIS implementation • Costs that one might reasonably expect to require for a data project

Districts

|			

• There is a need to increase the urgency at the district level to adopt data systems
  • Linked to clear evidence that doing so will improve outcomes or provide ancillary benefits
	• Districts need to upgrade their systems to enable more sophisticated analysis	• Districts would benefit from more detailed models of systems and how to implement
		
		• Districts do not appropriately value training and therefore do not budget
			• Funding availability is a true obstacle
			  • Reallocation opportunities likely exist within districts, which must be examined during the change management assessment

Vendors

|			
• Change management models specific to education may be lacking or would benefit from wider visibility	• Potential IMS and usability tool deficiencies, but vendors are responsive to market requests – likely solution is to "shape the ask"	• Potential shortage of high quality integrators • Quality shortcomings in training can be overcome through more demand	• None

BACKUP

Survey Respondent Overview

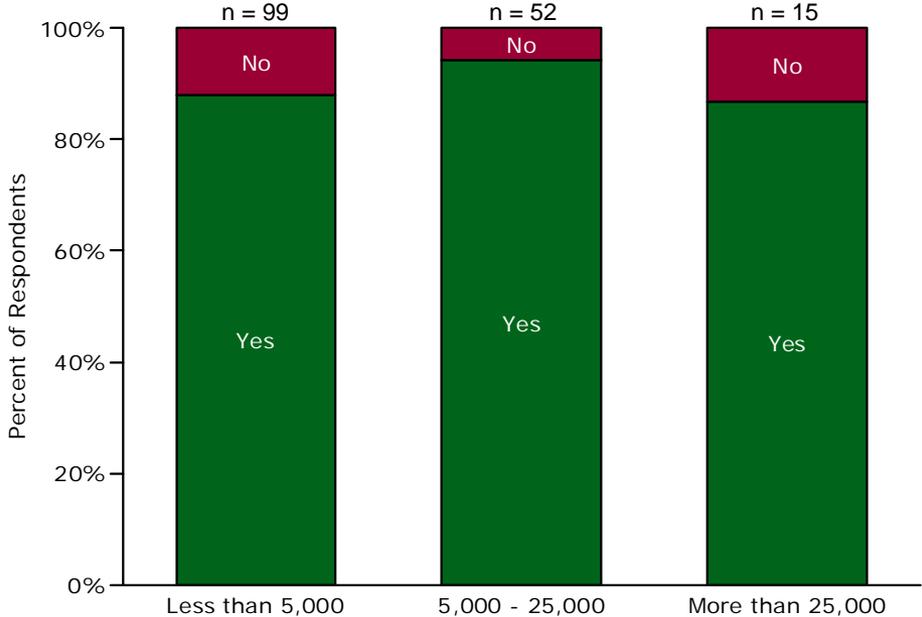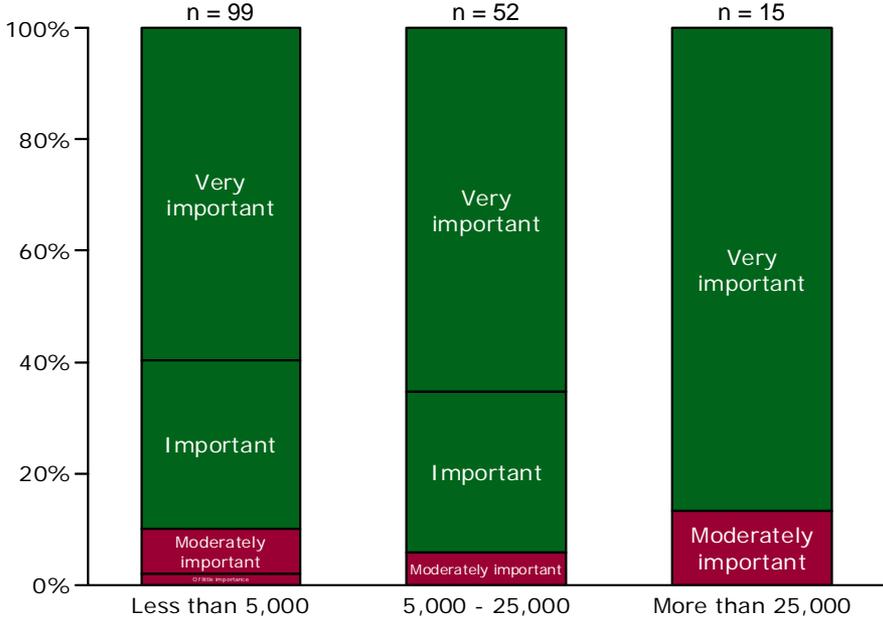## Survey Respondent Demographics
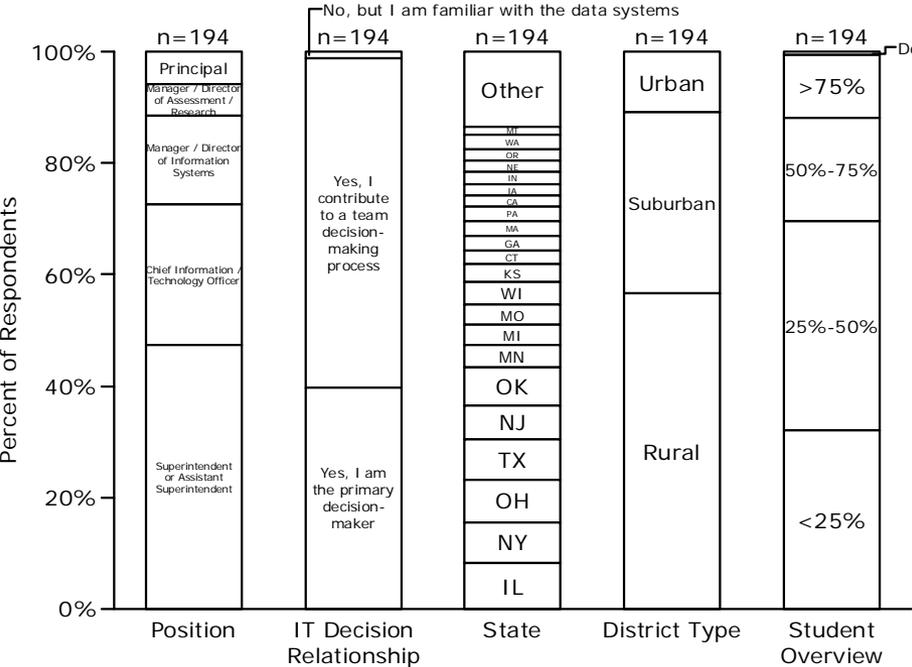
Districts by Enrollment
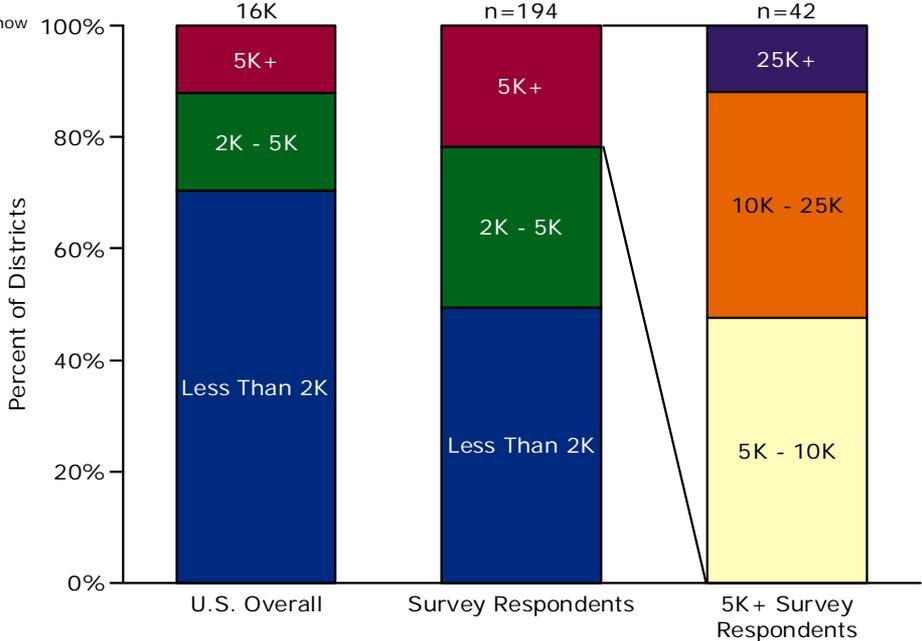
Note: District type reflects self-reported district locale
Source: Parthenon District Data System Survey (n=194)

Districts Report an Appreciation for Integrated Data

Q: Based on your experience, how important is it to integrate academic and administrative data from various district technology systems?

Q: Do you believe a K-12 enterprise management approach would enable your district to be more effective on behalf of its students?

Percent of Respondents

| n = 99 | n = 52 | n = 15 |

Left chart (Percent of Respondents, 0%–100%):
- Less than 5,000: Of little importance, Moderately important, Important, Very important
- 5,000 - 25,000: Moderately important, Important, Very important
- More than 25,000: Moderately important, Very important

Right chart (Percent of Respondents, 0%–100%):
- Less than 5,000: Yes, No
- 5,000 - 25,000: Yes, No
- More than 25,000: Yes, No

Cost and Human Capital Concerns Pose Significant Barriers to Data System Implementation

Q: On a scale of 1-7, where 1 indicates "not a significant barrier" and 7 indicates "extremely significant barrier," how significant are the following barriers when implementing a new system?

DISTRICT SIZE: OVERALL

Legend:
- **Overall**
- **Superintendents**
- **Non-Superintendents**
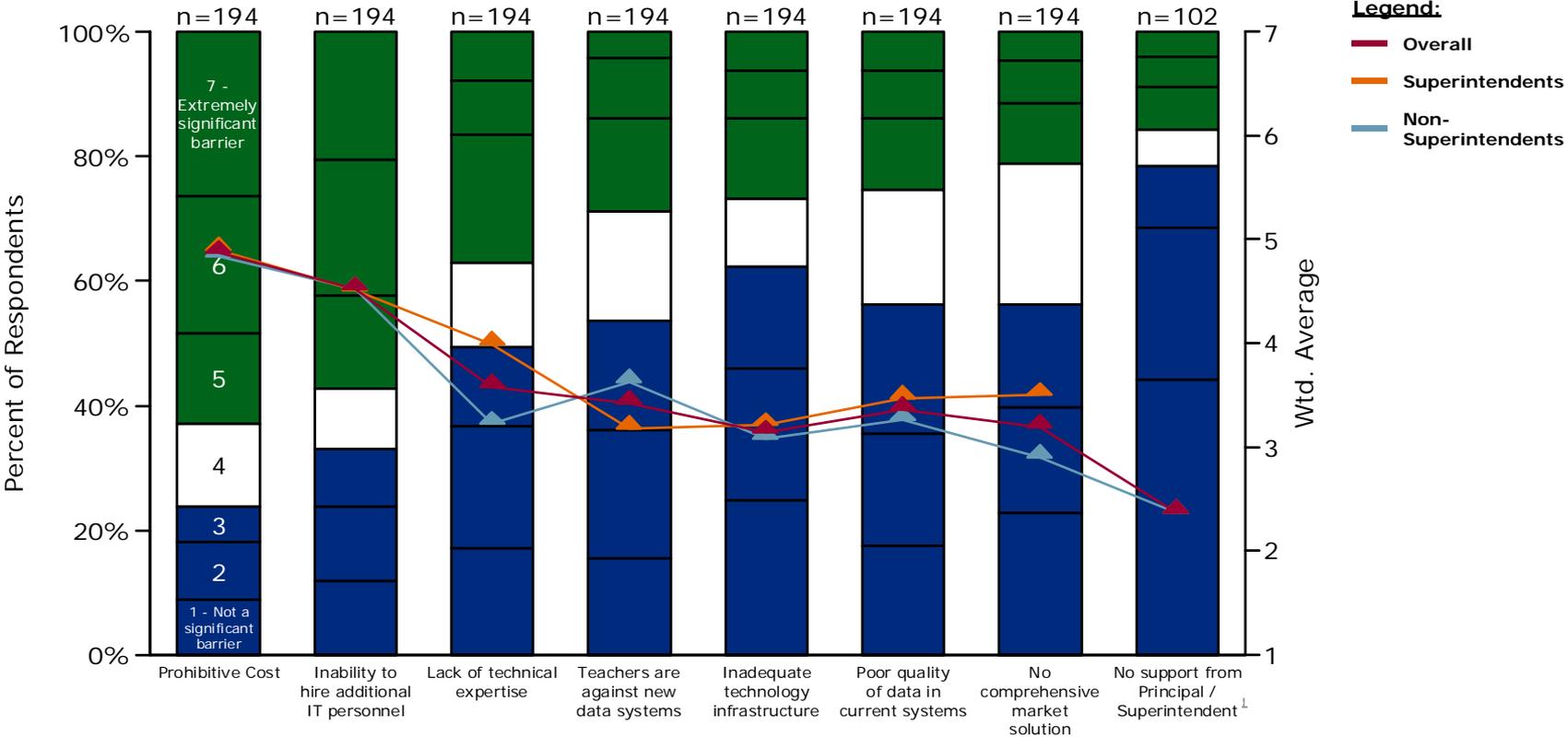
¹ Superintendents were not asked question

Source: Parthenon District Data System Survey (n=194)

Comparison of Data Elements Reported and Key Questions

Validity Assessment Based on Data Elements Reported for IT Respondents Who Claimed Could Answer Key Questions Easily (5-7)

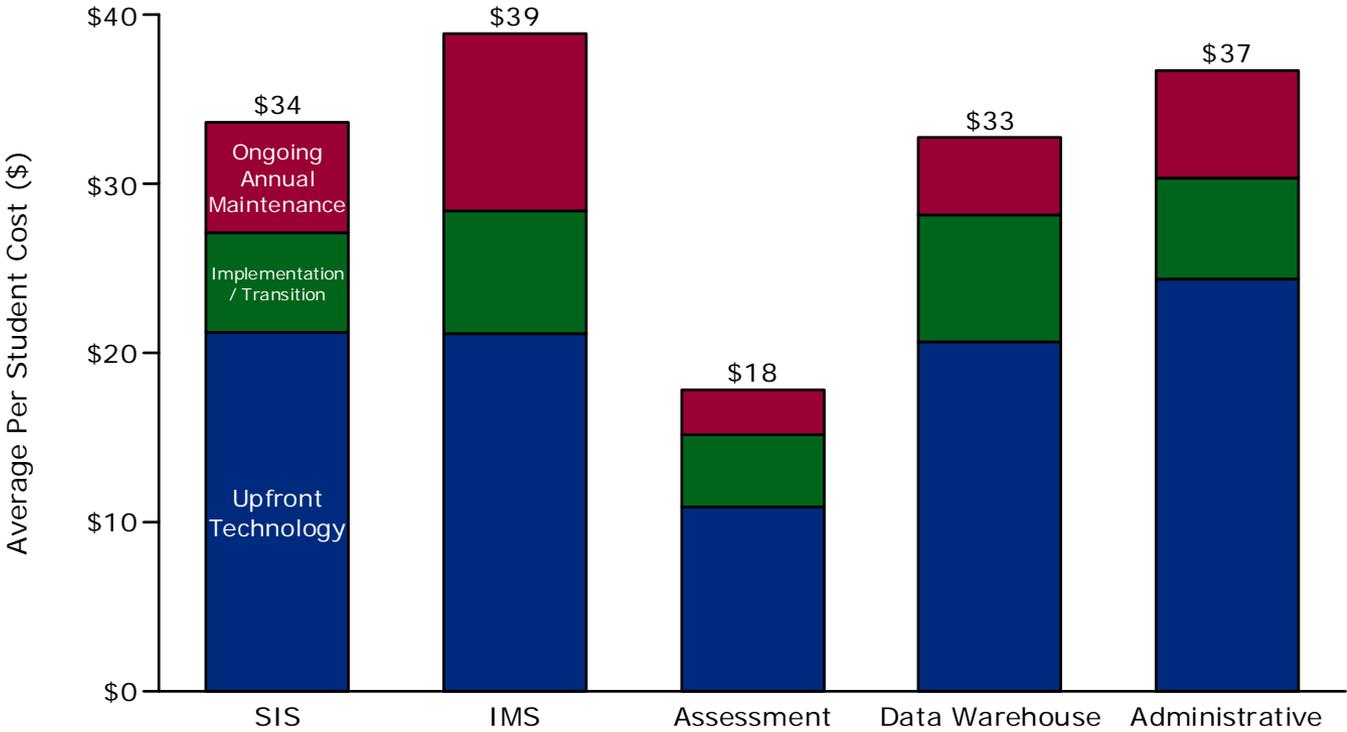Source: Parthenon District Data System Survey (n=194)
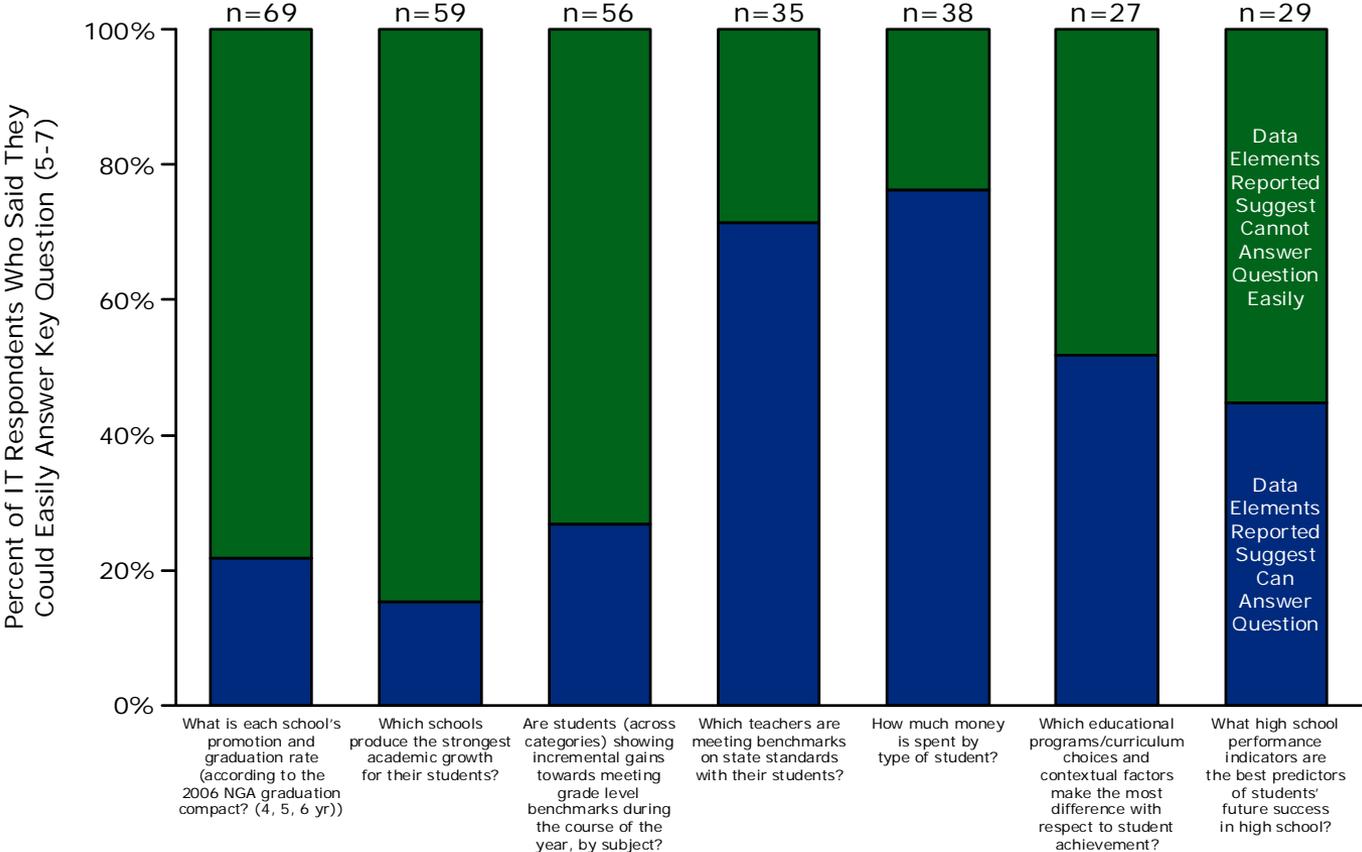
Reported Average System Costs per Student

Q: What was the approximate <u>UPFRONT TECHNOLOGY</u> (hardware/software licensing) cost associated with the new system?

Q: What was the approximate <u>IMPLEMENTATION/TRANSITION (data integration, process</u> redesign, and training) cost associated with the new system?

Q: What is the approximate ongoing annual <u>MAINTENANCE</u> (system and human resource) cost associated with the new system?

Only Systems Purchased From Vendor

Average Per Student Cost ($)

- SIS: $34
- IMS: $39
- Assessment: $18
- Data Warehouse: $33
- Administrative: $37

Categories (SIS bar labels): Ongoing Annual Maintenance, Implementation / Transition, Upfront Technology

Overview of Districts Who Developed Solutions In-House

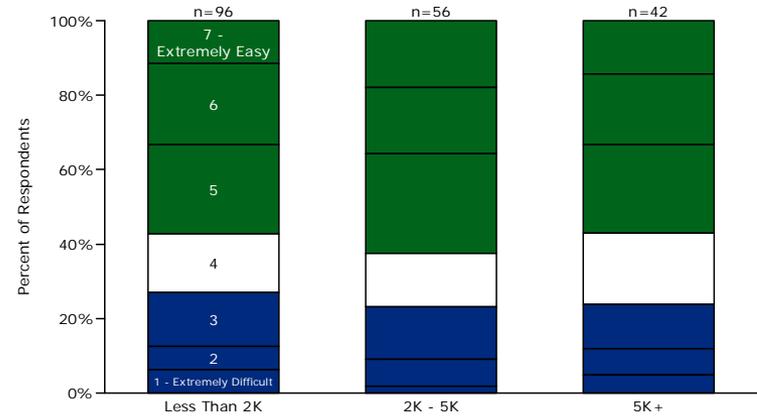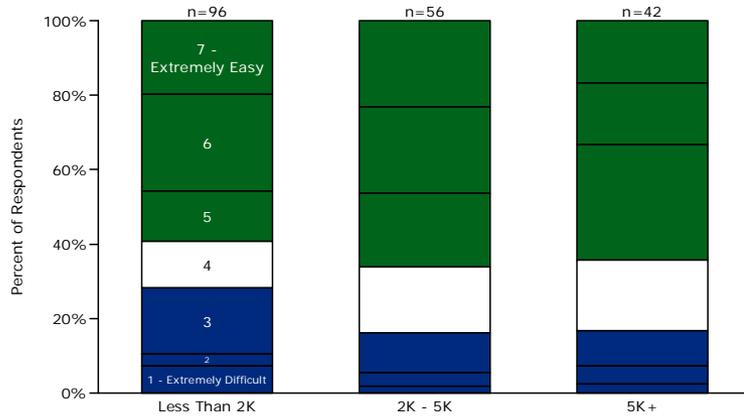**Respondents Who Developed System In-House by Size**
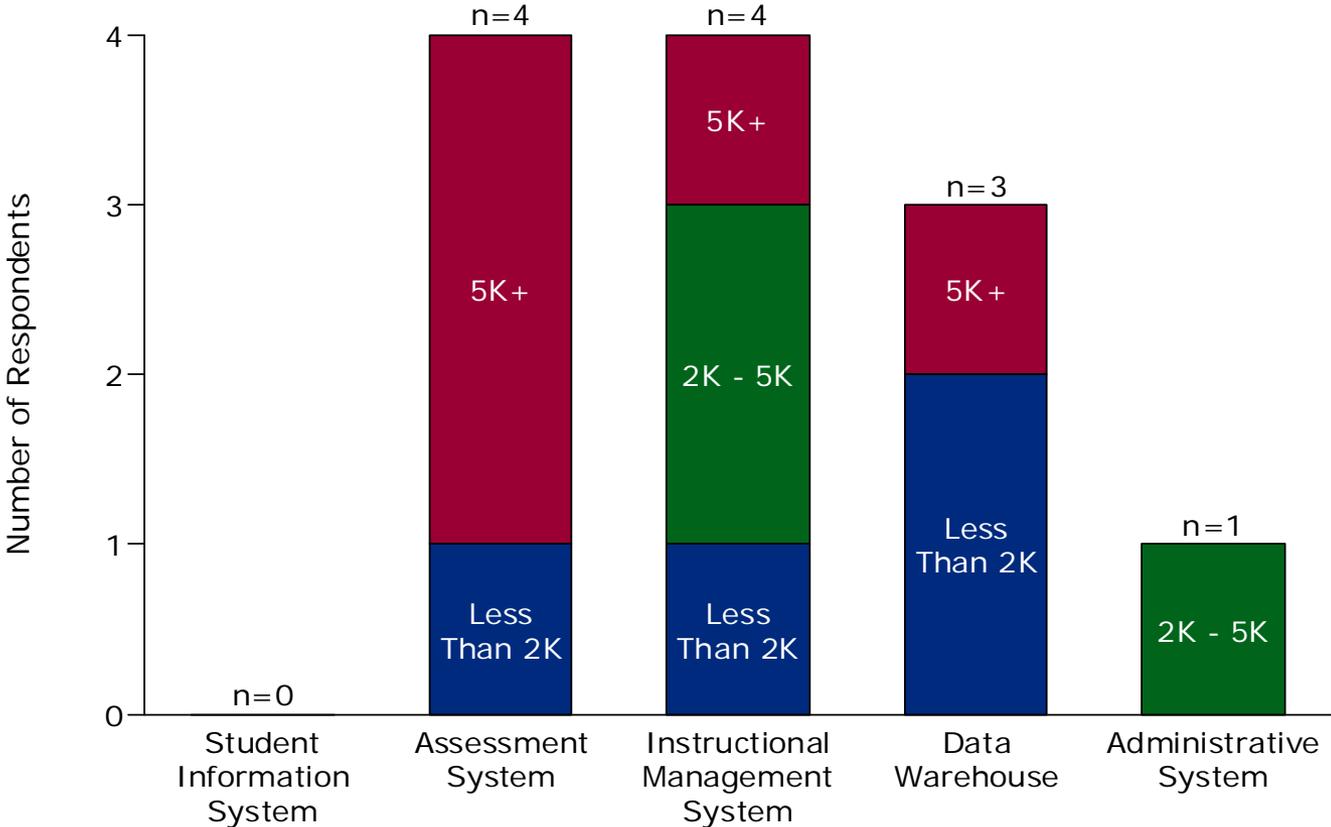
District Ability to Answer Key Questions With Current Systems

Q: On a scale of 1 to 7, where 1 indicates "Extremely difficult" and 7 indicates "Extremely easy," how easy is it for your district to answer the following questions using the data that is collected electronically today?

Q: What is each school's promotion and graduation rate (according to the 2006 NGA graduation compact? (4, 5, 6 yr))

Q: Which schools produce the strongest academic growth for their students?

Q: Are students (across categories) showing incremental gains towards meeting grade level benchmarks during the course of the year, by subject?

Q: Which teachers are meeting benchmarks on state standards with their students? Is there a link with PD?
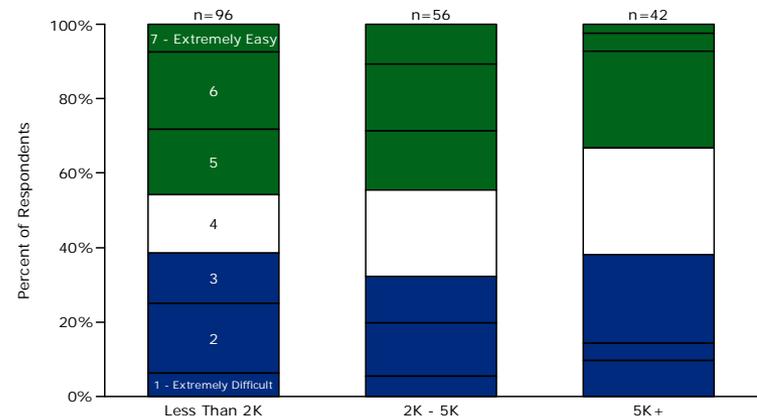
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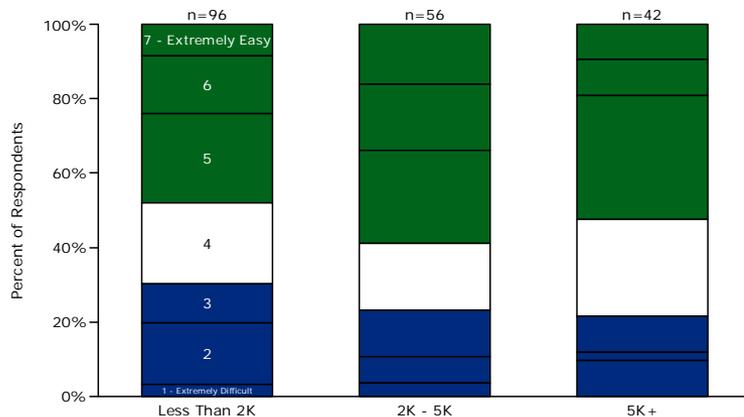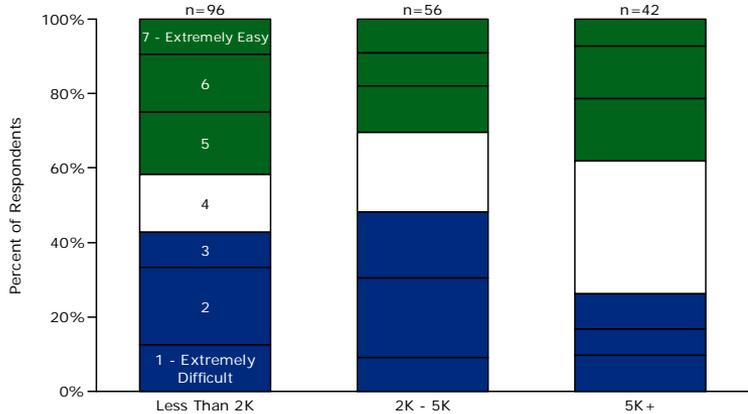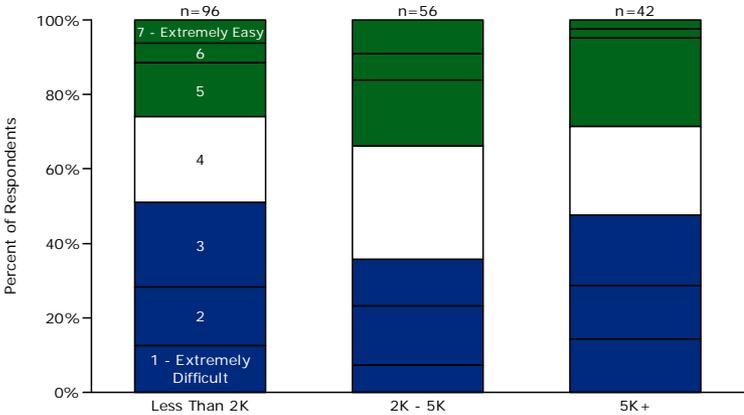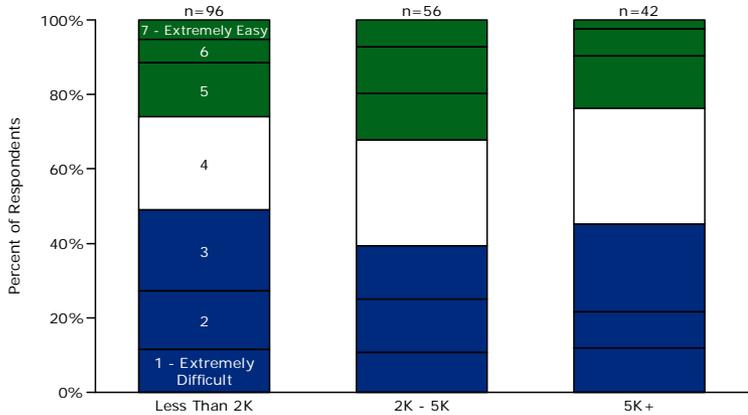
Q: How much money is spent by type of student?

Q: Which educational programs/curriculum choices and contextual factors make the most difference with respect to student achievement?

Q: What high school performance indicators are the best predictors of students' future success in high school?

Barriers Limiting Data Usage by District Size

> **Q:** On a scale of 1 to 7, where 1 indicates "extremely uncomfortable" and 7 indicates "extremely comfortable," how comfortable is your district with the following components of the district data system process?

Selecting and Managing Vendors
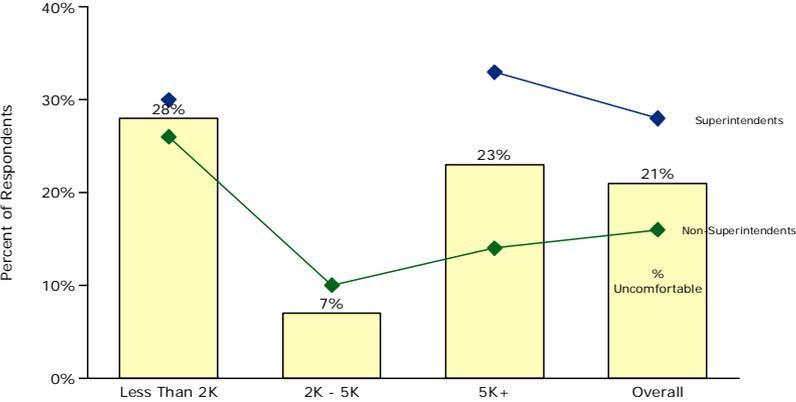
Identifying Implementation Best Practices

Defining the Technological Components of the Ideal District Data System
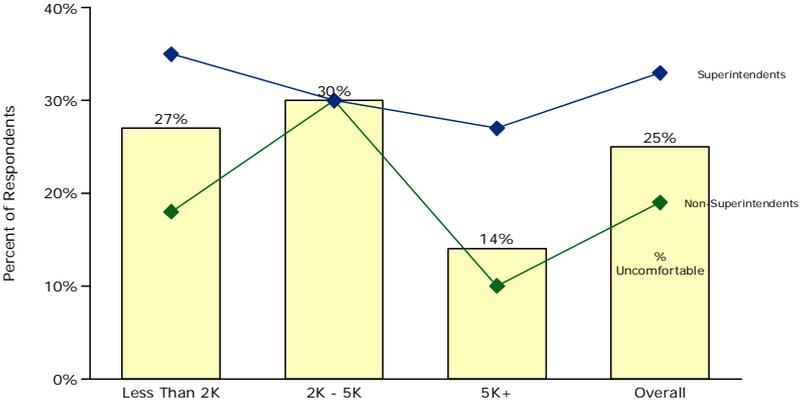
Barriers Limiting Data Usage by District Size

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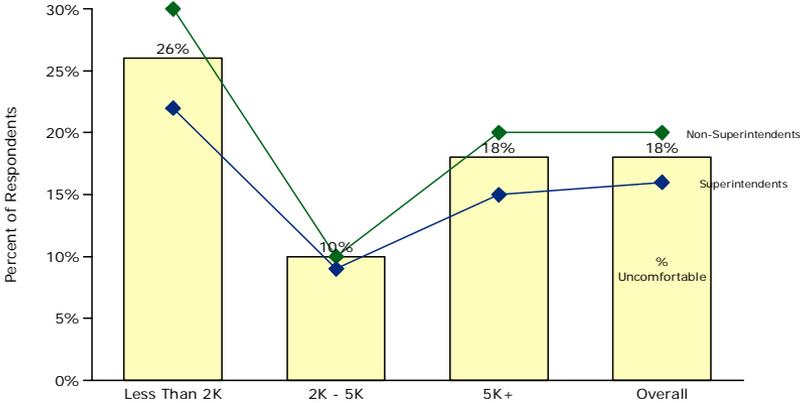**Changing Culture and Encouraging the Use of Data**
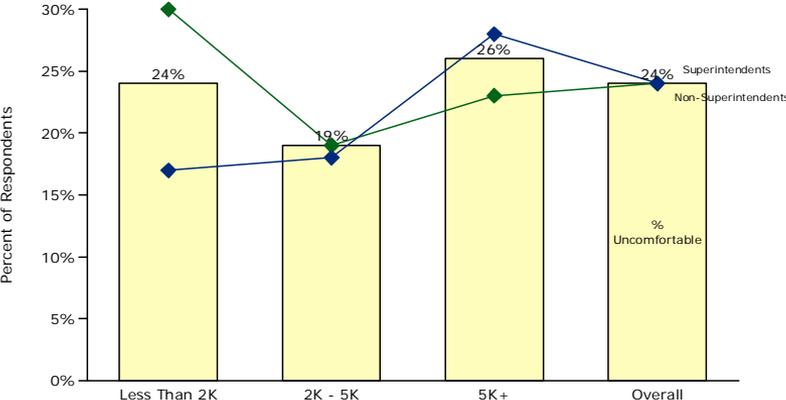
Managing the RFP Process
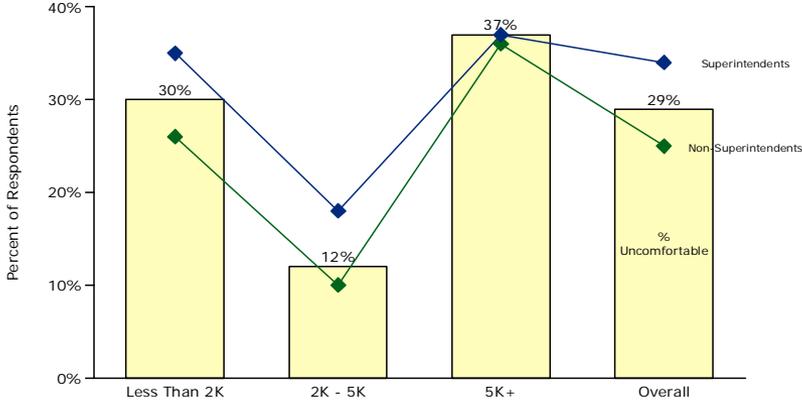
Small Districts Rely on State and Federal Funding While Large Districts Utilize Local Funds

- Funding for technology systems comes from multiple sources

- Districts rely on an increase or reprioritization of their local budget in many instances

Q: **Please indicate the importance of each of the following as sources of funding to support new district technology investments.** *(Important and very important responses only)*
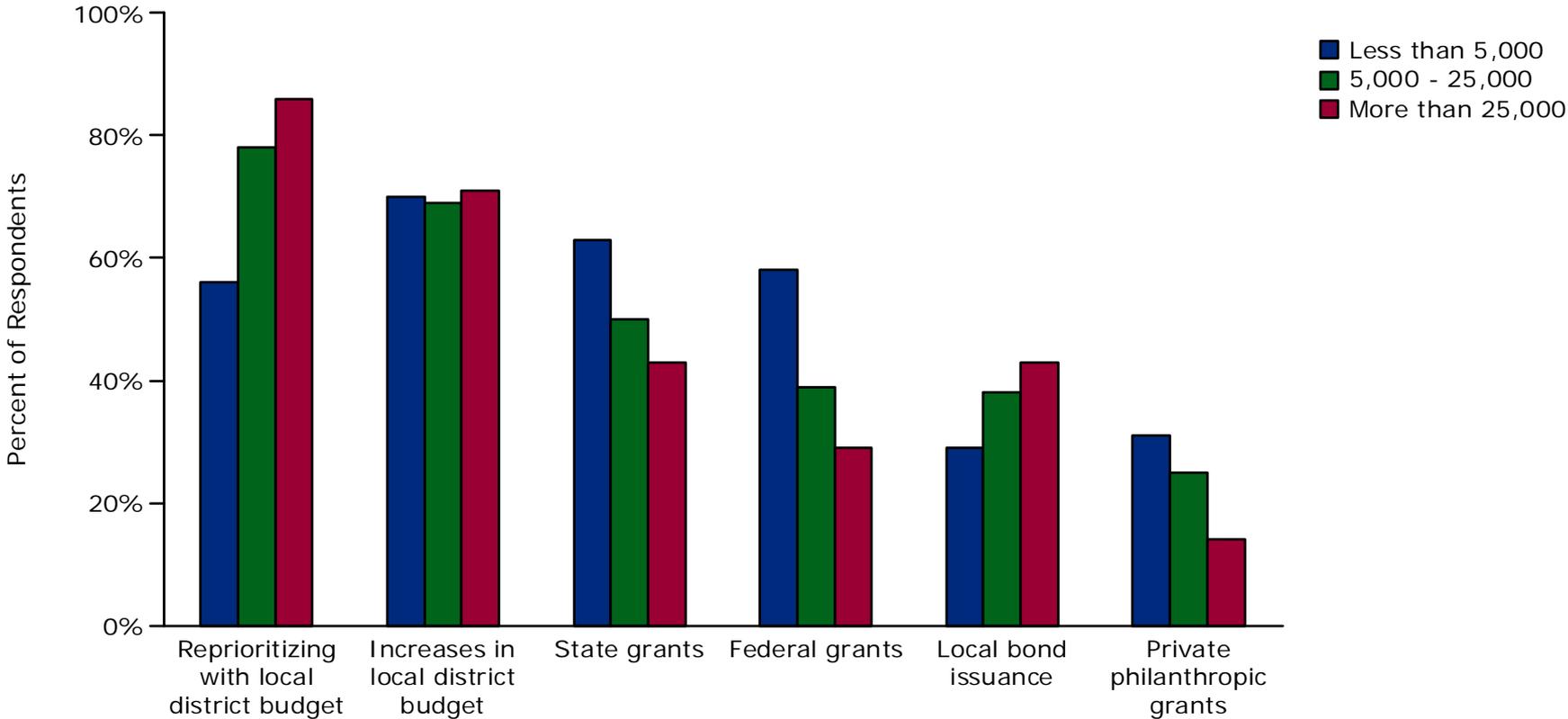
Importance of Stakeholders in Technology Purchases

Q: **Please indicate how important the perspectives of each of the following individuals or groups are when making decisions to invest in district technology systems.** (*Important and very important responses only*)

Legend:
- Less than 5,000
- 5,000 - 25,000
- More than 25,000

Y-axis: Percent of Respondents (0% to 100%)

Data values by category:

Superintendent: 94%, 94%, 100%
District IT Dept: 90%, 98%, 100%
District business/legal staff: 68%, 68%, 100%
District curriculum/instruction staff: 84%, 74%, 73%
School board members: 77%, 62%, 87%
School staff (principals, teachers): 66%, 48%, 53%
Parents/community: 27%, 34%, 33%
Colleagues from neighboring/similar districts: 18%, 8%, 20%
State education department representatives: 23%, 10%, 7%

Varied Challenges Exist, Including the Perception of Low Value

Q: **To what extent do you agree that the following are obstacles to your district's ability to invest in a K-12 enterprise management approach to academic and administrative data?** *(Agree and strongly agree responses only)*

Legend:
- Less than 5,000
- 5,000 - 25,000
- More than 25,000

Percent of Respondents

Category	Less than 5,000	5,000 - 25,000	More than 25,000
Lack of financial resources	93%	83%	100%
Existing/legacy infrastructure	62%	38%	83%
Time constraints	53%	61%	67%
Political challenges	30%	41%	83%
Lack of a compelling argument regarding benefits	34%	48%	33%
Insufficient technology capacity	27%	24%	33%
Poorly aligned incentive structures	23%	17%	33%
Ineffective communication	18%	21%	33%
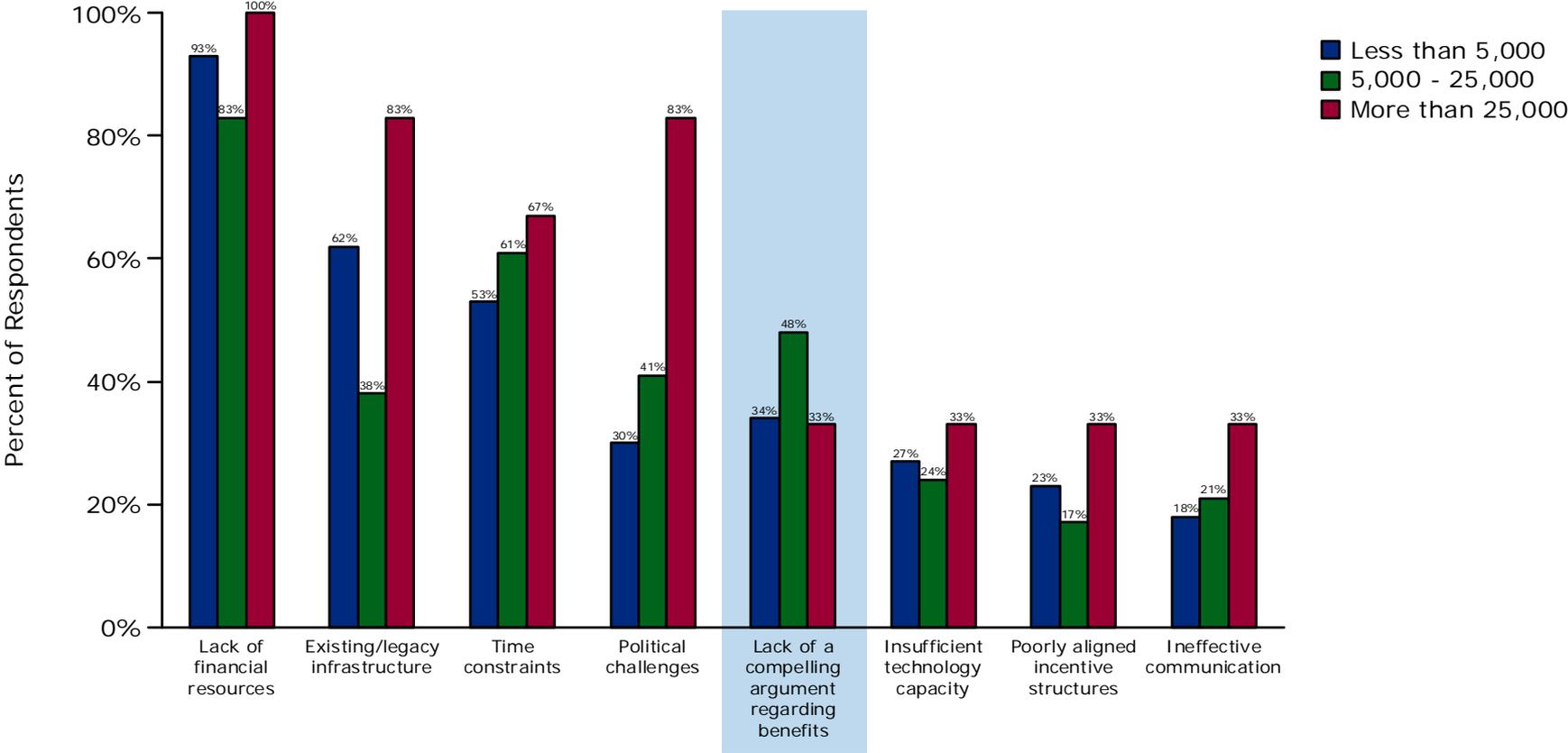
Data Collected in Typical Systems	Critical Data															
	Longitudinal Capabilities	Student Dem.	Graduation Outcome	Transcripts	Teacher Information	School Model Descriptors	Finance Data	Attendance	State Asses. Performance	Curriculum	Formative Assessment	PD	Special Services	Col. Success Factors	Workplace Success	Perceptions Data
Student Information System (SIS)	✓	✓	✓	✓				✓	✓	IC	IC		IC			
Information Management System (IMS) / Learning Management System (LMS)	SN		✓	✓				SN	SN	✓	SN	✓	✓			
Formative Assessment									✓		✓					

IC=Infinite Campus

SN= SchoolNet

Note: Longitudinal capabilities are generally provided through data warehousing functionality; Curriculum includes lesson plans and mapped curriculum supports

Districts Report on Ideal Data Systems

Q: In thinking about the data systems you currently have in place, which of the following would you need to purchase or replace in order to achieve the ideal level of data system functionality in your district?
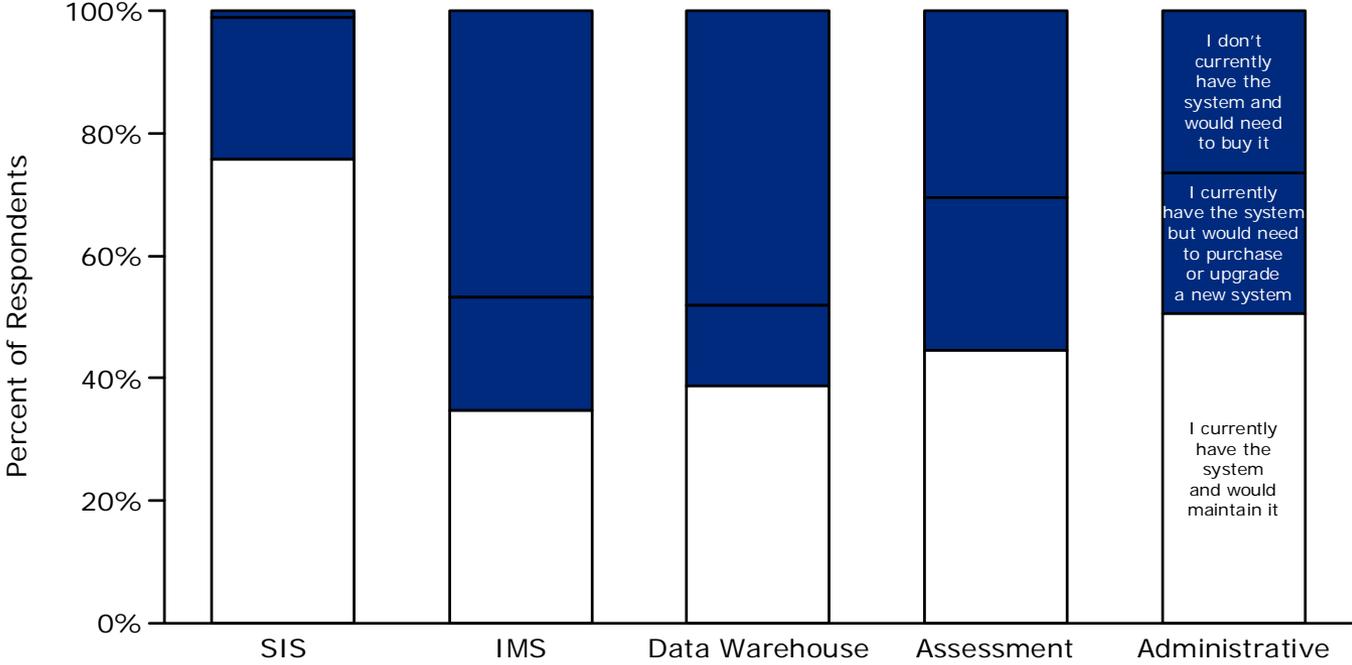
% Districts Need to Invest in System				
24%	65%	61%	55%	49%

District Budgets for Buying and Maintaining Data Systems

Q: **What percent of the total district budget is allocated to buying and maintaining education data systems in your district?**

Average District Funding

Categories (legend): 20%+, 15% - 20%, 10% - 15%, 5% - 10%, 2% - 5%, Less Than 2%

X-axis: Less Than 2K, 2K - 5K, 5K+, Overall
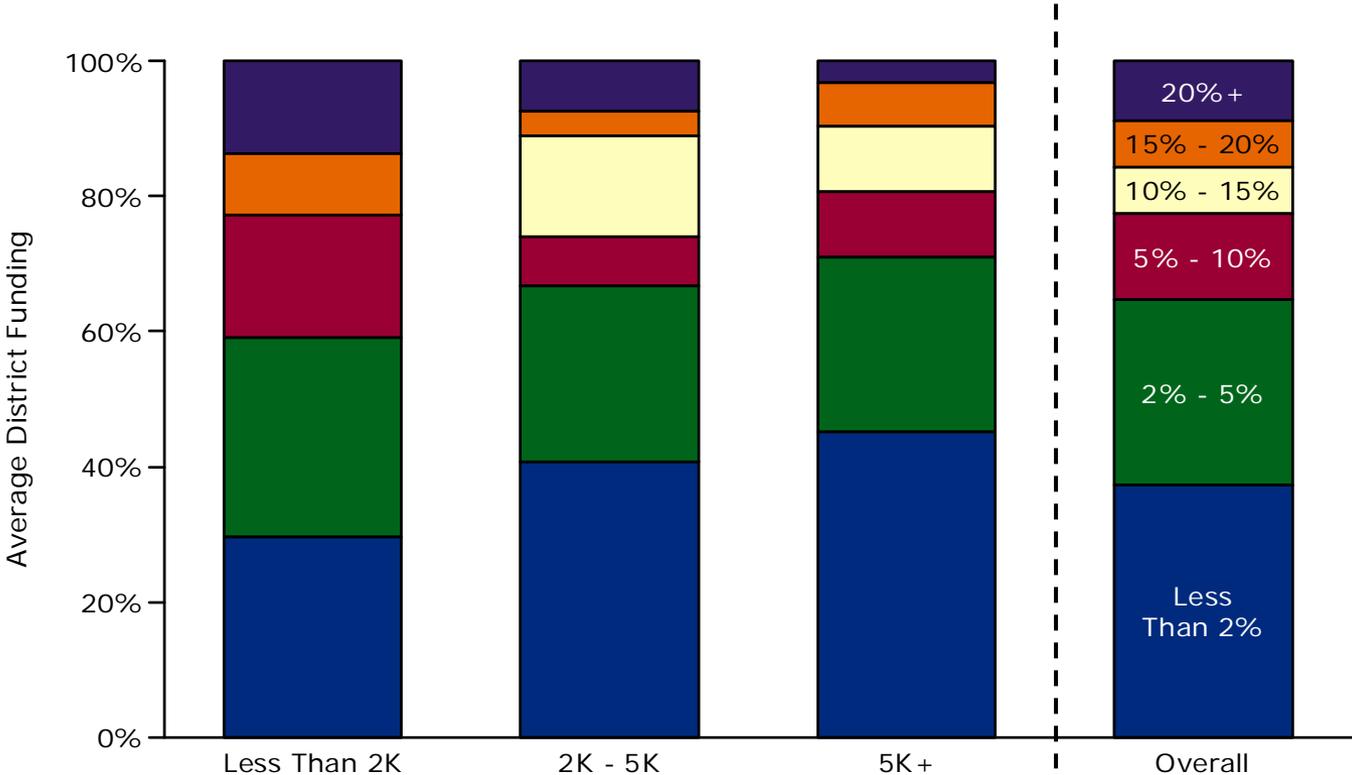
District Software Investments

District Investment in Enterprise Systems[1]

Chart: Average District Funding (y-axis, 0% to 100%) vs. Breakdown of District Investments (x-axis)

Stacked bar (bottom to top):
- Student Data Management Systems
- Business Management Systems
- Instructional Management Systems
- Integrated Communications Portal
- Integrated Data Warehousing
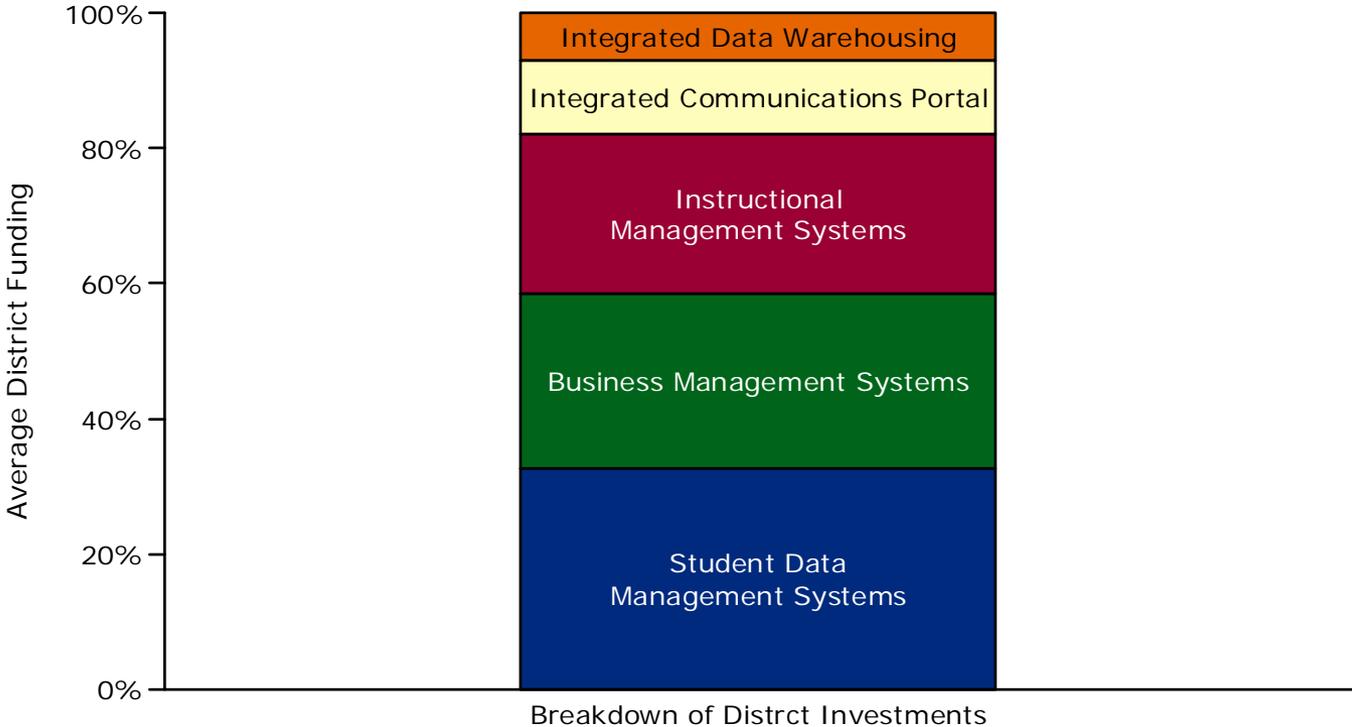
[1] % of annual non-payroll budget for software and technology services
Source: Eduventures

Distinctions Between Data Systems Are Blurring

Data System Elements / Functionality	SIS		IMS		Assessment	
	Pearson Powerschool	Infinite Campus	Houghton (Riverdeep)	SchoolNet	NWEA MAP	Riverside (Edusoft)
Student Data Management						
Attendance	X	X		X		
Census	X	X				
Enrollment	X	X		X		X
Fee Management	X	X				
Graduation Planning	X	X		X		
Scheduling / Registration						
Course Catalog	X	X	X			
Online Registration	X	X				
Scheduling	X	X				
School Choice		X				
Assessment / Reporting						
Ad Hoc Reporting	X	X		X	X	X
Embedded Data Analysis		X		X		X
State Reporting	X	X		X	X	X
Formative Assessment		X		X	X	X
Student / Classroom Management						
Grade Book		X		X		
Individual Learning Plans		X		X	X	
Lesson Planning		X	X	X		
Mapped Curriculum Support		X	X	X	X	
Special Education		X	X	X	X	
Standard Management		X	X	X		
Professional Development for Teachers			X	X	X	
Data Mgmt Tools						
Data Warehousing	X	X		X		
Mobile Interface		X		X		

Stand-out Data System Vendor Profiles: IC, SchoolNet, Mizuni

Vendor	Core Systems Function	Size	Differentiating Factors	Functionality
Infinite Campus	SIS	67 Employees Founded in 1996	• Offer one system that performs the functions of a SIS, IMS, assessment system and back-office enterprise system • Does not require integration services • 100-10K student district sweet spot, has a state edition	The district-level solution includes: • Administrative functions: attendance, behavior, census, enrollment, health, Medicaid, school choice • Curriculum functions: course catalog, graduation planning, online registration, scheduling, standards management, mapped **curriculum support** • Instruction functions: **assessment**, grade book, individual learning plans, **lesson planning**, special education • School service functions: fee management, food service, locker management • Communications functions: email and voice messenger, form letter wizards, mobile interface, **parent/student portal**, parent/student/staff surveys, user notices • Reporting & analysis functions: ad hoc reporting, **integrated state reporting**, SQL reporting services, standard reports, **data analysis** and visualization, **data warehousing**
SchoolNet	IMS	125 Employees 2006 Revenue $23.1MM 2003 Revenue $2.5MM Founded 1998, not yet profitable	• IMS system that incorporates assessment, limited data warehousing, and advance reporting capabilities, all in one • Provides guidance and coaching for district data system development	• Partners with Microsoft for delivery of the SchoolNet platform, and is part of Intel's Managed Learning System framework • Instructional management functions: formative **assessment** tools, performance recording, form and **customizable reporting**, longitudinal student profile creation, standards-aligned content **guidance for curriculum**, online curriculum matching and lesson planning, and classroom performance profiles • Human Capital management functions: provides professional development tracking for teachers and administrators, as well as career planning • "Outreach" is a platform for sharing of best practices and communication resources among teachers • School IT services: data systems "coaching" and **roadmap development**, performance management seminars
Mizuni	Integrator	8 Employees Founded in 2003, profitable since Day 1	• Expertise in education integration • Scalable to districts of up to 190Ks students, with goal of serving larger districts in the future	• Mizuni provides **consulting** services in improving the data collection and use process, **custom report development** • Provides a **Zone Integration Server** to route data in SIF integrations • **Data Warehouse** collects data via SIF from data systems and stores it for use in informing classroom solutions; 17 of Mizuni's 20 customers use its data warehousing function • Customizable **web portal** to provide students, teachers, IT professionals and parents access to performance data • Mizuni also develops **SIF agents** for systems not already prepared for SIF integration

Data Systems District Demonstration Blueprint – Diagnostic Tool

- The diagnostic tool serves two purposes for Program Officers

  - First, as an information source to further a PO's understanding of the key issues related to data

  - Second, as framework for understanding a potential district partner's level of sophistication with regards to data

Category	Sub-Category	Minimum	Moderate	Advanced
Technology	SIS Functionality	Rudimentary SIS with no linkages to other district data systems	Functional SIS with few – if any –linkages to other district applications	Functional SIS that is linked to other applications, especially IMS or Formative Assessments
	Data Warehouse with Reporting Functionality	District has no data warehouse and no meaningful reporting capabilities	District has a data warehouse but does not have the ability to generate meaningful reports	District has a data warehouse and the ability to generate automatic and custom reports
	Formative Assessment Tools	Ad hoc, paper-based assessments in the classroom	Regular, consistent assessments, occasionally using technology	Frequent, technology-based assessments with clear linkages to academic interventions
	IMS Functionality	No current IMS or LMS but district plans to invest in the near term (1-2 years)	Some electronic content sharing through a coordinated system or portal	Electronic content coordination across subjects and grades and accessible by teachers, administrators and parents. Linked to the SIS and Formative tool
	Human Resource Functionality	Human resource data is collected and no linkages to other systems exist	Human resource data is collected and linked to key systems, but no analysis is completed	Human resource data is collected and linked to key systems, and value-add analysis is completed
	Finance Functionality	District finance data is collected – but cost allocation is impossible – and no linkages to other systems exist	District finance data is collected and cost allocation is possible, but no linkages to other systems exist	District finance data is collected, cost allocation is possible, and linkages to other systems exist
	SPED Functionality	District has inadequate special education systems with no linkages to other systems	District has adequate special education systems but no linkages to other systems	District has adequate special education systems and linkages to other systems exist
Leadership	Superintendent and Cabinet	Superintendent who does not view the use of data as a priority	Superintendent who views the use of data as a priority and has made strides to improve culture of data in the district	Established, stable Superintendent who requires the use of data as part of his/her decision making process and has established culture of data in the district
	School Board	School Board that does not view the use of data as a priority	School Board that views the use of data as a priority and is focused on improving culture of data in the district	School Board that requires the use of data as part of its decision making process and has instilled culture of data in the district
	Principals and Other School Level Leadership	Principals that do not view the use of data as a priority	Principals that view the use of data as a priority and have made strides to improve culture of data in their schools	Principals that have established a culture of data in their schools and require teachers to use data as part of the decision making process
	Teachers Union	Union opposes the use of technology to inform analysis of teacher performance at the classroom level	No opposition to the use of technology to inform analysis of teacher performance and at least some vocal support	Full support for the use of technology to inform analysis of teacher performance at the classroom level and the use of data embedded in their professional competence models

Data Systems District Demonstration Blueprint – Diagnostic Tool

Category	Sub-Category	Minimum	Moderate	Advanced
Training and Usage	Teacher PD	Little ongoing teacher training or collaboration time allotted	Non-coordinated or siloed teacher training within subject and grade	Coordinated and integrated new and experienced teacher training on both instructional techniques and content, with structured time allotted for teacher best-practice sharing and coaching
	Teacher Use	No familiarity with data-driven individualized instruction	Moderate data use exists in the classroom	Data used on a regular basis in the classroom, especially formative assessments with feedback loops
	Administrator PD	Little new administrator training or ongoing leadership training	Training for new administrators only	Robust leadership and analytical training for both new and experienced administrators
Resources	Financial	Inadequate funding is available for technology-related system investments or transition support	Adequate funding is available for technology-related system investments but no resources exist for transition support	Adequate funding is available for technology-related system investments and resources exist for transition support
	Information Technology	Inadequate information technology staff at the district office and within schools	Adequate information technology staff at the district office but limited resources within schools	Adequate information technology staff at the district office and sufficient IT resources within schools
	Analytical	Inadequate analytical staff at the district office and insufficient understanding of data constituent needs	Adequate analytical staff at the district office but insufficient understanding of data constituent needs	Adequate analytical staff at the district office and sufficient understanding of data constituent needs
Planning	District IT and Data Usage Plan	Inadequate strategic IT and data usage plan in the district	Detailed strategic IT plan exists but data usage plan is inadequate	Detailed strategic IT and data usage plan developed and appropriately resourced
	Change Management Plan	Inadequate change management and communication plan developed, and no resources allocated	Adequate change management and communication plan developed, but no resources allocated	Detailed change management and communication plan developed, and sufficient resources allocated
	Alignment of Curriculum and Instruction	Inadequate alignment of curriculum and instruction and no clearly articulated AIS strategy	Clearly articulated AIS strategy but curriculum and instruction are not aligned	Clearly articulated AIS strategy with core subject alignment across curriculum and instruction