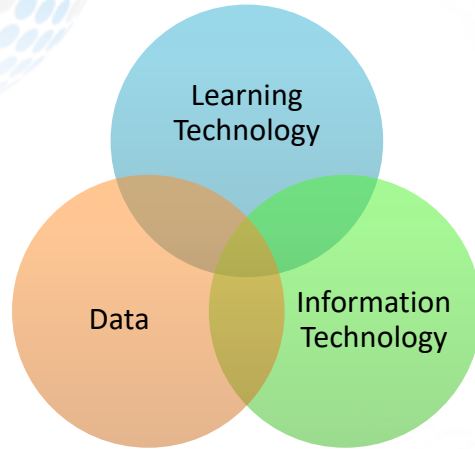


Building a Data Ecology for Data Informed Decision Making

ECIS 2019



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Download today's presentation
<http://edtch.co/ECIS19Data>



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My Background

- International EdTech consultant
 - Leadership consultation,
 - EdTech planning and evaluation
 - Digital Citizenship
 - Training<http://internationaledtech.com>
- Consulted with schools, MOEs, and companies on EdTech topics
- Worked as Tech Director for 15+ years
- Worked with American, IB, British, and German curricula
- Former Chair of the ISTE Board
- Led Data Systems team for new school in Saudi Arabia
- Conduct Data Audits at multiple campuses
- Blogger, Vlogger, Presenter on EdTech
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26 April 2019

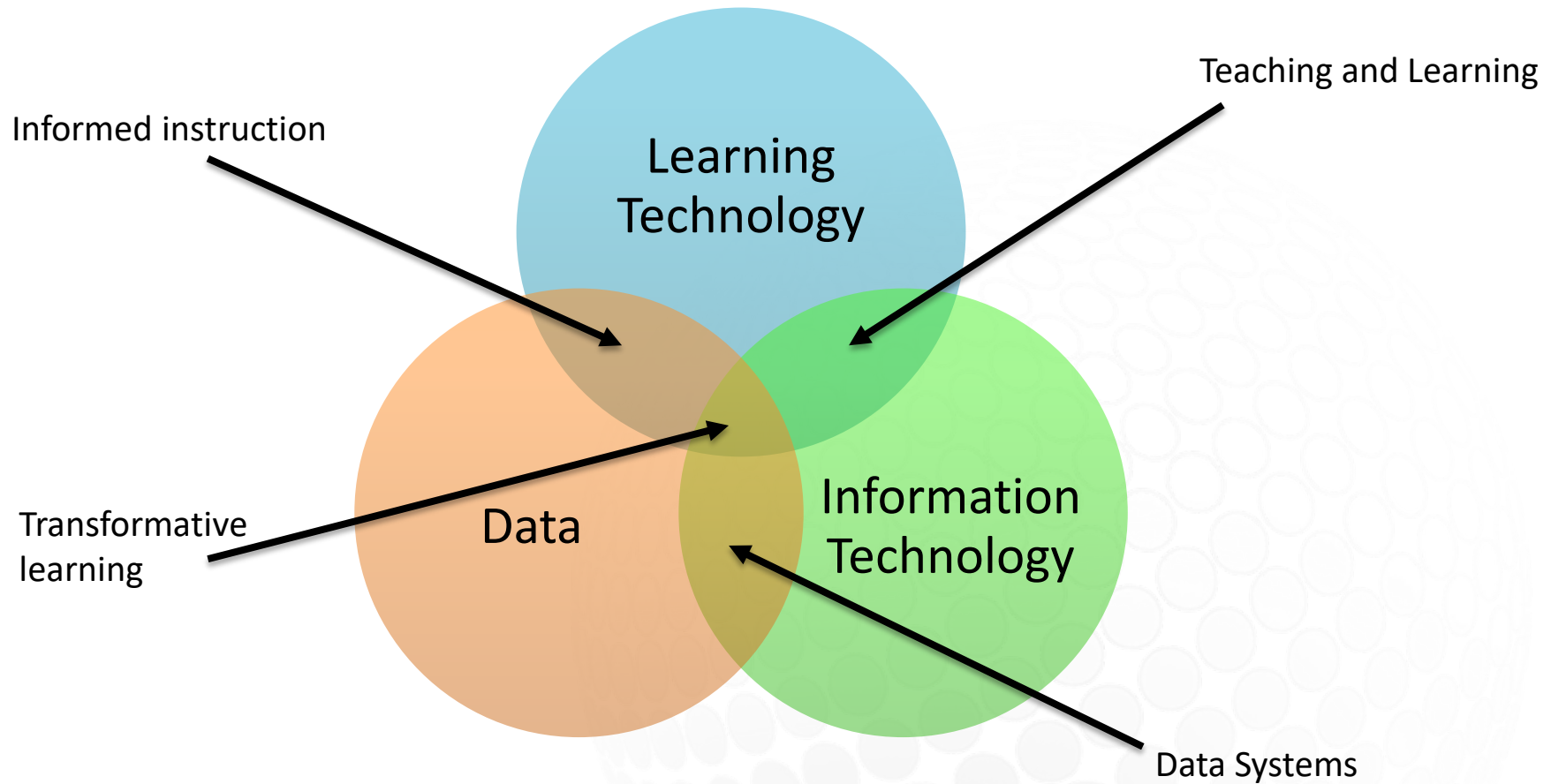
“We help all schools use technology successfully.”

“Information is the oil of the 21st century, and analytics is the combustion engine.” [Peter Sondergaard](#)

Elements of Technology in School

- Learning Technology
 - Technology for teaching and learning
 - Pedagogic based
 - Focus on teaching and learning
- Information Technology
 - Infrastructure
 - Devices
 - Networking
 - Resources
- Data





“Too often we forget that genius, too, depends upon the data within its reach, that even Archimedes could not have devised Edison’s inventions.”

Ernest Dimnet

Data is at the center of what we do in schools

Data based decision making

or **data** driven **decision making** refers to educator's ongoing process of collecting and analyzing different types of **data**, including demographic, student achievement test, satisfaction, process **data** to guide **decisions** towards improvement of educational process.

- https://en.wikipedia.org/wiki/Data_based_decision_making

Unleash the Power of Data

1. Get a big picture view of the organization
 2. Follow more than your customers
 3. Unify your departments under one umbrella
 4. Use data to develop
- <https://www.entrepreneur.com/article/245493>

What types of data do we have as international schools?

- Student academic performance data
 - Summative
 - Formative
 - Cumulative
- Student non-academic data
 - Behavior
 - PHSE
 - Health
 - Matriculation
 - Sports
 - Etc.
- Admissions data
- Alumni data
- Current parents
- Financial data
- Marketing data
- Recruiting data
- Human Resources data
- Transportation data
- Food services data
- External vendor data

THIS BEGS THE QUESTION:

**DO YOU KNOW AND HANDLE YOUR
DATA WELL?**

“Without big data analytics, companies are blind and deaf, wandering out onto the Web like deer on a freeway.”

[Geoffrey Moore](#)



40 ZETTABYTES

(40 TRILLION GIGABYTES)
of data will be created by
2020, an increase of 300
times from 2005



Volume SCALE OF DATA

It's estimated that
2.5 QUINTILLION BYTES
(2.5 TRILLION GIGABYTES)
of data are created each-day

Most companies in the
U.S. have at least
100 TERABYTES
(100,000 GIGABYTES)
of data stored

The New York Stock Exchange
captures
**1 TB OF TRADE
INFORMATION**
during each trading session



By 2016, it is projected
there will be
**18.9 BILLION
NETWORK
CONNECTIONS**
— almost 2.5 connections
per person on earth



Modern cars have close to
100 SENSORS
that monitor items such as
fuel level and tire pressure



Velocity ANALYSIS OF STREAMING DATA

The FOUR V's of Big Data

From traffic patterns and music downloads to web history and medical records, data is recorded, stored, and analyzed to enable the technology and services that the world relies on every day. But what exactly is big data, and how can these massive amounts of data be used?

As a leader in the sector, IBM data scientists break big data into four dimensions: **Volume, Velocity, Variety and Veracity**

Depending on the industry and organization, big data encompasses information from multiple internal and external sources such as transactions, social media, enterprise content, sensors and mobile devices. Companies can leverage data to adapt their products and services to better meet customer needs, optimize operations and infrastructure, and find new sources of revenue.

By 2015
4.4 MILLION IT JOBS
will be created globally to support big data,
with 1.9 million in the United States



As of 2011, the global size of
data in healthcare was
estimated to be

150 EXABYTES
(150 TRILLION GIGABYTES)



**30 BILLION
PIECES OF CONTENT**
are shared on Facebook
every month



Variety DIFFERENT FORMS OF DATA

By 2014, it's anticipated
there will be
**420 MILLION
WEARABLE, WIRELESS
HEALTH MONITORS**

**4 BILLION+
HOURS OF VIDEO**
are watched on
YouTube each month



400 MILLION TWEETS
are sent per day by about 200
million monthly active users



**1 IN 3 BUSINESS
LEADERS**
don't trust the information
they use to make decisions



In one survey were unsure of
how much of their data was
inaccurate



Veracity UNCERTAINTY OF DATA

Poor data quality costs the US
economy around
\$3.1 TRILLION A YEAR



Sources: McKinsey Global Institute, Twitter, Cisco, Gartner, EMC, SAS, IBM, WEPTEC, SAS

IBM

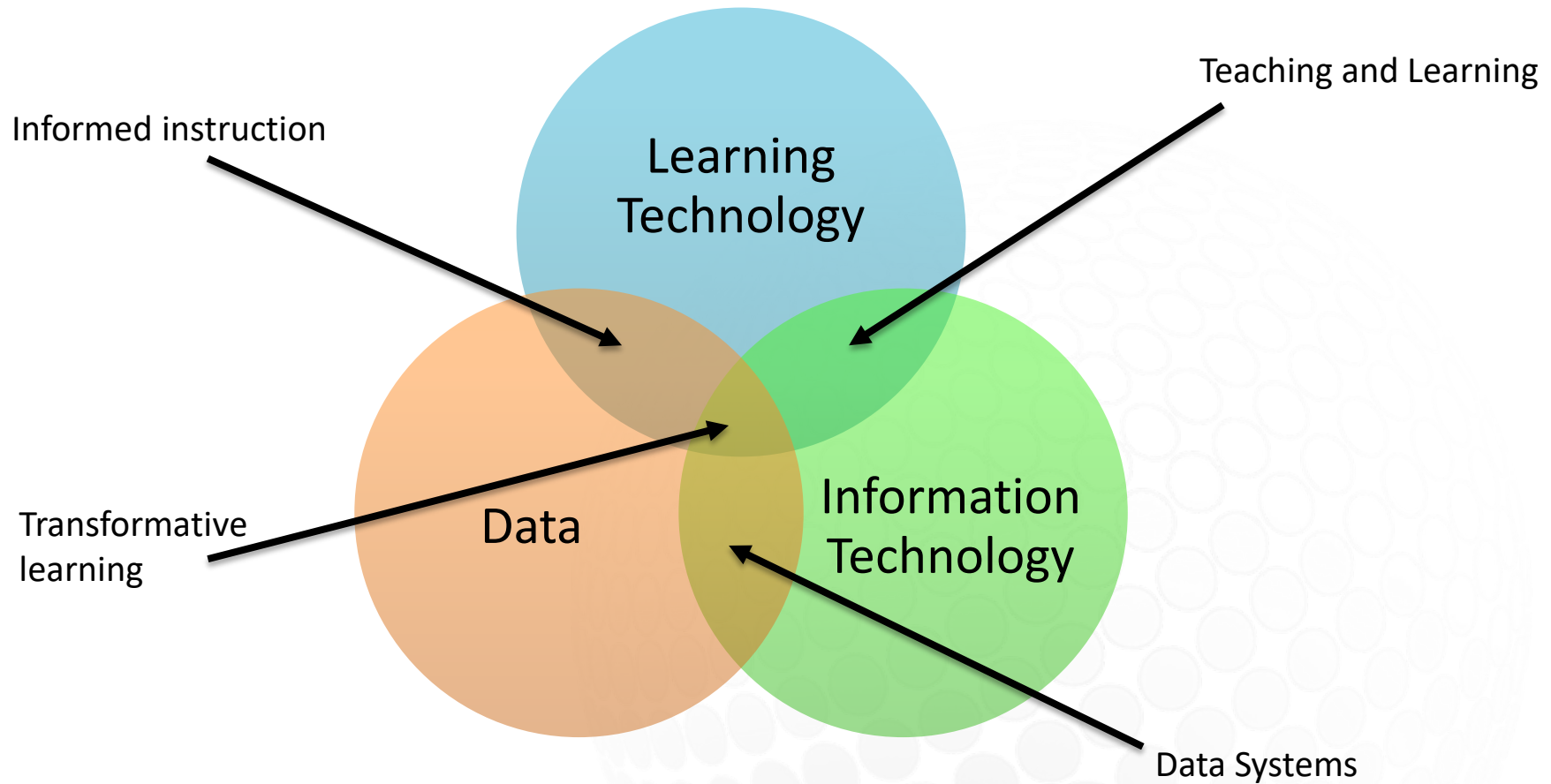
“It is a capital mistake to theorize before one has data.”
Sherlock Holmes, “A Study in Scarlett” (Arthur Conan Doyle).

But let's not get ahead of ourselves...

...the most important exercise a school can undertake is to organize its

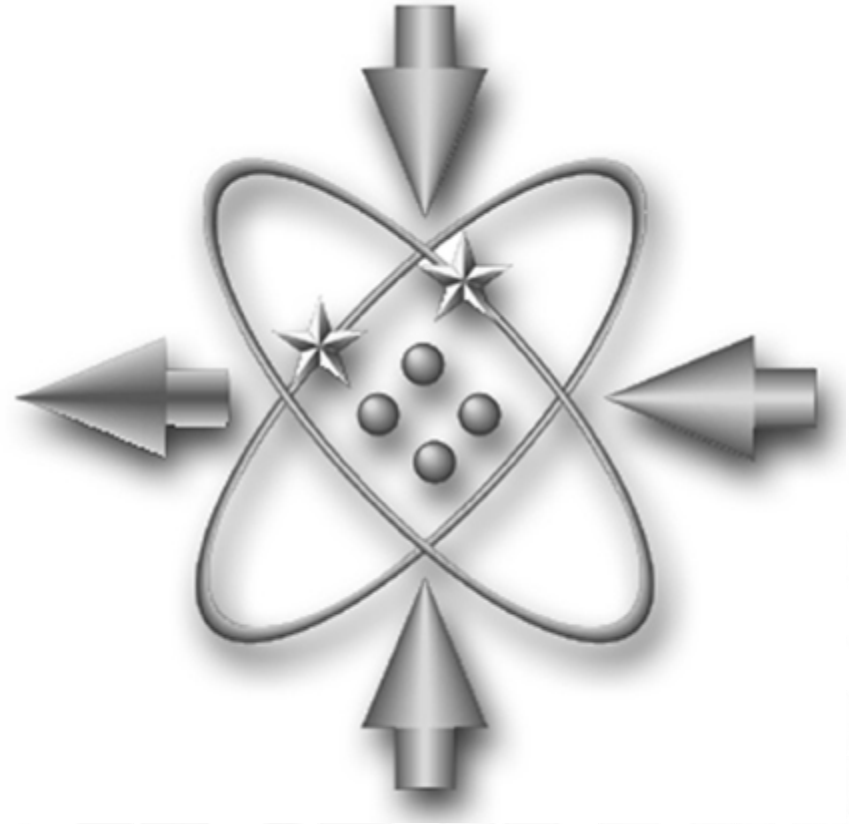
OPERATIONAL DATA SYSTEMS

These are the data systems where schools store and access their key operational and academic data.



Examples of Key Data Syster

- Student Information System
- Learning Management System
- Admissions System
- Finances/Accounting System
- Content Management System
- Human Resources Management System
- Library Management System
- Bus/Transport Management
- University Counselling System
- Point of Sale System



“He uses statistics as a drunken man uses lamp posts – for support rather than for illumination.”

Andrew Lang, Scottish Writer

The largest operational challenge in international schools:

Non-aligned data systems

The data systems separate departments and make school operations increasingly complex.

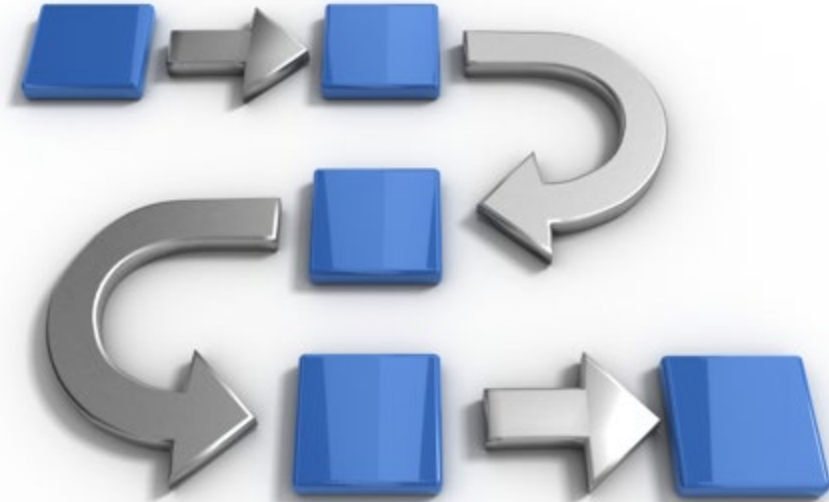
Workflows and Data Alignment – Singing from same hymnal



- **Hymnal** – Aligned data systems in the school
- **Hymn Sheet** – A single data system
- **Singers** – Teachers and staff members
- **Hymn - Workflow**

Example of workflow - A new student

1. Parent inquires
2. Communication
3. Application
4. Assessment
5. Acceptance
6. Enrollment
7. Scheduling
8. Participation in learning

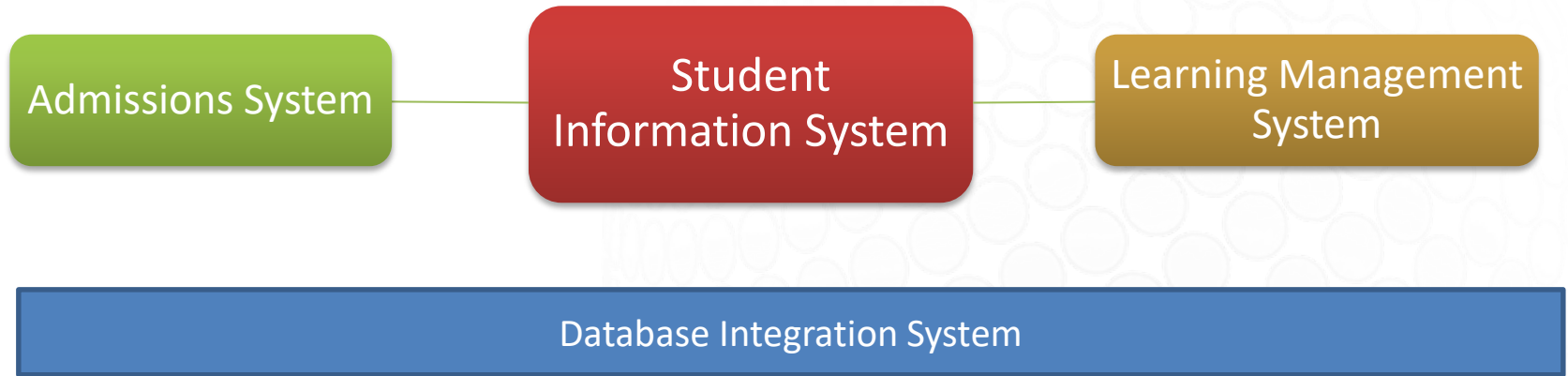


Specific processes vary by school.

What does this tell us about our school?

- Process and procedure
 - Opens up discussions about inefficiencies and connected relationships
- Needed data systems
 - What systems do we need and how should they talk?
- Personnel and tasks
 - Who is involved, at what point, and doing what function?
- Data
 - What information is collected and used and for what purpose

Data systems to facilitate our new student workflow



What does this mean? Where do I go?

1. Know your data – what you have and what you want
2. Learn your processes...and be prepared to change them.
 1. Either your process will change to meet the system or the system changes to meet the process
 2. The latter is far more expensive
3. Hold your data systems to account – they must meet your needs and all work together
4. Start asking question that the data should be able to answer
 1. What are our conversion ratios for admissions?
 2. How much does it cost to recruit a teacher?
 3. What was the value add on learning for XXX project?

The Essence of Data Based Decision Making

- Data Combination
 - The joining together from multiple sources
- Data Analysis
 - Analysis of the key conclusion, trends, and lessons to be learned from sets of data
- Business Intelligence (BI)
 - Optimize decision making and identification of best practices through data analysis
- Data Visualization
 - Visual representations of large data sets
- Report and Data Dashboards
 - Means of interacting with data towards identifying trends and dependencies

Analytics Applied at Various Sophistication Levels



Exploratory analysis

- Use descriptive and/or diagnostic analytics to understand and characterize the data



Predictive analysis

- Extrapolate what may happen in the future based on the historical events in the data



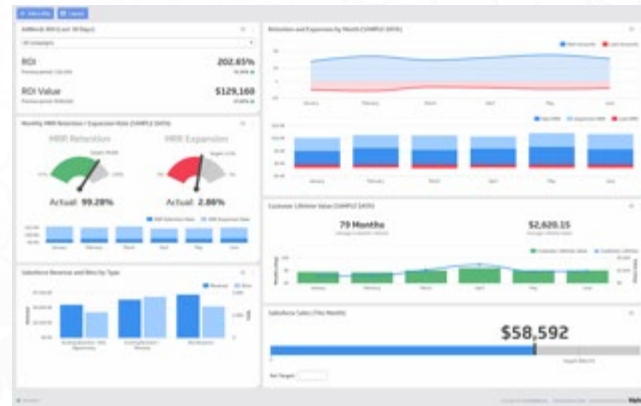
Prescriptive analysis

- Decide on the actions based on business rules assisted with diagnostic results and predictive insights developed



Optimization

- Obtain the optimal solution based on the historical behavior, extrapolated pattern for the future and business rules in place



Key Takeaways

- Data is vital to the current and long term life of an international school
- Schools must know and manage their data
- Big Data analytics is coming to education
 - Know thy analysis and they dashboards
- Improper data systems can be the largest operational impediment in a school
- Synchronized data systems are essential
- Workflows inform:
 - Data
 - Systems
 - Processes
 - Personnel
- It's vital to map a school's workflows, data systems, and data on hand

“If you torture the data long enough, it will confess.”
Ronald Coase, Economist

QUESTIONS? COMMENTS?

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