

What You Need to Know About the Future of Training Using Data and Analytics

A Primer on Essentials of Data Science and Analytics



PEREGRINE

PERFORMANCE GROUP

WE ENABLE SUCCESS

Rummler on the Importance of Analysis

“The key to training effectiveness is *analysis*—asking the right questions—not flashy new training techniques. Until such analysis becomes the major emphasis, the training field will remain a field consisting of a collection of techniques in search of an application.”

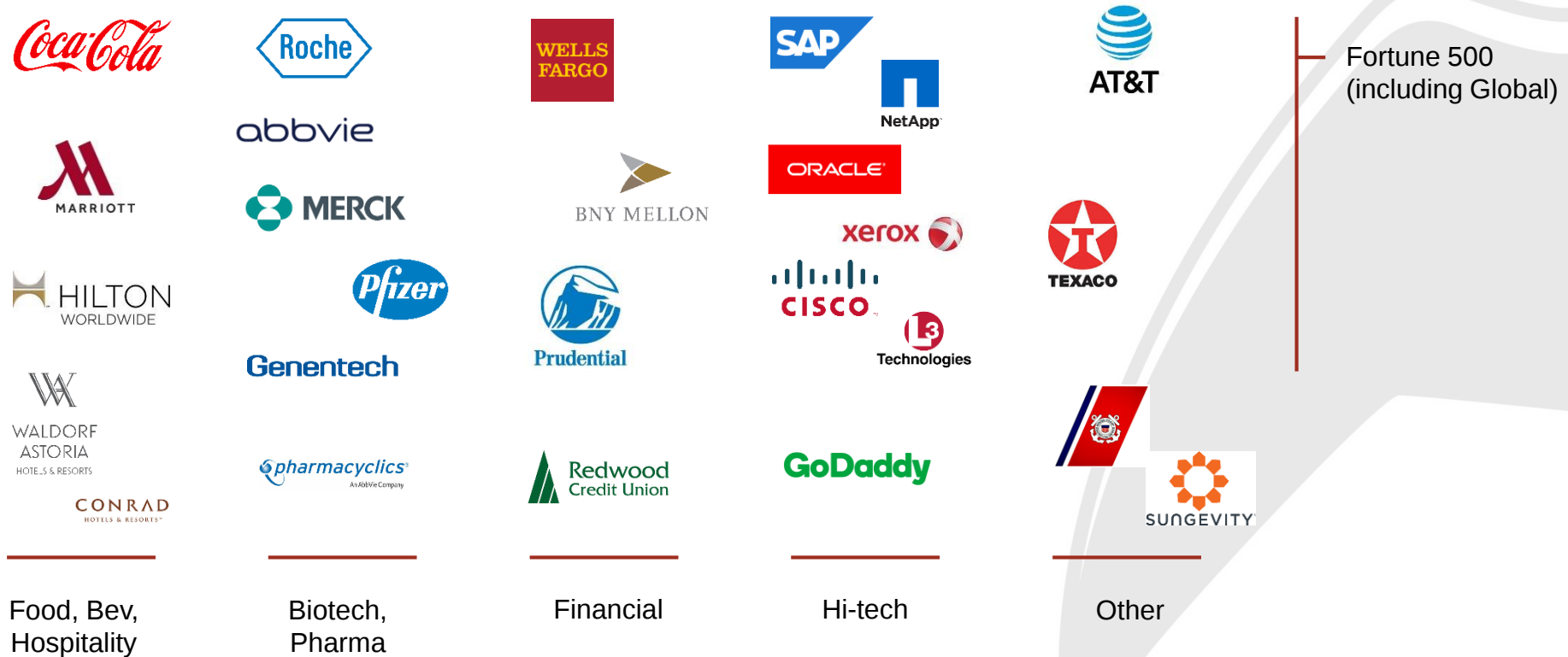
Geary A. Rummler
Handbook of Modern Personnel Administration
McGraw-Hill, 1972

Introduction

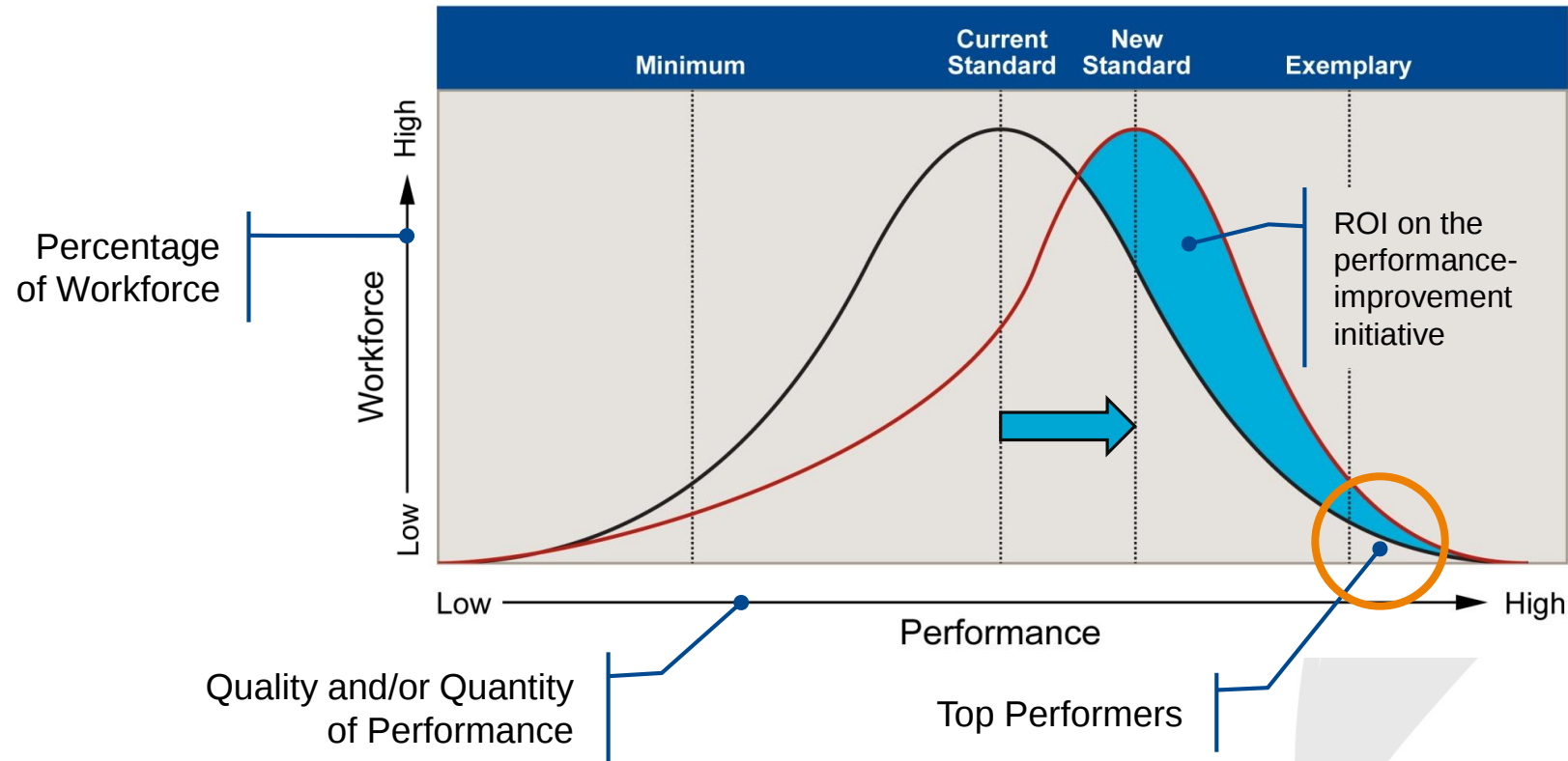
Agenda

- Mini needs analysis
- Introductions
- What are data science and analytics, and why are they important?
- A few essentials – types of analytics, what is data used for, essentials of data collection and reporting
- Examples – business and academic
- Q&A

We Are: Helping U.S. and Global Organizations



We Are: Shifting the Performance Curve



Original Source: *Exemplary Performance* by Paul Elliot, Al Folsom

Objectives: Why Are We Here?

Why Are We Here

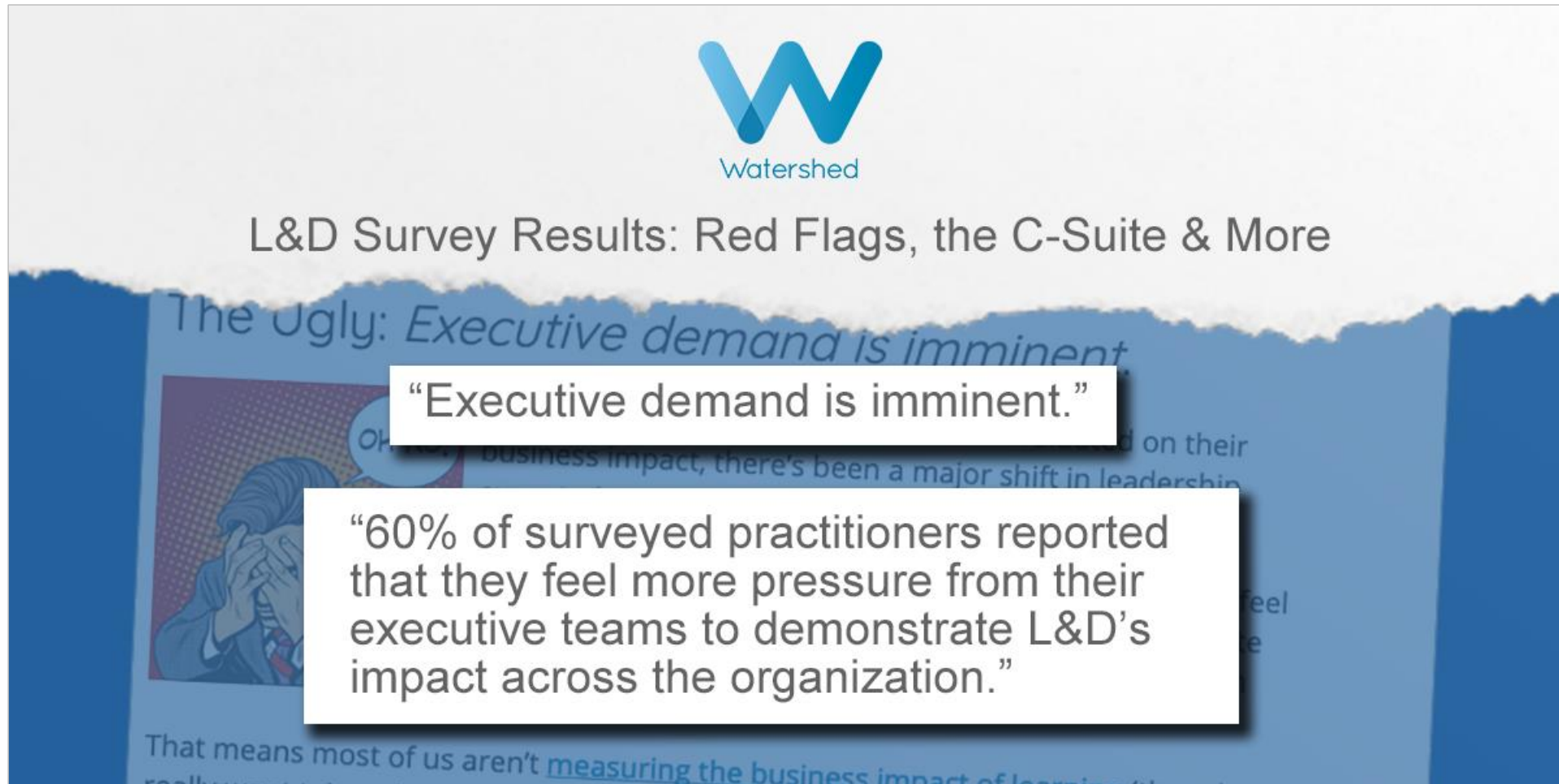
Move from, as Will Thalheimer's describes it, "vanity metrics" (efficiency and effectiveness), to *meaningful business impacts* (or outputs) that matter to the businesses we serve [Clark Quinn, Learnlets 1/22/19](#)

Beginning in 2017, LEO surveyed 1000 L&D practitioners

[LEO 2017/2018/2019 Measuring The Business Impact of Learning survey report](#)

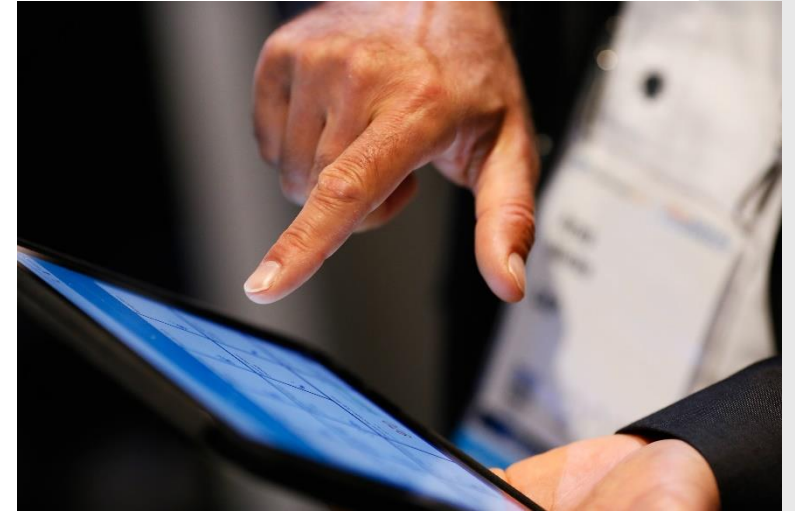
95% of L&D practitioners want to measure learning's impact on the business.

Why Are We Here



Why Are We *Not* Gathering Data and Analyzing It?

- Too busy being reactive
- Do not have the skills to collect, manage and analyze data
- Can't harmonize data from different sources
- Don't know what questions to ask
- Focused on describing rather than analyzing
- Positioned as a cost center by focusing on cost effectiveness – ROI



Of 1,500 L&D professionals surveyed, only 18% report that their organization have the technology to collect, aggregate, integrate and analyze data from multiple HR systems

2018 Chief Learning Officer survey

David James on L&D

"It's time to up-skill ourselves within L&D on the fundamentals of Data Analytics."

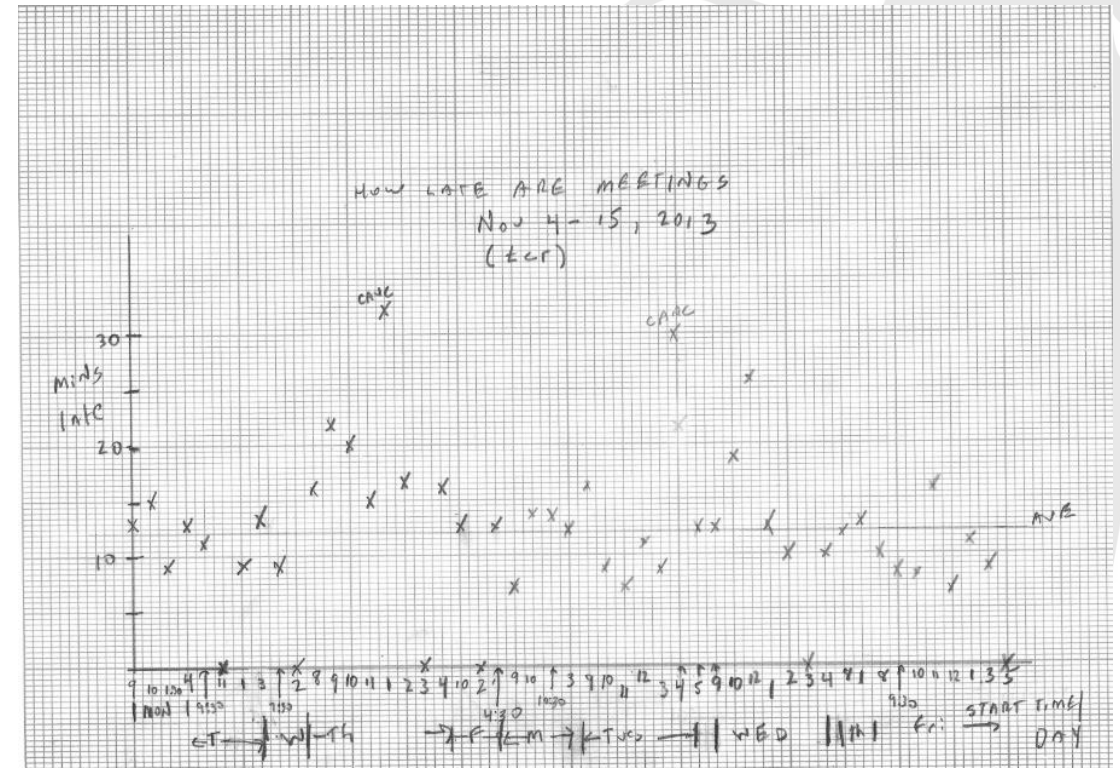
David James
Learning & Development and Data Analytics
LinkedIn, March 12, 2019

Skill-Up

If you're convinced already, read this blog post and try this exercise:

How to Start Thinking Like a Data Scientist

Thomas C. Redman
Harvard Business Review
November 29, 2013



Let's Get Data!

Why Are We Here

As learning and performance professionals we've struggled to move beyond data points that prove **our** value.

We tend to be good at...

- Proving Value
- Gaining buy-in

We must improve at...

- Proving results
- Showing impact

We tend to focus on:
who, what, when, how
many, presence, exposure,
progress, completion,
satisfaction, engagement

Too add value, focus on:
effectiveness, performance,
outcomes, benchmarks,
retention, productivity,
operational needs

L&D Strong
(Vanity Metrics)

L&D Weak

Forcing change with the automating the collection of data

- People analytics
- Experience API – xAPI
- Machine learning
- Artificial intelligence
- Apps
- Chat bots
- BI visualization
- Recommendation engines

94% of L&D leaders are specifically looking to improve how they gather and analyze data on learning impact. Only 18% believe they are successful

L&Ds relationship with data, Toward Maturity Pulse Report 2018

Why Data and Analytics

Why are organizations increasingly thinking about or developing a "Culture of Analytics"

- **Align** actions with corporate metrics (identify what's working)
- **Continuously** improve
- **Sustain** growth
- **Scale** the business (using a network of peers to do things faster and better than we could ever do on our own)
- **Compete** in a world where "insights are the new currency" →
- **Proactive** instead of reactive (predictive analytics)
- **Targeted** action instead of spray and pray
- **Shape** future outcomes

..Insight-driven organizations are growing at an average of more than 30 percent annually...
[*Insights-Driven Businesses Set the Pace for Global Growth a 2017 report by Forrester Research Inc.*](#)

What Is Insight?

the power or act of seeing into a situation

Merriam-Webster

How Do I Start to Build a Culture of Analytics?

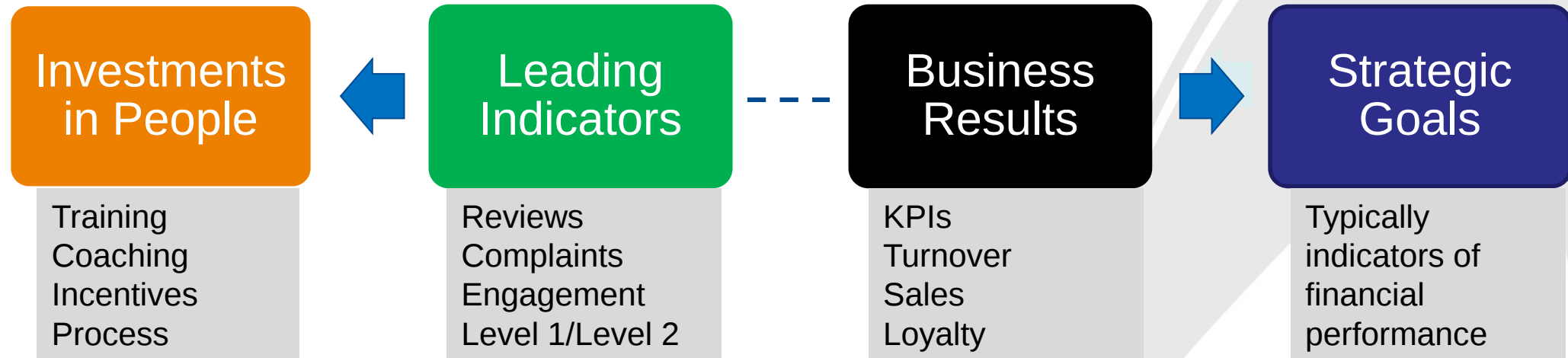
1. Identify the elements that you need to create your culture - Mindset, People, Processes, Systems
2. Help the businesses you serve solve problems (reduce errors, hire more qualified candidates, reduce the time to market, lower turnover rate, increase sales volume)
3. Look for easy data points
4. Track/gather data, identify trends (leading indicators) of the things that are important to your business partners
Sales and Mktg – meetings, presentations, proposals
Manufacturing - errors, safety issues, underperforming machinery
HR - time to fill roles, in and out of compliance, turnover rates

Measurement Maps is a casual chain of evidence to link people strategies with business strategies
Developing Human Capital, Pease, Beresford, Walker

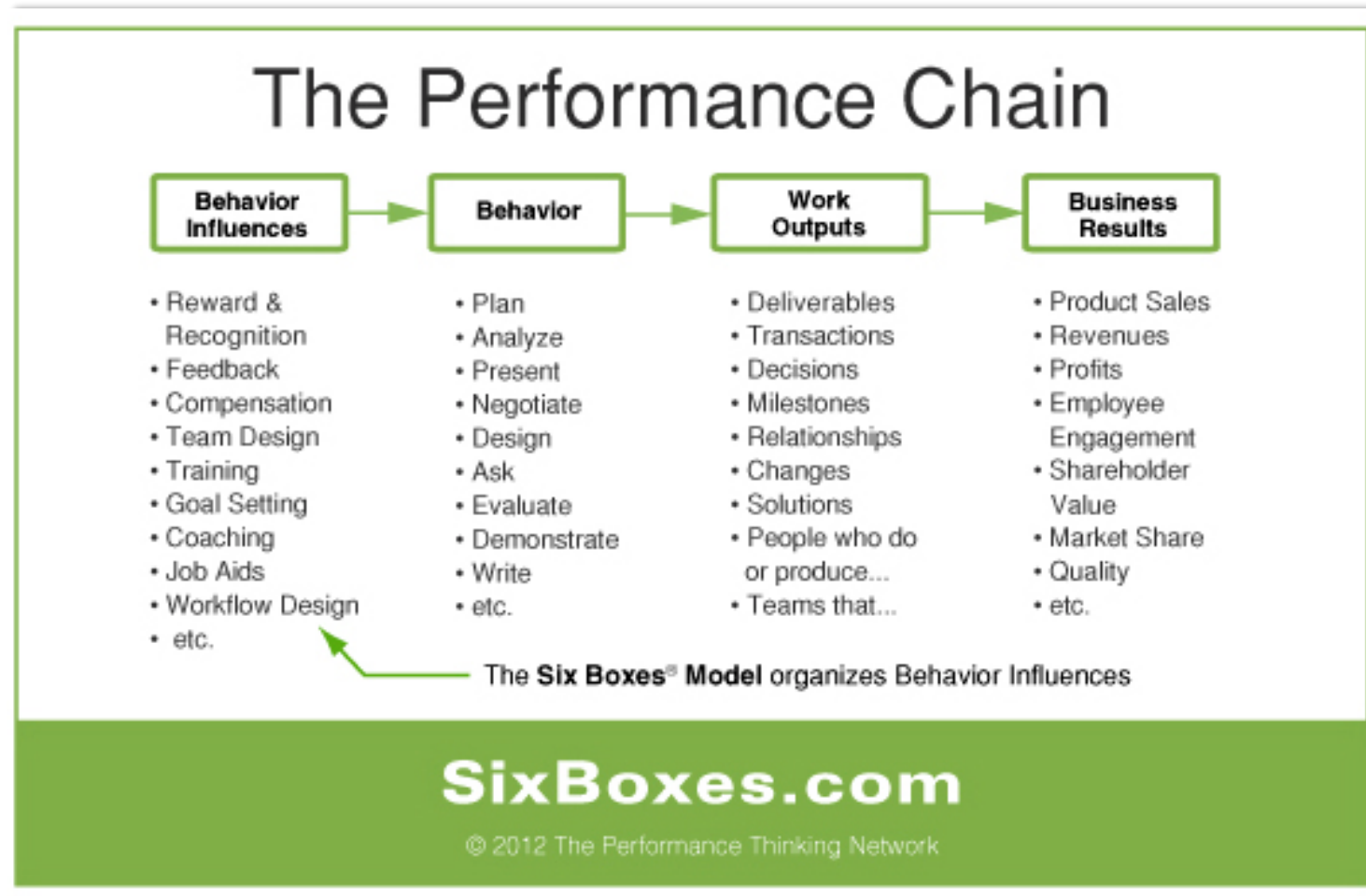
The Performance Chain for connecting people to results
Carl Binder

Measurement Map

A casual chain of evidence that is measurable



The Performance Chain



How Do I Start to Build a Culture of Analytics?

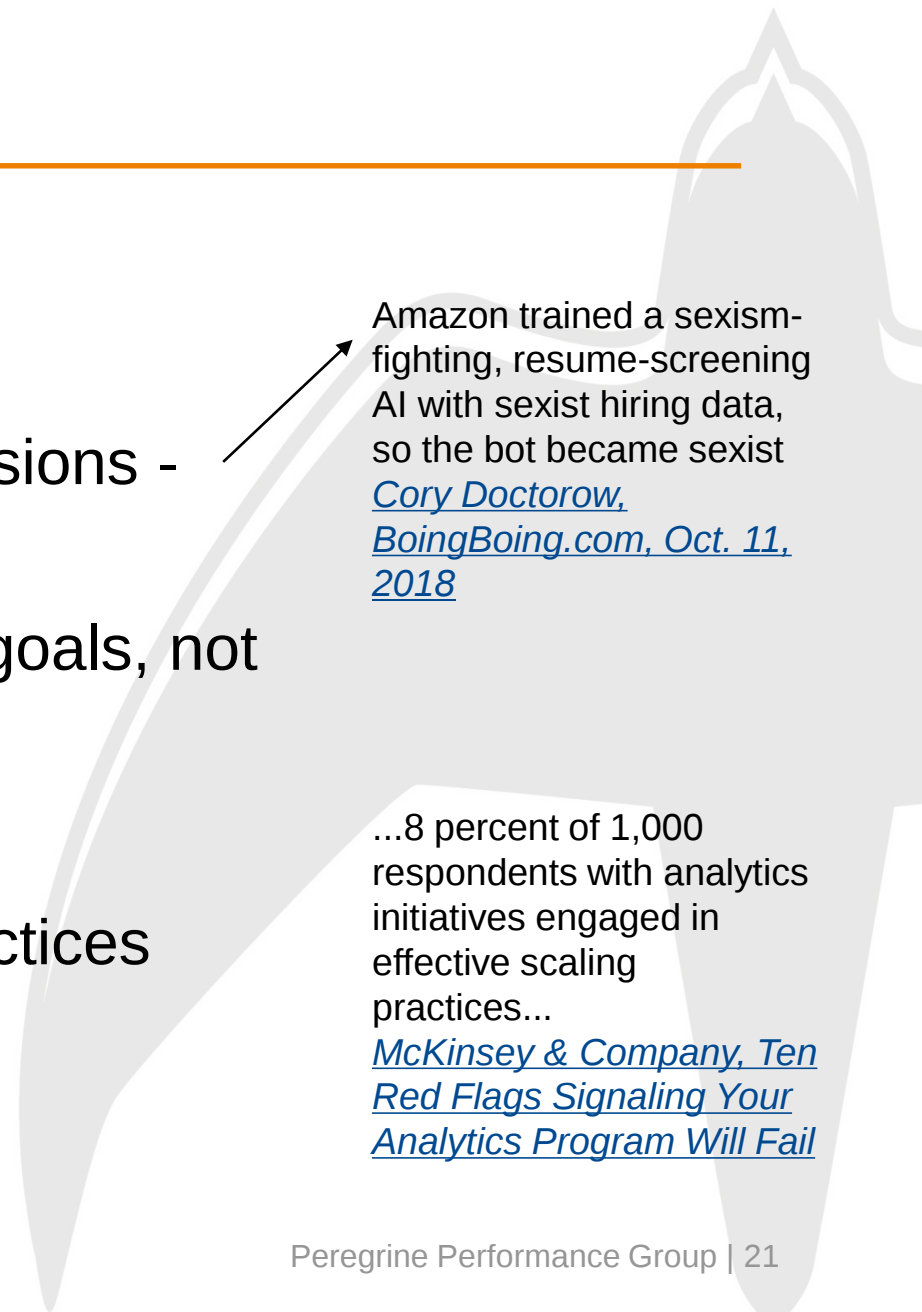
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Sales and Mktg – meetings, presentations, proposals
Manufacturing - errors, safety issues, underperforming machinery
HR - time to fill roles, in and out of compliance, turnover rates
5. It's no use if you have all the data but no **insight**
6. Be curious - ask why and gather feedback

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Developing Human Capital, Pease, Beresford, Walker

The Performance Chain for connecting people to results
Carl Binder

Keys to Success

- There is no longer a finish line – continuous improvement
- Bad data put into a system results in bad decisions - GIGO
- Develop a data strategy - driven by business goals, not technology
- Prioritize projects based on business goals
- Continue to re-evaluate your strategy and practices



Amazon trained a sexism-fighting, resume-screening AI with sexist hiring data, so the bot became sexist
[Cory Doctorow, BoingBoing.com, Oct. 11, 2018](#)

...8 percent of 1,000 respondents with analytics initiatives engaged in effective scaling practices...
[McKinsey & Company, Ten Red Flags Signaling Your Analytics Program Will Fail](#)

Keys to Success

- Clarify your customer's criteria for success
- Transparency is paramount - Data and analytics ability need to be democratized
- Data is an asset, protect it like one
- Put information in the hands of decision makers
- Use quantifiable data insights to highlight successes and tell a story

Look for a low friction path to a quick win, even if the metrics don't seem impactful yet.

Mike Rustici, Getting Started With Learning Data and Analytics, by Mike Rustici, Chief Learning Officer August 27, 2018

Data Analytics Basics

Analytics

Descriptive

Predictive

Streaming

Search and Knowledge Discovery

Simulation

Mathematical Optimization

Machine Learning

Artificial Intelligence

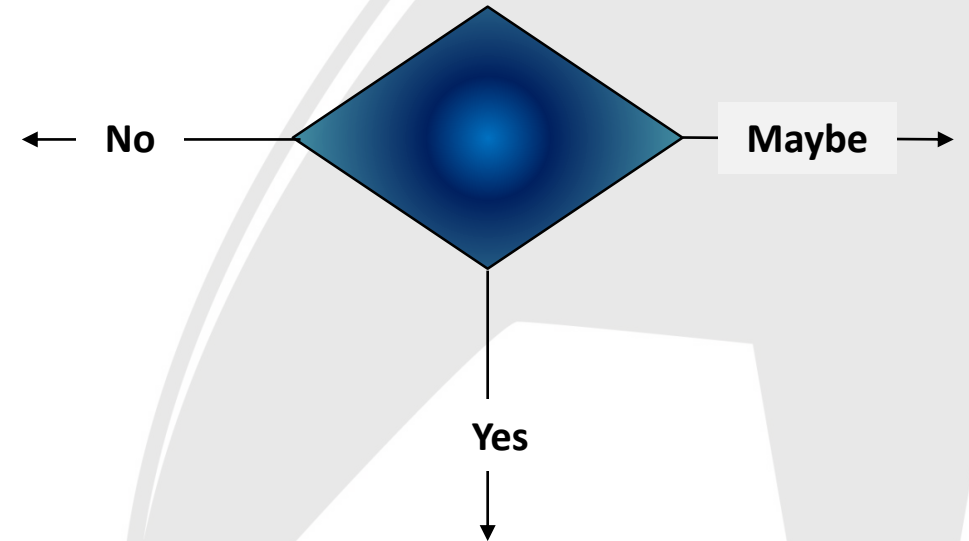


Somchai Kongkamsri

Analytics Purpose: Better Business Decisions

Prescriptive Analytics

- Umbrella term for many types of analytics that can improve decisions.
- Think of the term “prescriptive” as the goal of all these analytics — to make more effective decisions — rather than a specific analytical technique.



Analytics

Descriptive

Predictive

Streaming

Search and Knowledge Discovery

Simulation

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Artificial Intelligence



Somchai Kongkamsri

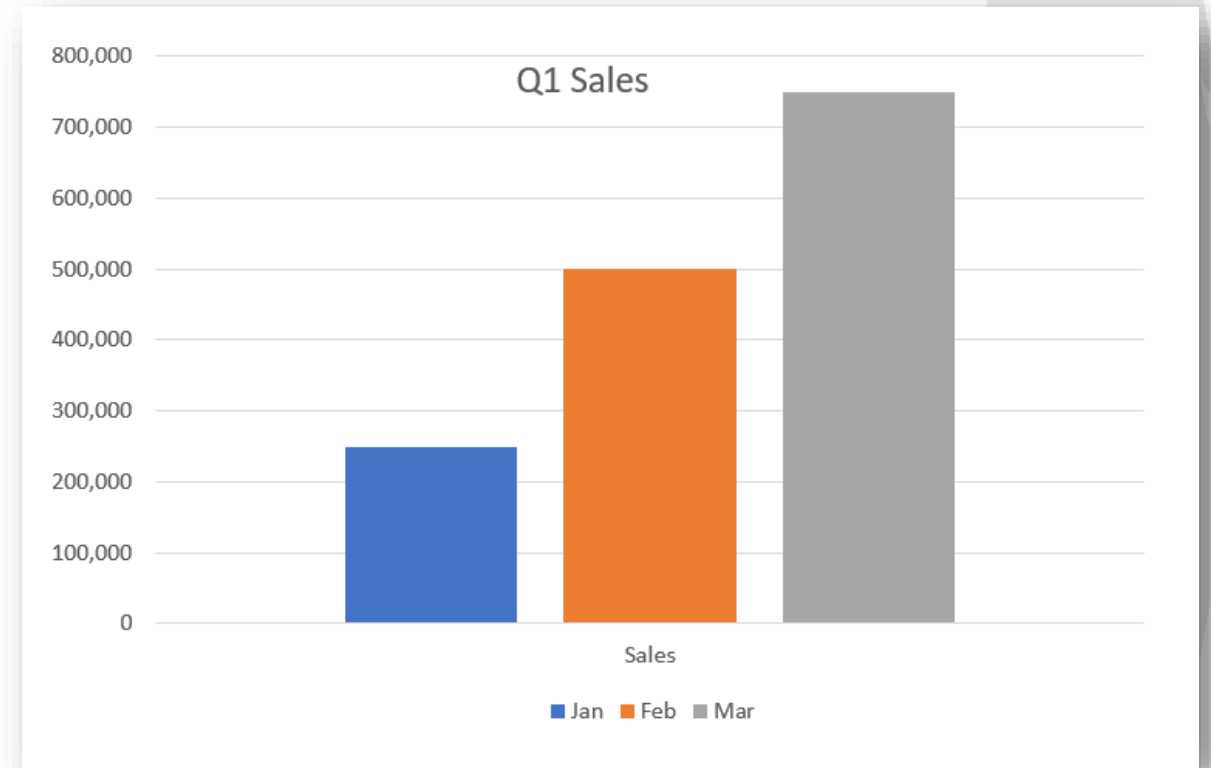
Two Basic Types of Business Analytics

	Descriptive	Predictive
Questions	What happened? What is happening?	What will happen? Why will it happen?
Enablers	• Business reporting • Dashboards • Scorecards • Data warehousing	• Data mining • Text mining • Web/media mining • Forecasting
Outcomes	Well-defined business problems and opportunities	Accurate projections of future events and outcomes

Descriptive Analytics

See what the data is saying:

- What data do you have?
- What variables are you interested in?
- Do you see any **trends**?
- What other variables are influencing those **trends**?
- Can some more related data help in understanding **trends**?



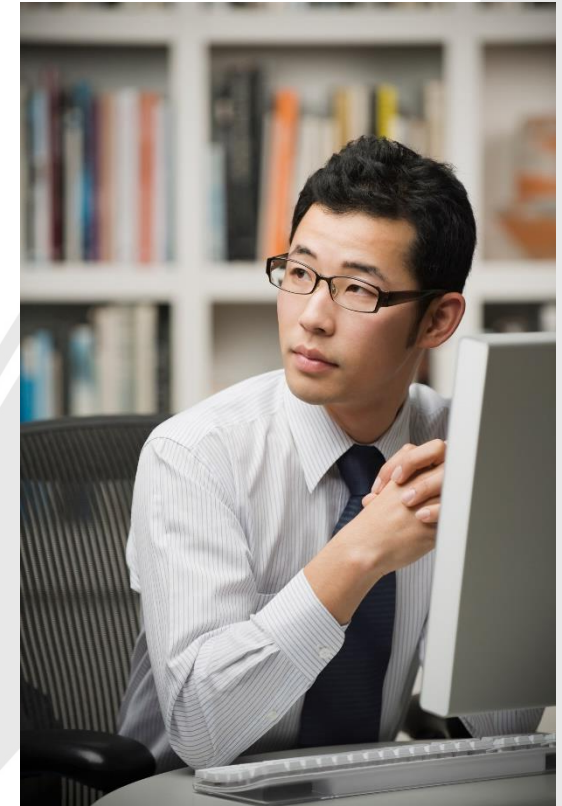
Company reports are a common example

Five Habits of Curating Trends

Watching and identifying trends is a critical skill when it comes to analyzing data. Expert trend curator Rohit Bhargava has identified five habits for identifying trends:

- Watch processes in action
- Be curious
- Be fickle - save an idea and move on - take notes, reflect on why is it interesting (this is the insight you had)
- Be thoughtful - pay attention to details, wait and think
- Be elegant - use poetic principles, simple ways to explain an idea

[How to think like a trend curator](#) by Rohit Bhargava 2019



Predictive Analytics

How much can the trends predict what is going to happen in the future?

- What do you want to predict?
- What are the variables in your data that can help predict the outcome?
- What kind of prediction are you making?
 - Classification (e.g., pass/fail)
 - Estimation (e.g., performance metrics)
 - Sentiment identification

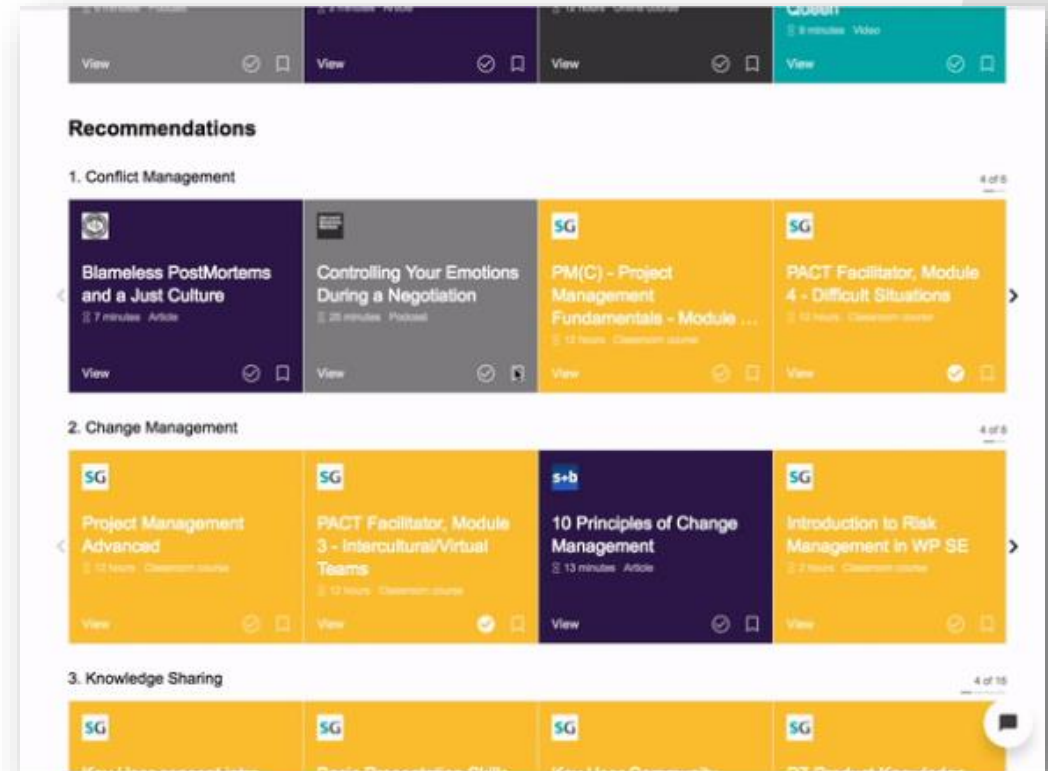


Netflix's recommendation engine is a good example

Predictive Analytics

How much can the trends predict what is going to happen in the future?

- What prediction methods are available?
 - Regression
 - Machine learning
 - Time-series modeling/forecasting



[Magpie's](#) learning recommendations is a good example

Examples

JobAider Dashboard

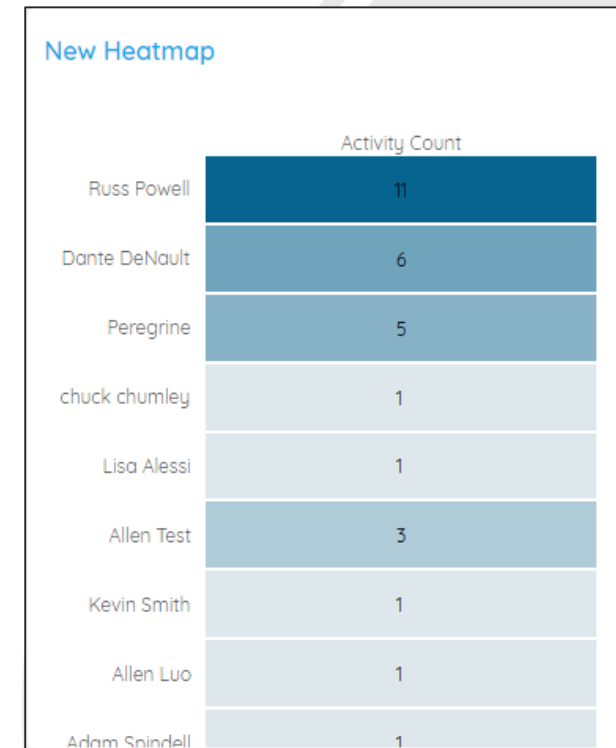
Using xAPI, we track real-time (streaming) activity of learning content.

Joe Job Aid Posts

-  Peregrine posted Be safe on the Internet 5 days ago.
-  Peregrine posted 6 Important Wine Selling Tips 24 days ago.
-  Peregrine posted 6 Important Wine Selling Tips 24 days ago.
-  Peregrine posted Tasting Notes - Chardonnay 2018 2 months ago.
-  Peregrine posted Tasting Notes - Chardonnay 2018 2 months ago.

Watched Step 2 Video in Create a New Job Aid

-  Patrick Sherman viewed Create A Job Aid 3 days ago.
-  Jen McWherter viewed Step 2 6 days ago.
-  Jen McWherter viewed Create A Job Aid 6 days ago.
-  Paul hancock viewed Create A Job Aid 7 days ago.
-  Peter Schlosser viewed Create A Job Aid 21 days ago.

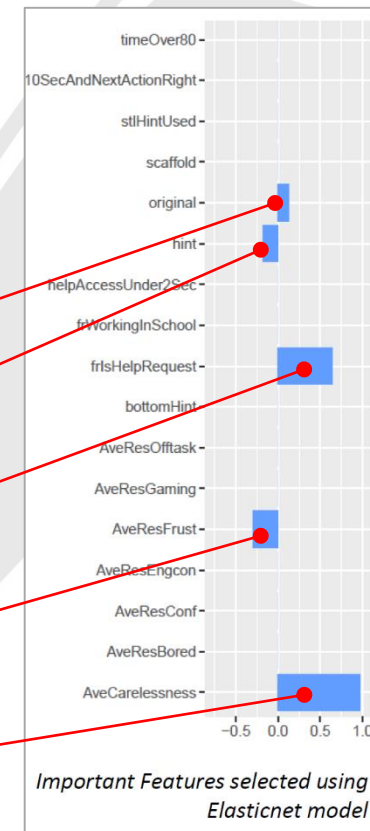


ASSISTments Data Mining Competition

Participants in a data mining competition used data science and analytics to observe students' real-time performance on a high school math test and predict—with >95% accuracy—probability of who would opt for STEM careers and remain in those careers for at least 10 years.

ASSISTments

- Higher number of attempts
- Attempts more original questions
- Higher average knowledge
- Higher average of correct answers
- Attempted higher number of problem types



Coca-Cola Merchandiser Curriculum

Analyzed cost of attrition for merchandisers (recruiting, lost sales, on-boarding, etc.). Direct and indirect costs of replacing a single merchandiser was \$1M.

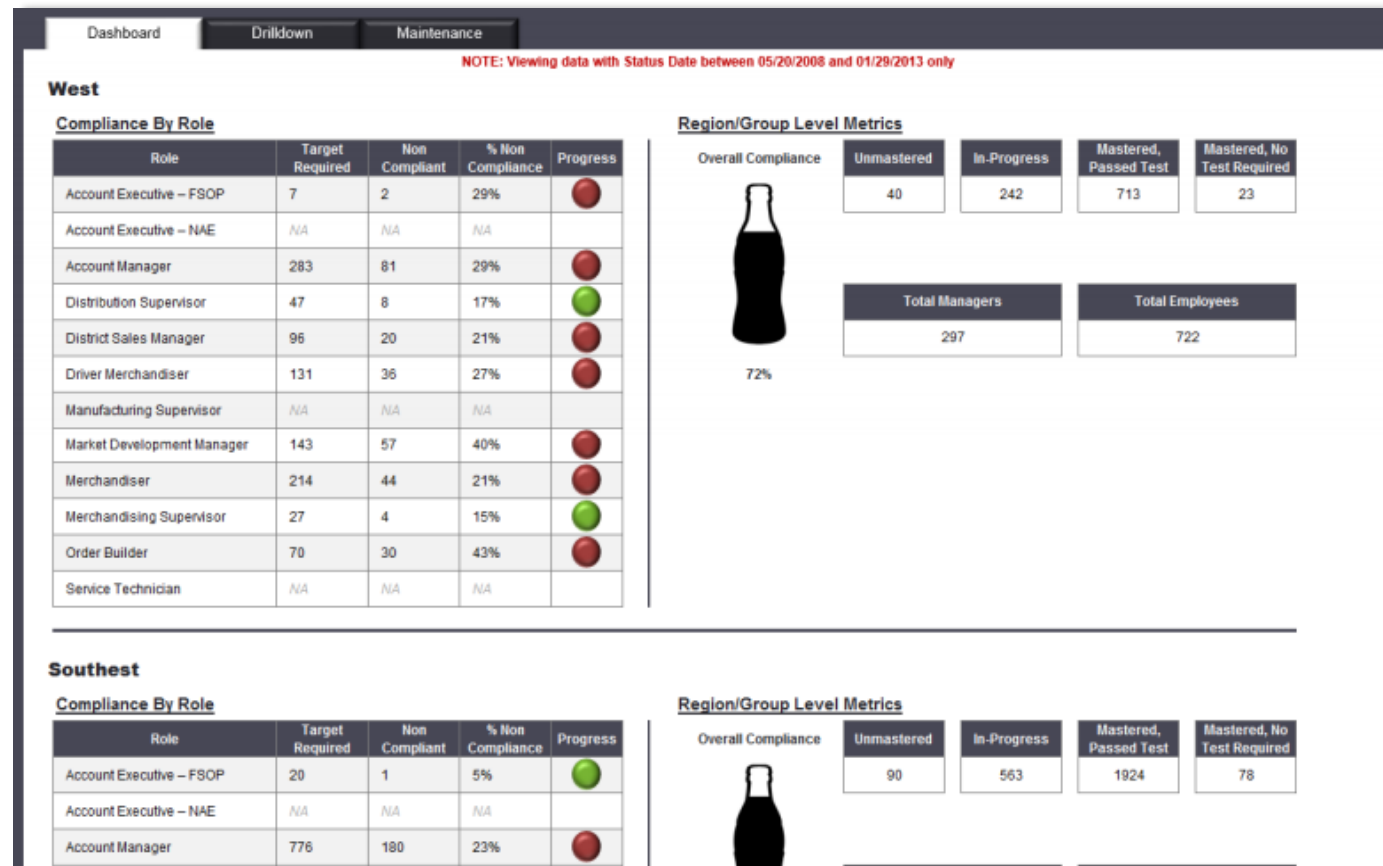


For first time in Coca-Cola's history, developed and implemented a ten-week curriculum for on-boarding and training US merchandisers.

During training, also emphasized the career opportunities at Coca-Cola.

Within 6 months of implementing the curriculum, Coke reduced the cost of attrition by \$250K per merchandiser.

Coca-Cola Merchandiser Curriculum



Dashboard developed in Excel for regional managers. Provides real-time (streaming) data and ability to track metrics for merchandiser curriculum by region and role. Allows regional managers to adjust curriculum day-to-day.

HT2 – Villeroy & Boch (Ceramics Producer)

Conducted market research from a customer perspective and found that 85% of the purchase motivation for premium products is emotional



Trained employees to identify the emotional purchase motivation

The initiative translated into a €2.5m improvement in revenue during when they tracked results

Source: *L&Ds relationship with data* Towards Maturity, Pulse Report 2018

Get a Copy of this Presentation

Training, Data, Analytics – Resources Page

<http://peregrine.us.com/data-analytics>

Tools

Tools

- Data Storage
 - Storage Server
- Data Cleaning / Processing
 - Databases: SQL, Oracle, NoSQL, Hive
- Reporting
 - Excel
- Predictive Analysis / Machine learning
 - SQL
 - R / Python
- Prescriptive Analytics
 - Excel
 - Tableau / Power BI / Kibana
 - R / Python / SAS
 - Excel Solvers / Other Solvers
 - Spark / Analytics Platforms

Tools

People/Process/Business Analysis

- [The Performance Chain](#) – A tool to link what people do to what the organization wants to achieve (from SixBoxes Performance Thinking)
- Measurement Maps – A casual chain of evidence to link people strategies with business strategies (from *Developing Human Capital* by Gene Pease, Bonie Beresford, Lee Walker)

Tools

Data Gathering and Analysis

- [Sunrise KPI](#) - Gathers a key metric from all the services you use and sends you all your numbers.
- [Baremetrics](#) – API for gathering data
- [Minitab](#) - Statistical analysis
- [Microsoft Analysis ToolPak](#) - Excel add on for statistical analysis
- [Sheetgo](#) - Create and automate workflows from Google Sheets

Tools

Visualization

- [Power BI](#) – Microsoft's business intelligence and data visualization tool
- [INZight](#) – Basic data analysis tool
- [Tableau Public](#) – Free data visualization tool
- [Flourish](#) – Data visualization
- [TimelineJS](#) – Build interactive timelines
- [StorylineJS](#) – Illustrate data over time

Sources

- *Business Intelligence, Analytics, and Data Science: A Managerial Perspective* by R. Sharda, D. Delen, and E. Turban
- *Data Driven: How Performance Analytics Delivers Extraordinary Sales Results* by J. Dearborn
- [L&Ds relationship with data](#), by Towards Maturity, Pulse Report 2018
- [Transitioning to a Data-Driven Learning Department](#) by Mike Rustici, Chief Learning Officer, August 20, 2018
- [Scalable Learning Will Be the Strategic Differentiator in the 21st Century](#) by Mike Rustici, Chief Learning Officer August 13, 2018
- [Getting Started With Learning Data and Analytics](#) by Mike Rustici, Chief Learning Officer August 27, 2018

Sources

- [Curated Insights: The Human Side of Extracting Business Value from Information](#) by Bob Danna, clomedia.com, August 29, 2018
- [Want Sustainable Growth? Think Insights \(Not Data\) For Your Midsize Business](#) by Mario Farag, Digitalist Magazine, May 22, 2018
- [Key Concepts in a Data-Centric Learning Stack](#) by Brit Keller, YET Analytics, August 9, 2018
- [Learning Leaders: Data Driven Learning Design](#) by Lori Niles Hofman
- [How to think like a trend curator](#) by Rohit Bhargava
- [What to Evaluate](#) by Clark Quinn, Learnlets January 22, 2019
- [In Real Life: The Value Proposition for Better L&D Data](#) by JD Dillon, Learning Solutions November 28, 2018

Sources

- [*Why You Need A Culture Of Analytics \(Part 1\)*](#) by Anders Liu-Lindberg, Digitalist Magazine, October 8, 2018
- [*Why You Need A Culture Of Analytics \(Part 2\)*](#) by Anders Liu-Lindberg, Digitalist Magazine, October 15, 2018
- [*Why You Need A Culture Of Analytics \(Part 3\)*](#) by Anders Liu-Lindberg, Digitalist Magazine, October 22, 2018
- [*Why data culture matters*](#) by Alejandro Díaz, Kayvaun Rowshankish, McKinsey.com, Sept. 2018
- [*When building an enterprise data strategy, consider “why?” before “how?”*](#) by Nicole Tache, January 6, 2016, O'Reilly

Sources

- [*Why People Analytics is Key to Strategic HR Decisions: An Interview with Khiv Singh of Sapience Analytics*](#) by Apoorva Kulkarni, hrtechnologist.com, Nov 8, 2018
- [*Ask the Right Questions Make the Right Interventions*](#) with Scott Weersing, GP Strategies, YET Analytics Podcast
- [*L&D Survey Results: Red Flags, the C-Suite & More*](#) by Lizelle Holstein February 7, 2018 Watershed
- [*Measuring the Business Impact of Learning: 2019 Survey Results*](#) by Leo
- *Developing Human Capital* by Gene Pease, Bonnie Beresford, Lee Walker
- [*Why Does Every Company Need A Data Strategy For 2019?*](#) by Bernard Marr, LinkedIn, March 20, 2019

Sources

- [*Learning & Development and Data Analytics*](#) by David James, LinkedIn, March 12, 2019
- [*How to Start Thinking Like a Data Scientist*](#), Thomas C. Redman, Harvard Business Review, November 29, 2013
- [*10 Smart Ways HR Departments Can Leverage Workforce Analytics, Forbes Human Resources Council*](#), Forbes, March 11, 2019
- [*Measurement Efforts Don't Quite Measure Up*](#), by Ashley St. John, Chief Learning Officer Magazine, February 2019
- [*Know the Difference Between Your Data and Your Metrics*](#), by Jeff Bladt and Bob Filbin, Harvard Business Review, March 4, 2013
- [*What Exactly The Heck Are Prescriptive Analytics?*](#) by Mike Gualtieri, Forrester, February 20, 2017
- [*Key Performance Indicators For Measuring Customer Experience Value*](#), by Mike Rowland, West Monroe, April 11, 2019

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