How your I-O psychology training has prepared you to handle the BIG, complex, and Scary world of Data Analytics

Shawn M. Bergman, PhD
Appalachian State University
Vela Institute

Ten Years in the Making

Making it Stick: The Secret to Developing a Data-Driven Culture
Cheryl Nielson, Lora Preu, Anne Bond
Dr. Shawn Bergman & Dr. Chris Cunningham

Mo’ Data, Mo Problems? The Potential of Big Data and Analytics in Employment Decisions
Presented by Joel Goldstein and Shawn Bergman

Appalachian State University
Decade Long Trend

Keyword utilization in Google Trends


Analytics versus HR

Analytics vs HR

WARNING!

DANGER
Big Data for HR: Does Big Data Take Human Out of Human Resources?

5 REASONS HR STRUGGLES WITH DATA ANALYTICS

5. Taking the “Human” out of Resources

To many HR managers, the idea of implementing computers to decide whom to hire is commendable, remember that it is not just computers that make people for the right jobs. It is best for employees, shareholders, society—everyone.

Big Data Is Taking the ’Human’ out of Human Resources

5. Taking the “Human” out of Resources

You probably know what your IQ score is. You might even know a little bit about your EQ score. But have you heard of GQ? This is the score that almost half of all new hires fall short of. It is not surprising that those who score well in other areas may fail to excel in this crucial element of leadership. It is important for HR managers to take a realistic view of their own leadership abilities and not be overconfident. They need to be aware of their weaknesses and develop strategies to overcome them.

PROVOCATION SERIES PAPER

HR and analytics: why HR is set to fail the big data challenge

David Angrave, Management School, University of Sheffield
Andy Charlwood, School of Business and Economics, Loughborough University
Ian Kirkpatrick, Leeds Institute for Data Analytics, Leeds University Business School
Mark Lawrence, Independent Strategic HR Analytics Consultant
Mark Stuart, Leeds University Business School

doi: 10.1111/hrm.12090

RCI

KEEP CALM
AND LET THE
INDUSTRIAL-ORGANIZATIONAL
PSYCHOLOGIST HANDLE IT
Technology will change everything...


Define and Demystify Data Analytics
Framework for Applied Data Analytics
Cartoons, IOP, HR, and Analytics
Define and Demystify Data Analytics

Framework for Applied Data Analytics

Cartoons, IOP, HR, and Analytics

What Is Big Data?

Definitions
- “Database whose size is beyond the ability of typical database software tools to capture, store, manage, and analyze” (McKinsey Global Institute, 2011)
- “Doesn’t fit in Excel sheet” (Amex)

Characteristics
- Volume
- Velocity
- Variety

Big Data

Volume | Velocity | Variety

Source: http://www.internetlivestats.com/one-second/#tweets-band; and http://one-second.designdly.com/, retrieved October 13, 2019

Other V’s of Big Data?

Veracity  Validation  Value

Analytics: What is it?

Scientific process of transforming data into insights for making better decisions

Explore  Visualize  Discover  Communicate
The image contains a diagram titled "Analytics Mountain," which illustrates the process of data analytics. The mountain is divided into several layers, each representing a different type of analytics:

1. **Descriptive Analytics**
   - What has happened?
2. **Diagnostic Analytics**
   - Why did it happen?
3. **Predictive Analytics**
   - What is going to happen?
4. **Prescriptive Analytics**
   - How to prevent bad things from happening and ensure good things?

The diagram also includes a timeline element labeled "Future," indicating a progression from past to future timeframes.

Below the diagram, there are additional text boxes with the following contents:

- Define and Demystify Data Analytics
- Framework for Applied Data Analytics
- Cartoons, IOP, HR, and Analytics
Bergman, S.M. (2016, December). Applied data analytics: It is not all about the numbers. Presentation made to the Appalachian State University Walker College of Business, Boone, NC.
Technology: Databases

- Database a collection of information organized so that it can be easily accessed, managed, and updated
- Relational database management
  - 9 of top 10 DBMS


Analytics in HR

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### Technology: Relational Databases

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Technology: Relational Databases

Pre-Employment | Post-Employment | Outcomes

5 Components of Applied Data Analytics

Bergman, S.M. (2016, December). Applied data analytics: It is not all about the numbers. Presentation made to the Appalachian State University Walker College of Business, Boone, NC.
### Algorithms and Procedures

- Measure of Central Tendency
- Measures of Variability
- Correlation
- ANOVA
- Regression
- Factor Analysis
- Cluster Analysis
- Decision-Tree
- Transfer Learning
- Reinforcement Learning
- Natural Language Processing
- Word Embeddings
- Neural-networks
- Boosting
- Smoothing
- Ensemble Methods

### Machine Learning

- Systems can perform specific task(s)
  - Without continued explicit instructions
  - Relying on data patterns and inference
- Method that automates model building
  - Branch of artificial intelligence
  - Make decisions with minimal human intervention
5 Components of Applied Data Analytics

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History Lesson

• Who is the only U.S. president from the state of Missouri?

History Lesson

• Who ran against Harry S. Truman in 1948 presidential election?
“Students from XXX are technically proficient, but they don’t know how to ask the right questions.

People can learn the technical skills, but they aren’t taught how to think.

That’s holding people from XXX back from moving up in our company.”

Lindsay Marshall
Data Scientist, Leadership and Team Intelligence, People, and Communities (HR) at Cisco
5 Components of Applied Data Analytics

Bergman, S. M. (2016, December). Applied data analytics: It is not all about the numbers. Presentation made to the Appalachian State University Walker College of Business, Boone, NC.
Implementing Analytic Solutions

40% Of Data Initiatives Fail

Why?


Reasons Analytic Initiatives Fail
Analytics Is More Than Just Numbers


5 Components of Applied Data Analytics

Bergman, S.M. (2016, December). Applied data analytics: It is not all about the numbers. Presentation made to the Appalachian State University Walker College of Business, Boone, NC.
Analytics, Big Data, and HR

HR Analytics: The Possibilities
- Benefit of Analytics in HR
  - Looking forwards, not backwards
- Obtain Relevant Information
  - Enhances recruiting
  - Improves selection
  - Monitors job satisfaction
  - Evaluates organizational culture
  - Assess performance
  - Predicts employee turnover
  - Prevents burnout

HR Analytics: Pre-Employment Possibilities
- Pre-Employment Analytics
  - Scan cover letters and resumes
  - Quantify application forms
  - Evaluate video interviews
  - Score work samples
  - Personality tests
- Benefits of Analytics
  - Efficient
  - Non-biased
  - Empirically based
  - "Hidden" information


Why Should I-O Psychologists Be Involved?

I-O Psychologists uniquely capable of solving Big Data’s current problems
- Knowledge base
- Quantitative training
- Ethical code
- Legal ramifications


Bergman, S. M., Davison, K., Tamanini, K., Oki, T., & Winter, J. (2019, April). Identifying the Mullet Candidate: Should We Use Social Media in Employee Selection? In B. Weathington (Chair), panel discussion conducted at the Annual Society for Industrial and Organizational Psychology Conference, Washington, DC.
Consistent Processes


Local to Global


A GDPR Update for Employers, Part I: Determining Whether Your Organization’s HR Data Processing Is Covered

Article By:
Grant D. Petersen
Simon J. McMenamy
Danielle Vunderzandten
Stephan A. Riga
Cécile Martin

Much has happened since the European Union (EU) General Data Protection Regulation (GDPR) went into effect on May 25, 2018. Many EU countries have enacted national legislation to implement and expand the requirements of the GDPR, while other developments have directly affected employers and created new obligations regarding the collection and processing of human resources (HR) data.
5 Components of Applied Data Analytics

- **Technology**
- **Algorithms**
- **Methodology**
- **People**
- **Industry**

Bergman, S.M. (2016, December). *Applied data analytics: It is not all about the numbers*. Presentation made to the Appalachian State University Walker College of Business, Boone, NC.

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Define and Demystify Data Analytics

Framework for Applied Data Analytics

Cartoons, IOP, HR, and Analytics
Define and Demystify Data Analytics

Broader Context for Implementing Analytics

Cartoons, IOP, HR, and Analytics

The Purple Unicorn

## Analytics is a Team Sport

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<td>Project Manager</td>
<td><strong>Coordinator</strong> – oversees the project</td>
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<td>Communicator</td>
<td><strong>Broker</strong> – manages the people relationships</td>
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<tr>
<td>Scientist</td>
<td><strong>Thinker</strong> – provides scientific rigor</td>
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<tr>
<td>Data Analyst</td>
<td><strong>Wrangler</strong> – handles all data work</td>
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<tr>
<td>Journalist</td>
<td><strong>Reporter</strong> – pursues the scent of an enquiry</td>
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<tr>
<td>Designer</td>
<td><strong>Conceiver</strong> – provides creative direction</td>
</tr>
<tr>
<td>Technologist</td>
<td><strong>Developer</strong> – constructs the solution</td>
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### Define and Demystify Data Analytics

- Framework for Applied Data Analytics
- Cartoons, IOP, HR, and Analytics
RCIO Alumni

• “Same skills that are learned through research are highly valuable in the HR space since only a few are familiar with the numbers and data.”
• “Makes it easier to make a business case.”

HR with Analytics

Where We Stand…

Collect → Analyze

→ PSYCHOLOGISTS

Interpret

Analytics + HR
