

Creative Disruption: Data Analytics

Capitalizing on the Rise of Data Analytics



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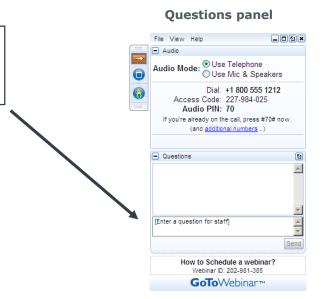
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The Next Report in the Industry Futures Series

Programs at the Intersection of Profit, Mission, and Employability

Profitable for COE • National reach • Minimal competition • Low-cost marketing • Accelerated formats and industries

- Appealing to Students
- Lasting Impact on Workforce

· Reimbursed by

employers

Industry Futures Reports

New in 2017

Health Professions: Capitalizing on Creative Disruption Data Analytics: Capitalizing on Creative Disruption

Industry Futures Library

2015

Designing Programs for the Millennial Workforce

2013

Second Bachelor's Degrees for Career Starters

2013

Multi-Track Cybersecurity Pathways

2011

In the Wake of Health Care Reform

2013

Design Thinking Business Programs

2013

Second Careers in Aging Services

2012

In the Era of Big Data

Ouick ROI

Clear career outcomes

COE Forum: New Resources



Recently Published Studies and Toolkits



Health Professions: Capitalizing on Creative Disruption Industry Futures Study



Data Analytics: Capitalizing on Creative Disruption Industry Futures Study



Competing on Student Outcomes to Attract Today's Career Changer Research Study



Critical Disciplines for Securing Employer Partnerships Research Study



Developing Health Profession Programs in an Era of Disruption Opportunity Evaluation Resource



Health Care Publication Library Update Health Care Resource Collection

Learning Objectives for Today



Data Analytics' Transformation of the Working World

- Explain why data analytics demand has been surging in the "Analytics 3.0" era
- Introduce the emerging "citizen data scientist" role
- Highlight continued opportunities for data analytics specialists

2 Emerging Threats from Competition and Automation

- · Examine growing competition from traditional and non-traditional educational providers
- Illustrate how artificial intelligence will soon undermine analytics professionals

3 The Adaptive Analytics Portfolio Part I: Maximize Credential Applicability

- · Introduce three-part strategy for launching or enhancing your analytics offerings
- Discuss recommendations for maximizing the COE opportunity
 - Allow all students to highly customize their degrees
 - Accommodate liberal arts graduates
 - Attract current or aspiring citizen data scientists

1 Data Analytics' Transformation of the Working World

2 Emerging Threats from Competition and Automation

The Adaptive Analytics Portfolio Part I: Maximize Credential Applicability

Defining Data Analytics

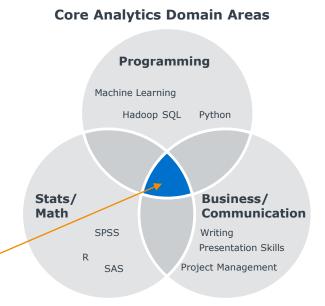


Data Analytics is the process of extracting, organizing, and modeling data to transform it into information for decision-making processes. This definition encompasses **data science** and **business analytics**.

Data Analytics Professionals

Data Scientists are the most advanced data analytics professionals. They have a sophisticated combination of programming, statistical, and business skills.

Data Analysts extract, organize, and transform data to generate insights for decision-making. They are similar to data scientists, but have less advanced technical training.



Data Analytics: The Next Generation



The Evolution from Big Data to Analytics 3.0

Explosion of analytic capabilities...

Natural Language Processing Internet of Thinas Deep Learning Artificial Intelligence Sentiment Analysis Neural Networks Pattern Recognition Data Mining Cognitive Computing Machine Learning Predictive Analytics Data Visualization Behavioral Analytics Cloud Computing Facial Recognition

...and interdisciplinary applications...





...signals the next generation of data analytics

Analytics 3.0



Prescriptive Models



Analysis of "Internet of Things"



Ubiquitous within Industry and Function

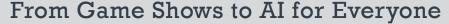


Embedded in All Workflows



Thomas Davenport

- Co-founder of the International Institute for Analytics
- MIT Fellow
- Distinguished Professor of IT and Management, Babson College





Data Analytics Inexorably Gets Faster, Smarter and Cheaper

2011: IBM spends \$2B on Jeopardy!





2016: Salesforce Einstein is Launched



The "Question Answering Machine"

- Converts human speech into database queries
- Analyzes 16 terabytes worth of information (32 million books)
- Uses 6 million logic rules to determine best answer
- Automatically generates game theory models to determine optimal betting strategies

"Salesforce Einstein is Your Data Scientist"

- Applies AI to consumer relationships
- Analyzes CRM data, emails, calendars, social media, and Internet of Things devices
- Delivers predictions and recommendations tailored to each customer service agent or salesperson
- Generates automatic responses to routine inquiries

Transforming Industry



Analytics is the 21st Century's Internet



Almost overnight, the Internet has gone from a technical wonder to a business must."

> Bill Schrader, Founder of PSINet, an early internet service provider

> > 99

"As we speak, data analytics is moving from a competitive advantage to a competitive necessity for all organizations."

> Simon Sheather Academic Director. MS Analytics Texas A&M University

Information Asymmetries "Winners"

Most Valuable Public Global Companies







2 Alphabet





Microsoft

Many Industries Playing Catch Up...

Analytics Maturity Assessment				
Lagging Industry	Maturity Level (1-6)			
Telecom	3.05			
Utilities	3.05			
Insurance	2.89			

...Along with Smaller Businesses

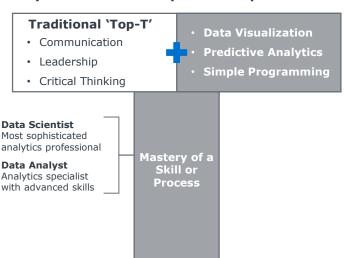


"The Big Data Market," O'Reilly Media Report

The Citizen Data Scientist Emerges

Greater Number of Jobs Require Facility with Analytics

Analytics Redefines Top of T Competencies



New Generalist Role Emerges

"A citizen data scientist is a person who creates or generates models that leverage predictive or prescriptive analytics but whose primary job function is outside of the field of

statistics and analytics."

Alexander Linden Research Director, Gartner

By the Numbers

≈400K

Citizen data scientist job postings in 2016

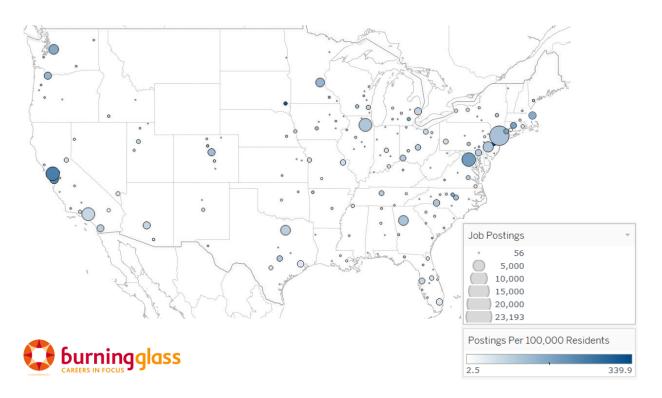
+24%

Citizen data scientist job posting growth from 2013 to 2016.





Citizen Data Scientist Job Postings (Top MSAs)





Intensifying Role for Analytics in Marketing

From Art...





...To Science

- "Programmatic buying" is the algorithmic sale, purchase, placement, and optimization of ad space in real time.
- Software is used to A/B test combinations of copy and images.
- 3 Social media analytics enables micro-targeting of content.
- Analytics helps track and compare effectiveness of all marketing channels.

The New Marketing Manager

Responsibilities

- Create and A/B test high quality content
- Track, analyze, and report on campaign performance

Required Skills

- Digital Content System Management
- Tableau
- SQL
- · Project Management
- Presentation Skills

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"If they want a career in marketing... [they need to] have a base or deeper understanding of analytics. We are blending art and science here, and everyone needs to know something about both."

Brian Harrington Executive Vice President and Chief Marketing Officer Zipcar

Masters of the Universe



Booming Job Market for Data Analytics Specialists...

Data Scientist: The most advanced analytics professional with sophisticated computer, statistical and mathematical skills.

\$120K

Median Base Salary

Job Posting Growth (2013 H2-2016 H2

Data Analyst: Similar combination of skills as the data scientist, but with less expertise in programming, modeling, and statistics.

\$60K

Average Base Salary

Job Postina Growth

(2013 H2-2016 H2)

...Fuels Hot Market for New and Established Analytics Programs



"We launched late so we did very little promotion. Yet, we received 40-50 applications to enroll a class of 16 on-campus students."

> Carl Lee, Program Director Central Michigan University

Northwestern SCHOOL OF PROFESSIONAL STUDIES

Enrollment in the MS in Predictive Analytics program doubled to 1,500 students since 2012.

Data Science Manager or College President: Who Makes More?

Median Base Salary of a Data Science Manager with 10 or more reports.

Salary of the Chancellor of a Southern Regional Public University with 18K students.

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Data Analytics' Transformation of the Working World

2 Emerging Threats from Competition and Automation

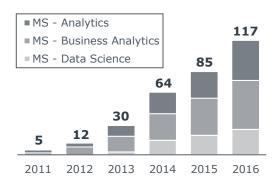
The Adaptive Analytics Portfolio Part I: Maximize Credential Applicability

The Perils of Success



Growth Opportunities Drive Competition, Old and New

MS Analytics Programs Grow 20-Fold

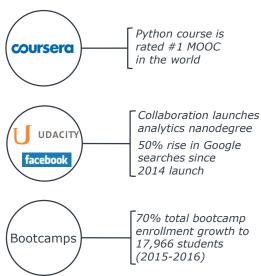


More on the way

57%

Increase in COE market research requests on data analytics opportunities, 2015-2016

A Prospective Student's Non-Traditional Options



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Analytics as "Sexiest" Job of the Century...

... But What If the Century Only Lasts 10 Years?

Automation is now blind to the color of your collar."

Jerry Kaplan

Humans Need Not Apply: A Guide to Wealth and Work in the
Age of Artificial Intelligence



Is Data Analytics Immune from Automation?

Fortune 500 Executive

"Over time, software will do more and more of what data scientists do today."

Ronald Coultier
VP and Chief Security Officer
ADP

Startup Founder

"[Higher level tools are] the sort of automation that eliminates the need for data scientists to a large degree."

> Sirish Raghuram Co-Founder and CEO Platform9 Systems

Program Director

"Data Scientists always joke about how they automate jobs. Now, their own jobs might be replaced."

Program Director, Midwestern Research University

Data Scientist

51% of Data Scientists surveyed believed that the majority of their expert-level tasks will be automated in the next 10 years or less.

KD Nuggets Survey 2015

Automation at Work, in Work



"Digitalize Your Enterprise with AI Software Purpose-Built for Operations"

∜WorkFusion

Founded: 2010

Location: New York City

VC Funding: \$36m Employees: ~200

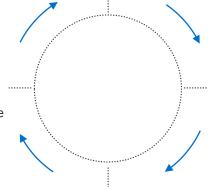
Continuous Learning

 AI software learns from the work of humans to automate additional tasks in the next project

Smart Process Automation

 AI software divides project into tasks to be automated, crowd-sourced, or

done in-house.



AI Project Management

- Sources, trains, and manages workers
- Distributes work based on capacity
- Makes payments with no management overhead

Quality Check

- Every task is automatically controlled using Six Sigma methods
- · Pinpoints workers who do not perform

Future-Proofing in the Age of Automation



Lifelong Learning Is Now a Career Necessity

Defining Future-Proofing

The process of anticipating the future and developing methods of **minimizing the negative effects** while **taking advantage of the positive effects** of shocks and stresses due to
future events."

Principlesoffutureproofing.com

The Experts Advise

"

"Finally, across nearly all industries, the impact of technological and other changes is shortening the shelf-life of employees' skill sets. So no matter what you choose to study today, expect to have to keep learning throughout the course of your career."

Saadia Zahidi Head of Education, Gender, and Employment Initiatives, the World Economic Forum

Your Prospects Agree

72%



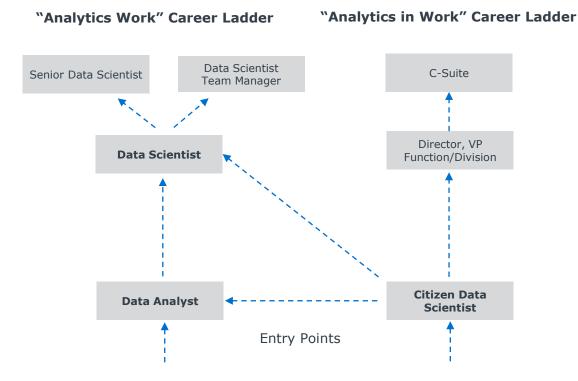
of prospective adult learners think they will need additional education to keep up with changes in their field

2016 Pearson Adult Learners Survey



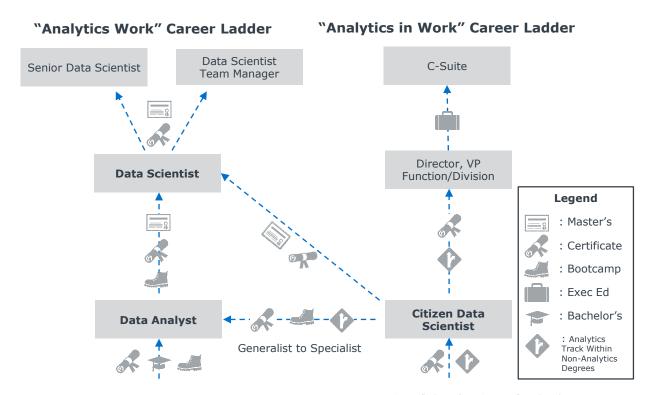
One Size Does Not Fit All

Variety of Analytics Roles and Pathways Compels a Credential Portfolio





Credential Versatility Serves Role Diversity



Data Analytics' Transformation of the Working World

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The Adaptive Analytics Portfolio Part I: Maximize Credential Applicability



Building the Adaptive Analytics Portfolio

Key Imperatives for Analytics Programs

Maximize	Track the	Realign the Practicum to
Credential Applicability	Technological Edge	Career Priorities
Enable Analytics Specialists	Monitor Rootcamp Market	

Enable Analytics Specialists to Tailor their Degrees

Offer advanced technical, function- and industry-specific electives

Diversify the Prospective Student Pipeline

Widen the enrollment pipeline by targeting non-STEM majors

Appeal to career starters and non-traditional students through undergraduate degrees

Provide Analytics Generalists Upskilling Options

Offer certificates, analytics tracks within existing degrees, and executive education programs to serve citizen data scientists and executives

Monitor Bootcamp Market Performance

Track bootcamp pricing, revenues, funding and valuations

Analyze Curriculum Gaps

Compare program curricula to bootcamps to assess market relevance

Enhance Employer Market Sensing

Generate broader perspectives on emerging employer skill and hiring preferences

Competitive Practicum Proposals

Practice #1: Galvanize/University of New Haven

Hardwiring Project Management

Practice #2: Louisiana State University

Solution Catalyst Hackathon

Practice #3: St. Mary's University

Analytics Program Evolution Accelerator

Practice #4: Indiana University

Launching a Data Analytics Program



What Opportunities Exist and How to Take Advantage?

➤ Four Steps to Support Decision Making

Conduct Market Assessment

- · Determine local and regional labor demand for analytics specialist and generalist roles
- Avoid "market sensing myopia" by conducting research with existing and leading generation analytics employers to pinpoint emerging skill and role preferences

Assess Institutional Analytics Ownership Options

- Acknowledge interdisciplinary nature of analytics and consult with colleges and faculty on analytics applicability to existing programs, majors and student audiences
- Prioritize discussions with business school and engineering school, as well as computer science, statistics and mathematics departments

Examine Viability of Masters Program as Foundational Credential

- Evaluate opportunity to develop masters as it provides interdisciplinary platform to innovate additional credentials and offer tracks/courses to other professional masters programs
- · Consider international student audience—residential programs are high demand and high margin

Embed Adaptability in Portfolio From the Beginning

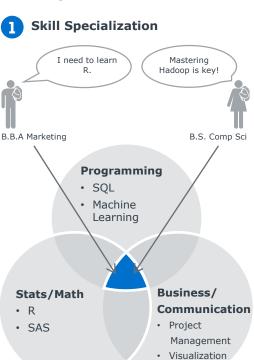
• Ensure selected student audiences have options; absence of steady state in the field necessitates tracking technological advances closely; invest in the practicum

Full new program launch guide included in "Data Analytics: Capitalizing on Creative Disruption" study



Options for Specialists to Tailor Their Degrees

Enabling Core Customization



Supporting Specialization

Function Focus

Electives and specialized degrees enable students to build business function-specific analytics skills



MS in Business Analytics

-Accounting analytics courses



MS in Marketing Analytics

3 **Industry Focus**

> Electives and specialized degrees permit students to build industry-specific expertise

Northwestern

MS in Predictive Analytics SCHOOL OF -Sports analytics focus PROFESSIONAL STUDIES



MS in Government Analytics

Source: "Government Analytics," Johns Hopkins University, http://advanced.jhu.edu/academics/graduate-degree-programs/government-analytics/; EAB interviews and analysis.



From "Made to Measure" to Bespoke

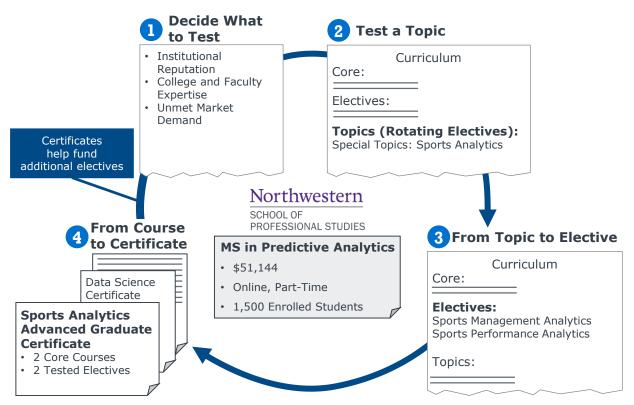
Customization Options Vary, but Proliferating Fast

Program	Launch Year	Electives	Skill Mix Options	Function Options	Industry Options
Northwestern SCHOOL OF PROFESSIONAL STUDIES MS in Predictive Analytics	2011	12	Heuristic Modeling Deep Learning	Analytics ConsultingMarketing Analytics	Sports Analytics Medical Data Science
MS in Analytics	2016	15	Managerial EconomicsStrategic Thinking	Brand StrategyMarketing Management	Cybersecurity Risk ManagementCybersecurity Governance
Berkeley Masters of Information and Data Science	2014	6	Natural Language Processing Machine Learning	• N/A	• N/A

Entirely Elective-Based Curriculum Maximizes Customization



Certificates Fund Innovation Pipeline



A Word About Certificates



Key Observations:

Number: ~150 certificates on the market¹

 Student Career Goals: Serve full range of analytics roles







Government Analytics Certificate

- School: Krieger School of Arts & Sciences: Advanced Academic Programs
- Cost: \$18,365
- Analytics Focus: Citizen data scientists
- Admission Criteria: No quantitative or programming skill requirements or recommendations
- Modality: Online/hybrid/in-person
- Format: For-credit
- Number of courses: Five
- Details: Stackable into MS in Government Analytics

Data Science Certificate

- School: Professional & Continuing Education
- Cost: \$3,735
- Analytics Focus: Data analytics professionals
- Admission Criteria: Score of at least 18/30 on test measuring programming, database, and quantitative skills
- · Modality: Online/hybrid/in-Person
- · Format: Non-credit
- · Number of courses: Three
- · Details: Predates MS in Data Science

Data Analytics Certificate

- School: Stetson School of Business and Economics
- Cost: Variable
- Analytics Focus: Senior managers
- Admission Criteria: Open Enrollment
- Modality: In-person
- Format: Non-credit
- Number of courses: One two-day class

Growth Lever Available



Non-STEM Students Represent Untapped Opportunity

We marketed mainly to prospects with STEM backgrounds. However, we also received many applications from liberal arts graduates. We've evolved our admissions process to better accommodate them."

Donald Harter Associate Dean for Master's Programs, Syracuse University

Lessons from Early Adopters

Reshape Admissions Criteria





Quant. Academic



Quant. Job Experience



Upward Career Progression



If <5 years exp., GMAT

Bridge the Gap



Pre-Program Summer Boot Camp

- Foundational knowledge courses in statistics, programming, and linear algebra
- Skills course on R (Stats Package)

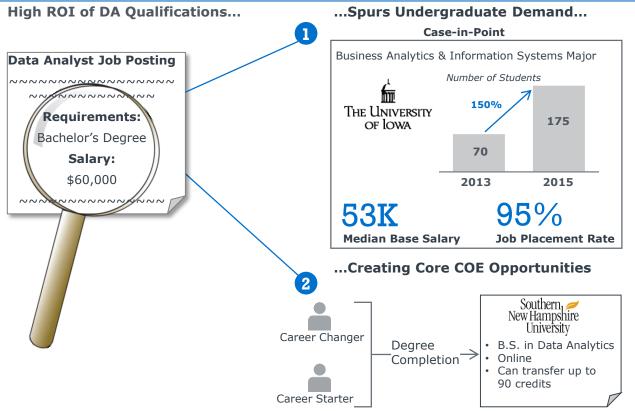
Offer Guided Pathways



- Technical: Focused on advanced programming and computational models
- Non-Technical: Focused on domain-specific applications; data visualization



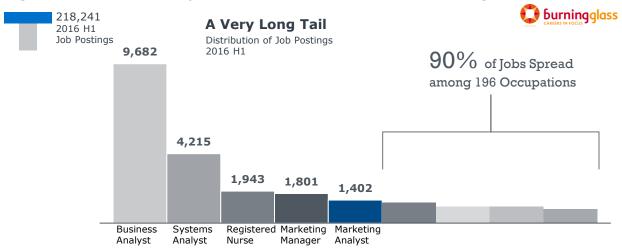
Embracing Career Starters & Changers



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Many, Many Types of Citizens

Significant Job Diversity Precludes One-Size-Fits-All Offerings



~2.4 Million Executives

Senior Management Market: Hiding in Plain Sight

"

"Senior teams...need both to acquire a knowledge of data analytics so they can understand what's rapidly becoming feasible and to embrace the idea that data should be core to their business."

"Mobilizing your C-suite for Big-Data Analytics"

McKinsey Quarterly

Many Ways to Make 'T'

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Tailored for Me...



Certificates

- · Serve multiple audiences
- Typically online
- Low startup costs



Certificate in Data Science

- · Four courses
- · For-credit
- Online
- Entirely customizable, choose among any course in data science program

...My Degree...



Tracks within Masters

- Enhances existing programs
- Boosts enrollment
- Cross-marketing opportunities

Executive Education

...My Company

- High margin
- · Limited customization
- · Employer partnerships



Northwestern

Sports Analytics Track within MA in Sports Administration

- Four courses from MS in Predictive Analytics:
 - Two core courses
 - Two Sports Analytics electives

The Data Institute

- Four-hour customized executive education sessions
- Use company's own data
- · Held on-site or on USF campus

More than Exec Ed

- Priority graduate hiring
- Priority selection of practicum students
- Members-only events

Showcase Your Portfolio



Key Website Lessons from Adaptive Portfolio Pioneers



1. Be Liberal Arts Friendly

Ensure posted admissions requirements accommodate non-STEM students



2. One-Stop Shop

Consolidate all university (or at least COE) data analytics credentials on a central landing page



3. Cross-Market

Cross-link your analytics credentials' individual webpages to drive student awareness of full portfolio of offerings



4. Best Fit Quiz

Create a "quick quiz" to guide prospective students to the best fit analytics credential



5. Website Audit

The COE Forum's web audit provides an assessment of your unit's online presence, highlights areas of excellence, indicates opportunities for targeted improvement, and recommends implementation tools and templates





Recruiting the Silent Funnel

Practice Example: Johns Hopkins' Program Explorer

Summary of Recommendations

- Allow specialists to customize their degrees through core, function- and industry-specific electives
- 2 Test customization options via rotating electives within analytics MS programs
- 3 Accommodate liberal arts graduates through alternative admissions and onboarding processes
- 4 Attract current or aspiring citizen data scientists via short-form credentials and analytics tracks embedded in existing masters' programs

Revisiting Today's Learning Objectives



Data Analytics' Transformation of the Working World

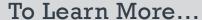
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Data Analytics Study Available Now



Thank you for your time!



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