DATA ANALYTICS CAREER ROLES: GUIDANCE FOR EDUCATORS, STUDENTS, AND PROFESSIONALS

June 3, 2019

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Presented at BDA EDCON 2019

Agenda

Purpose

Fuzzy Role Definitions in Analytics

Methodology

Common Career Roles

Common Skills

Mapping Roles to the Business Intelligence/Analytics Process

Limitations, Future Research, and Conclusions

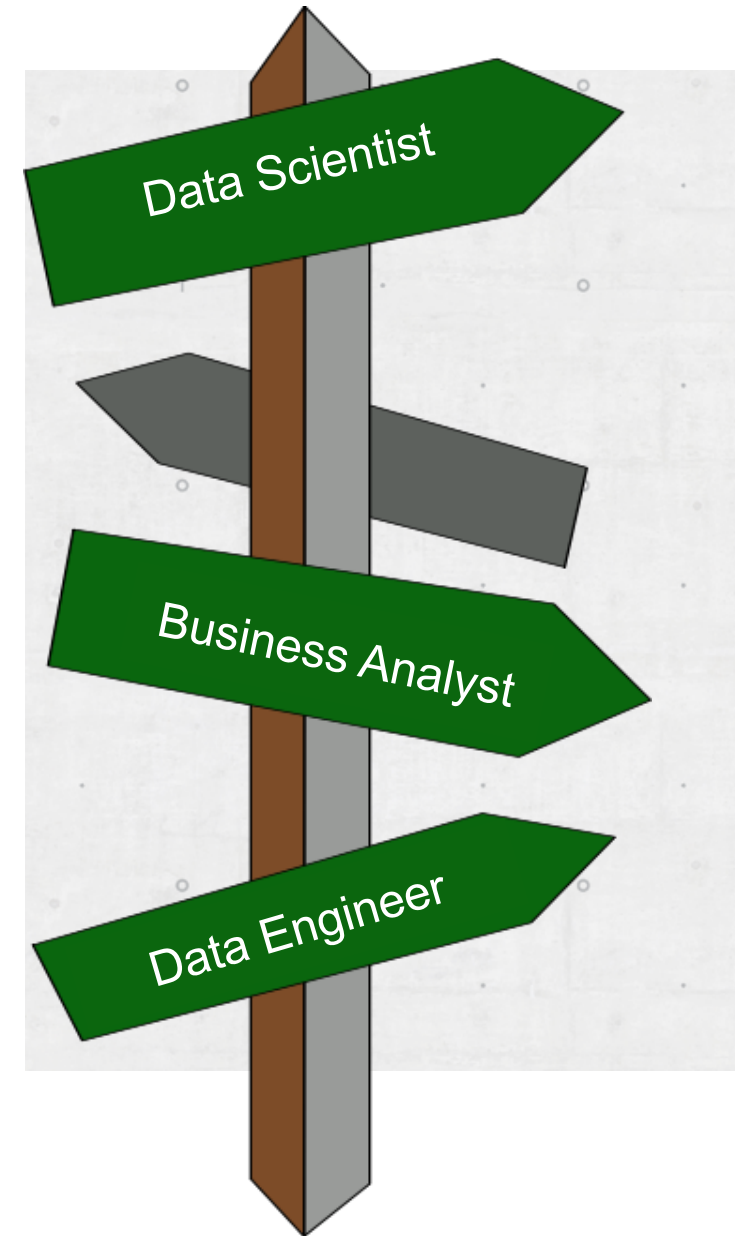# Purpose

Identify common role titles in analytics
- Role descriptions
- Skill requirements

Position roles along a technical-business spectrum

Provide guidance for
- Students seeking programs
- Institutions designing programs
- Graduates seeking careers

Move toward consensus terminology

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Data Scientist
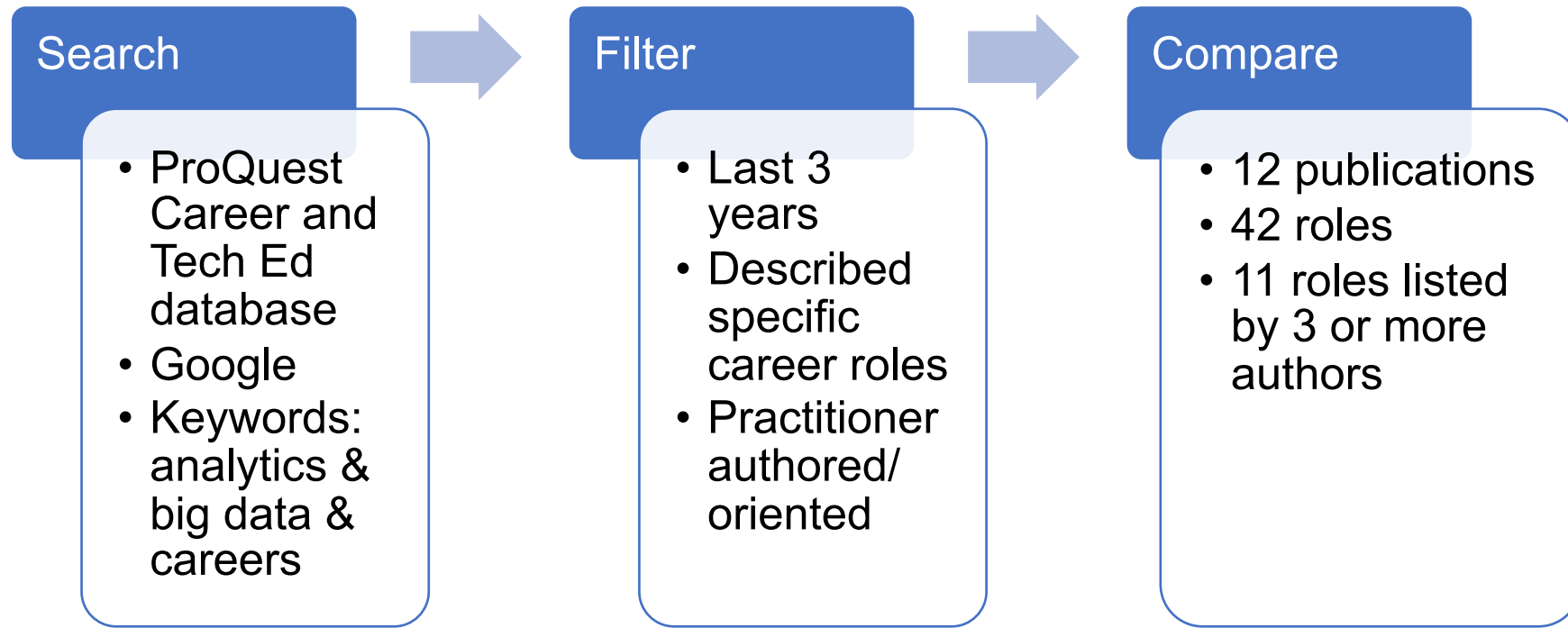
Business Analyst

Data Engineer

Fuzzy Role Definitions in Analytics

"Essentially, data science, data engineering, and data analytics are broad—and sometimes ambiguous—terms that describe a litany of skills and job titles in the world of data analytics." (White, 2016)

"The nature of jobs and careers associated with data management and insights has evolved. . . . Today's data professional may be part data scientist, tasked with digging into data to pull important nuggets and building a business story, part developer, and part administrator." (McKendrick, 2017)
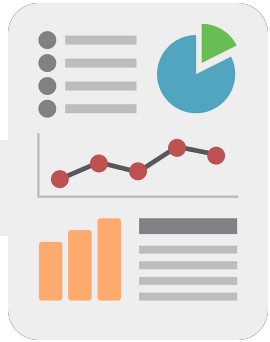
Methodology

Search
- ProQuest Career and Tech Ed database
- Google
- Keywords: analytics & big data & careers

Filter
- Last 3 years
- Described specific career roles
- Practitioner authored/ oriented

Compare
- 12 publications
- 42 roles
- 11 roles listed by 3 or more authors

Sources reviewed: Discover Data Science, 2018; Harvey, 2017; Helle, 2017; Jain, 2018b; Mayo, 2017; Marshall, Moore-Colyer, & Thorpe, 2018; McKendrick, 2017; Nelson, 2018; Pratt, 2017; Shacklett, 2016; White, 2018; and Wright, 2016.

Common Career Roles: Analyst Roles

Role	Description	Skills/Technologies
Data Analyst	Retrieves, prepares, and analyzes data using existing tools. Technically oriented (usually IT background). Often a junior position.	R, Python, HTML, C/C++, SQL, statistics, a/b testing, SAS/SPSS, Hive, BI tools (e.g. Tableau, Power BI).
Business Analyst	Retrieves, analyzes data using existing tools; presents and interprets results; gathers and documents information requirements. Business oriented.	SQL, NoSQL, reporting tools, dashboards, data warehousing, data visualization, basic statistics, BI tools (e.g. Tableau, Power BI). Often MBA.
Marketing Analyst	Business analyst focused on marketing.	Same as business analyst plus marketing degree/background. May have expertise in surveys, web/mobile analytics, and/or social media.
Business Intelligence Analyst	Often the next step up from business analyst. Builds and validates models; presents and interprets results, often at an executive/strategic level; oversees data and business analysts.	Similar to business analyst, but more advanced, plus advanced analysis techniques and scenario planning.

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Common Career Roles: Infrastructure/Architecture Roles

| Role	Description	Skills/Technologies
Data Engineer	Designs and implements infrastructure for data acquisition, storage, and analysis.	Software engineering, SQL, Hadoop, programming (Python, Java, Ruby), relational and NoSQL database design/implementation, data warehousing, cloud computing
Data Architect	Designs and implements overall strategy and systems for data capture, storage, processing, quality assurance, retrieval, and analysis across organization.	SQL, XML, Hadoop, Spark, data warehousing, systems development, database architecture (relational and NoSQL).
Database Administrator	Plans, designs, implements, operates, maintains, and secures databases and data warehouses.	Database design, operation, and maintenance (relational and NoSQL); SQL; scripting; security; performance monitoring and tuning; backup and recovery; distributed DBMS; cloud computing.

Common Career Roles: Other Roles

Role	Description	Skills/Technologies	
Statistician	Analyzes data using classical statistical methods with hypothesis testing (as opposed to other analytic methods using heuristics and/or machine learning).	Advanced statistics, R, SAS/SPSS.	
Data Modeler	Builds conceptual and logical models of data as foundation for database design, reporting, analysis, and machine learning.	Data modeling (e.g. entity relationship modeling); database design (relational and NoSQL); SQL; machine learning principles/tools.	
Data Scientist	Develops, implements, and applies complex algorithms and interprets results. Creates new tools. Able to work across multiple phases of the analytics process. .	SQL, Hadoop, Spark, R, SAS/SPSS, Python, Matlab, relational and NoSQL databases, advanced math/statistics, machine learning. Often a PhD.	
Data/ analytics manager	Manages analytics teams, projects and initiatives.	Data science, leadership, project management.	

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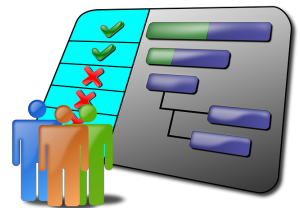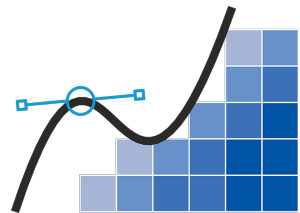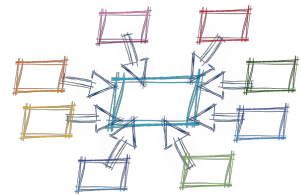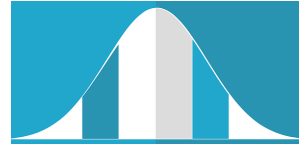
Career Roles Mentioned Less Frequently

CRM Analyst	E-commerce Analyst	ERP Analyst
Financial Analyst	**Pricing Analyst**	**Fraud/Risk Analyst**
	Data Miner	**ETL Developer**

Skills for Data Analytics Professionals

Most Frequently Requested Technical Skills (Hele, 2017)

SQL	Excel	Access
SAS	Oracle	SQL Server
Tableau	SAP	Python
SPSS	Java	R
	Hadoop	

Skill Requirements Mentioned Most Frequently in All Sources Reviewed

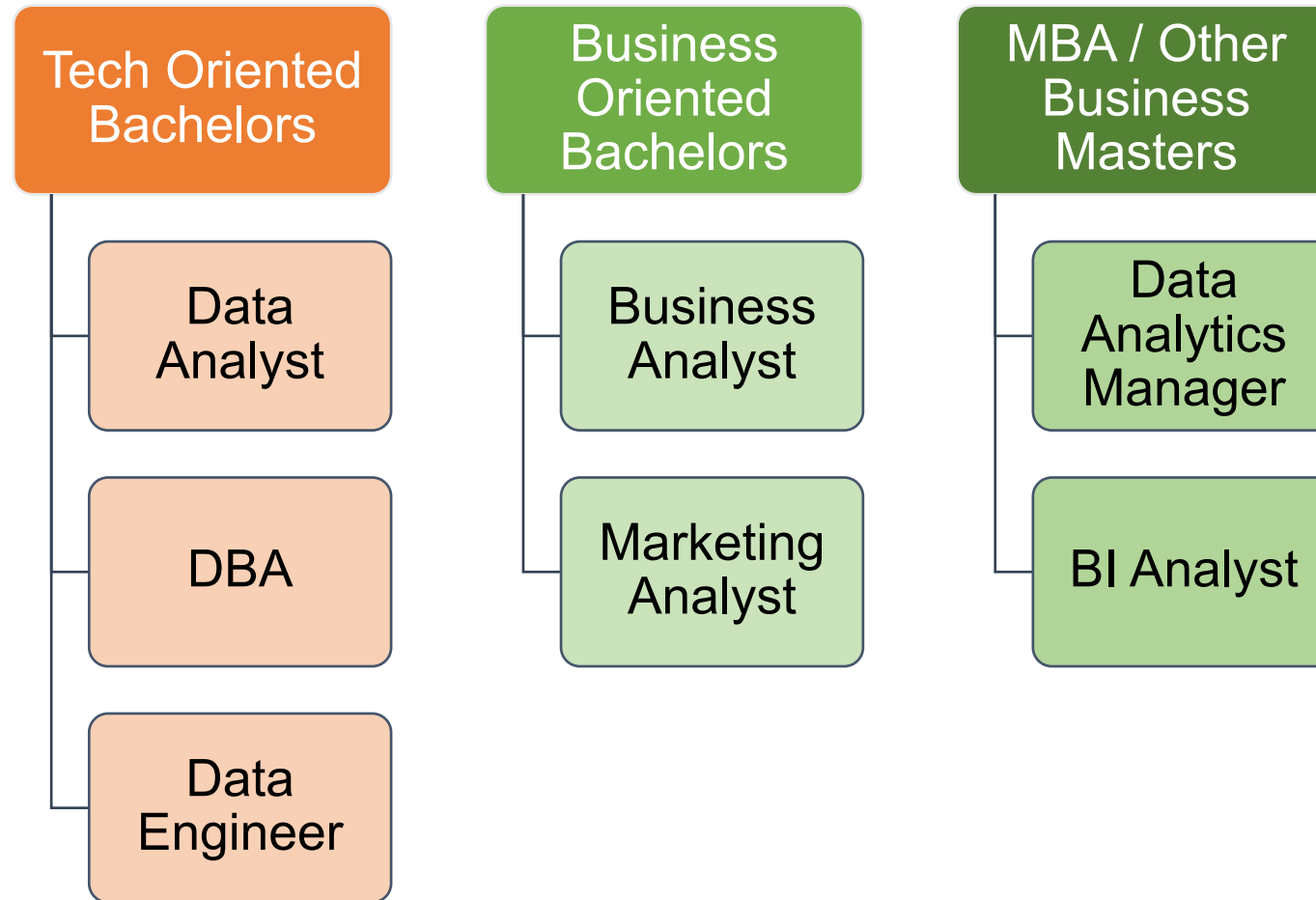|		
SQL	Statistics	Data Visualization
Hadoop	Spark	Data Warehousing
NoSQL	Python	R

Mapping Roles to the Business Intelligence/Analytics Process
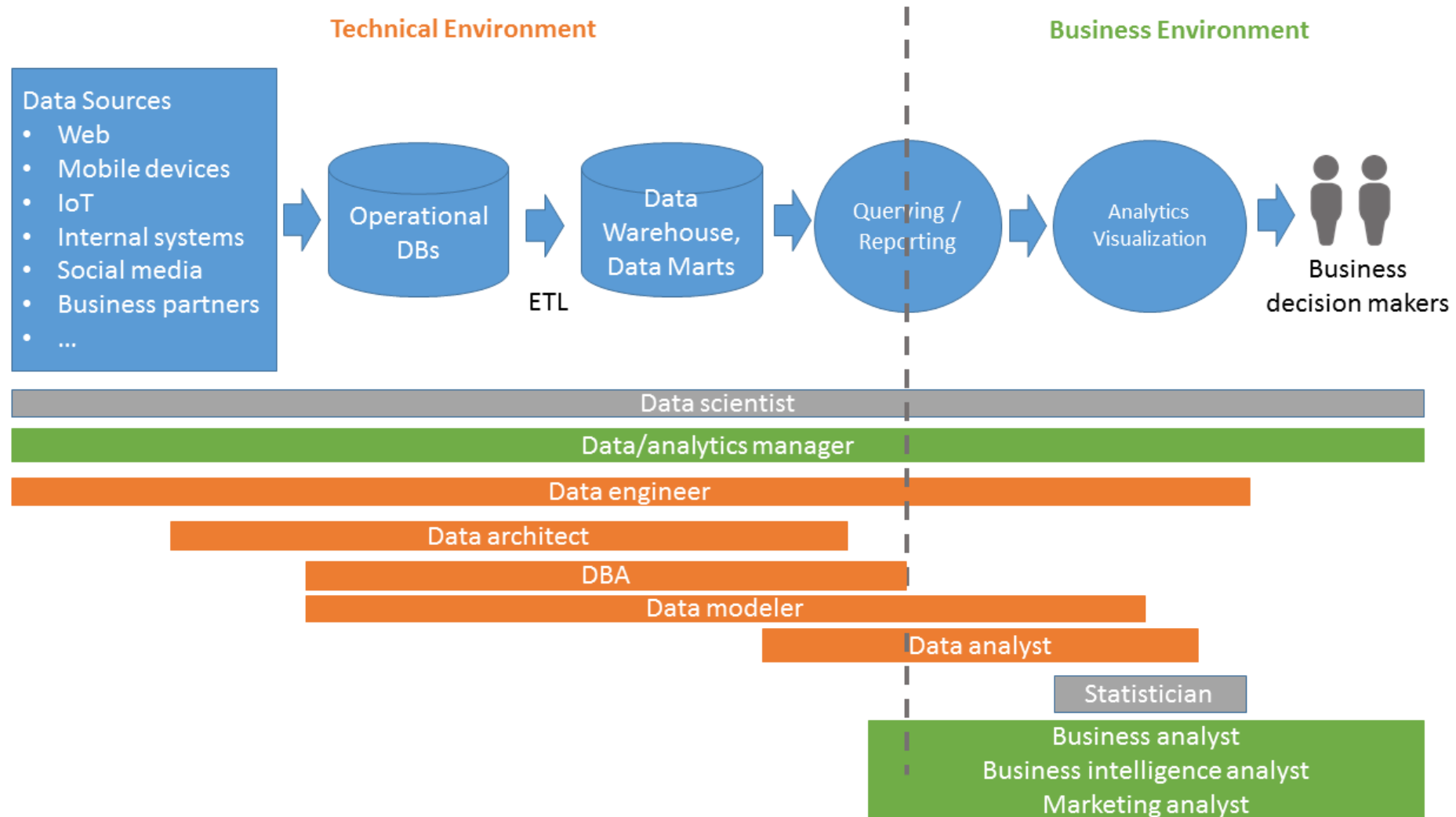
Combines aspects of BI framework (Coronel & Morriss, 2015) and Business Analytics model (Laursen & Thorlund, 2016)

Suggested Target Roles for Representative Analytics Programs

Tech Oriented Bachelors
- Data Analyst
- DBA
- Data Engineer

Business Oriented Bachelors
- Business Analyst
- Marketing Analyst

MBA / Other Business Masters
- Data Analytics Manager
- BI Analyst

Limitations and Future Research

Limitations

- Limited number of sources
- May not reflect industry practice
- Largely qualitative analysis

Future Research

- Analyze job postings
- More rigorous quantitative analysis

Conclusions

Potentially useful approaches

- Comparative analysis of published works on analytics career roles
- Mapping of roles to data flow through the BI-analytics process
- Definition of target roles to focus program and institutional offerings

Open question: Target roles versus broad preparation

- McKinsey: Broad need for data-driven decision makers (Jain, 2018a)
- All aspects of IT are impacted by data and machine learning (Shukla, 2018; Chawla, 2018; Subramanian, 2018)

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