Because learning changes everything.®

Dedicated Data Analytics for Accounting Course(s)

Agenda

- The Need for Data Analytics in Accounting
- How Data Analytics May be Covered in the Accounting Curriculum
- Introduction to Data Analytics for Accounting, 1e
- Data Analytics for Accounting, 2e
- Connect

Accounting Jobs Will Change –

More Analysis of Information than Collection of Information

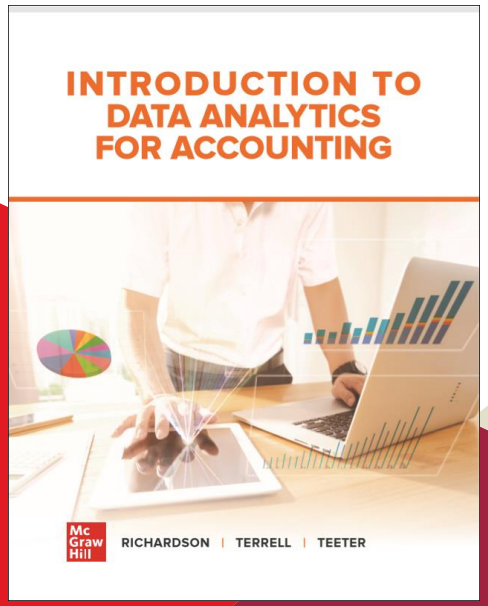
Figure 1 BRING ON THE PERSONAL TRAINERS

Probability that computerisation will lead to job losses within the next two decades, 2013 (1=certain)

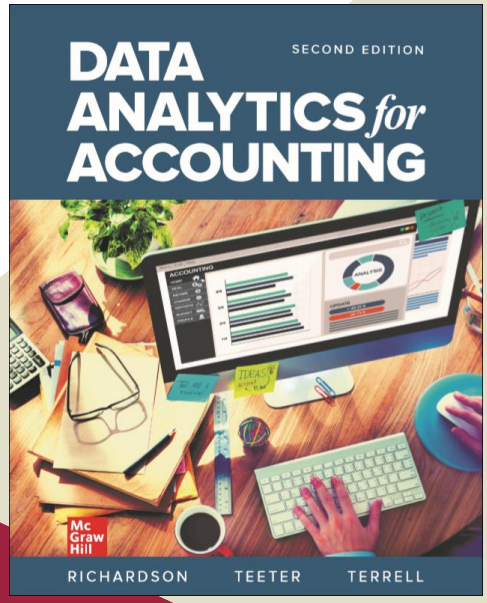
Jobs	Probability
Recreational therapists	0.003
Dentists	0.004
Athletic trainers	0.007
Clergy	0.008
Chemical engineers	0.02
Editors	0.06
Firefighters	0.17
Actors	0.37
Health technologists	0.40
Economists	0.43
Commercial pilots	0.55
Machinists	0.65
Word processors and typists	0.81
Real estate sales agents	0.86
Technical writers	0.89
Retail salesperson	0.92
Accountants and auditors	0.94
Telemarketers	0.99

Source: *"The Future of Employment: How Susceptible are Jobs to Computerisation?" by C.Frey and M.Osborne (2013)*

Data Analytics in Accounting: Only Textbooks in Accounting



Published May 2020

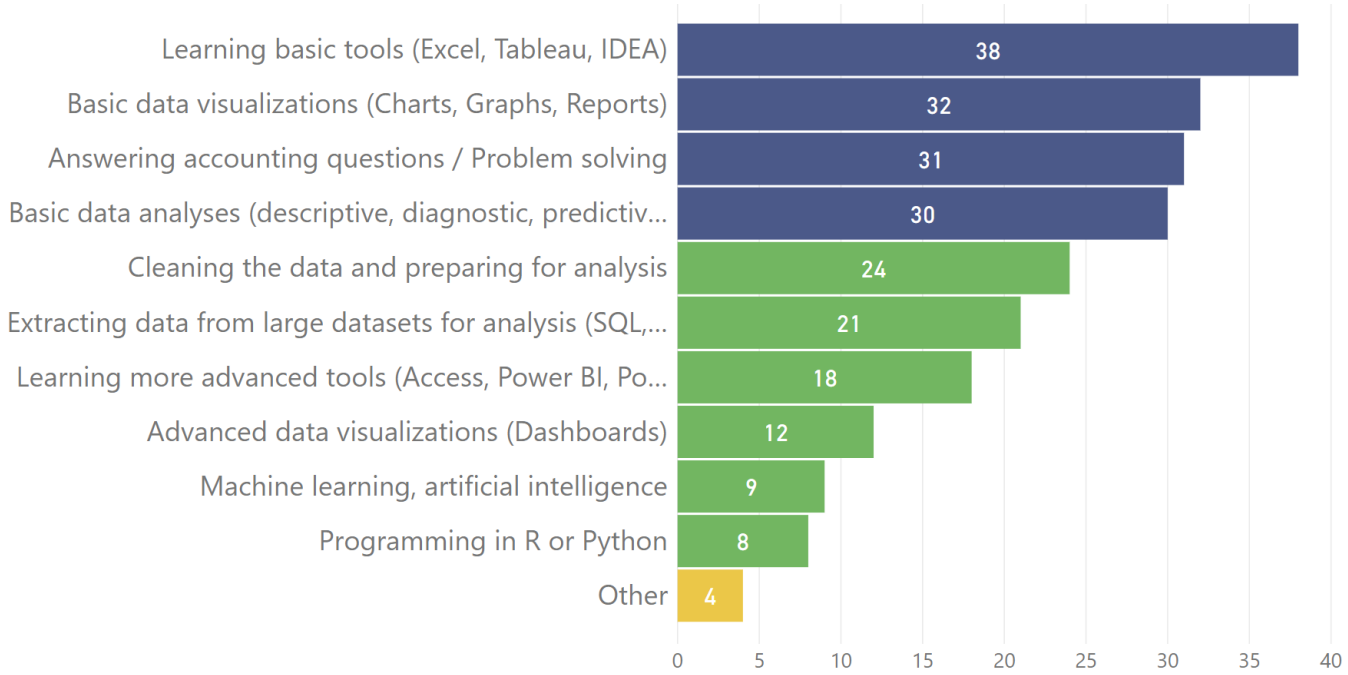


Published January 2020

Dedicated Data Analytics Courses/Texts

	Intro to Data Analytics for Accounting, 1e	Data Analytics for Accounting, 2e	Advanced Data Analytics for Accounting
Available from McGraw Hill?	May 2020	January 2020	
Level	Sophomore/Junior Year Undergrad	Senior/Masters in Accounting	Masters in Accounting
Prerequisites	Intro Financial and Intro Managerial	Intermediate, Systems, Audit, Cost Accounting	Data Analytics for Accounting
Tools Used	Excel, Tableau	Excel, Tableau, SQL Server, Remote Desktop, Access, Weka, XBRL, Python, IDEA	R, Python, Visualizations, Machine Learning
Extract, Transform and Load	None	Extensive (remote desktop), Dillard's Data	Extensive
Focus of Class	AMPS Model- Emphasis on "Asking the Question" and "Performing the Analysis"	Full IMPACT Model – Emphasis on "Mastering the Data", Use of multiple tools	ETL, Manipulating Large Data Sets, Visualizations
Type of Instruction	Chapters and Labs both step by step	Chapter conceptual, labs to address open-ended questions	

What should be the primary focus of the first (or potentially only) data analytics for accounting course? (Choose all that apply)

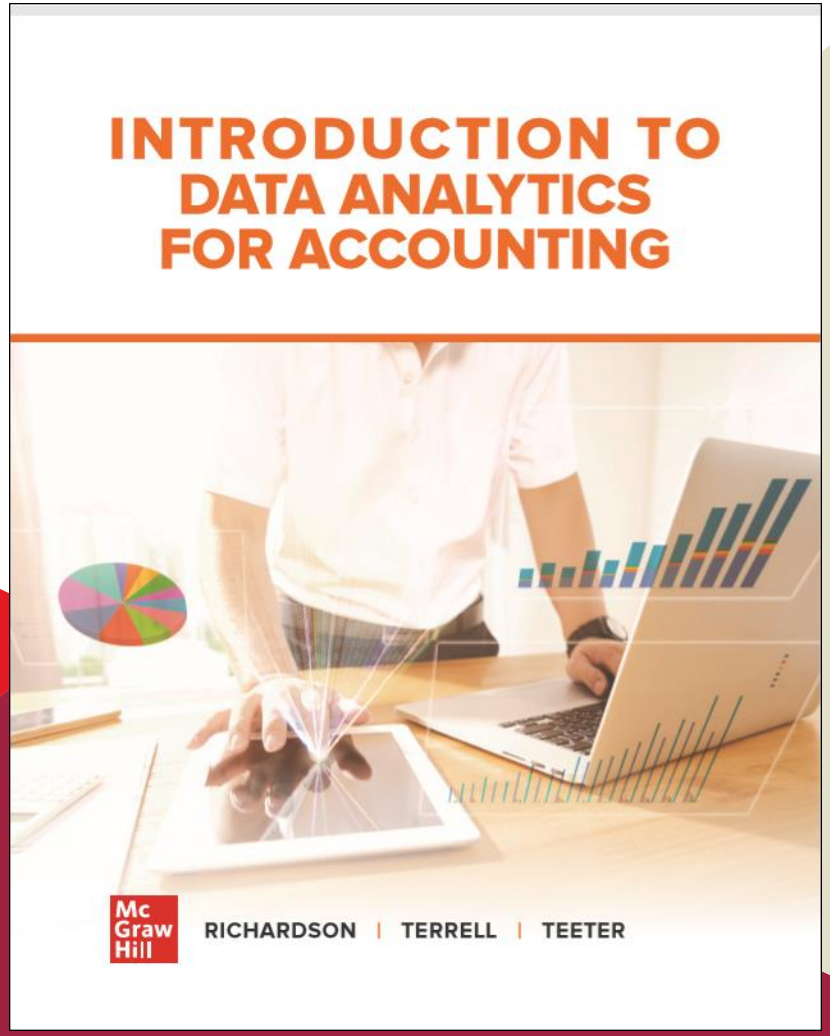


Introduction to DAA

DAA

Survey of Data Analytics Profs – Jan 2019 n=45

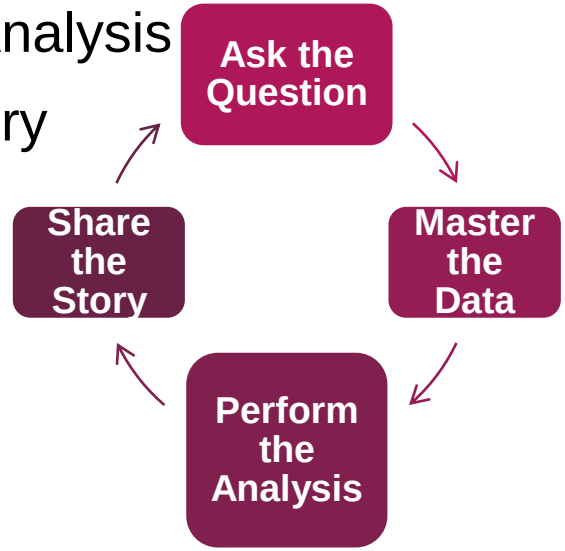
Introductory Data Analytics for Accounting 1e



Introduction to Data Analytics for Accounting

The AMPS Model:

- **A**sk the Question
- **M**aster the Data
- **P**erform the Analysis
- **S**hare the Story



Ask the Question

It all begins with understanding a business problem that needs addressing.

Having a concrete, specific question that is potentially answerable by data analytics is an important first step.

Accountants and auditors might be interested in questions like the following:

- Are employees circumventing internal controls over payments?
- Are there any suspicious travel and entertainment expenses?
- Why did profits fall when sales increased?'
- What is the forecast of sales next period?

Ask the Question

- What Happened? - Descriptive Analytics
- Why did it Happen? – Diagnostic Analytics
- Will it happen and if so, When? - Predictive Analytics
- What should we do, based on what we expect will happen? - Prescriptive Analytics

Analytics Type	Questions Types	Examples	Specific Types of Analysis Employed
Descriptive	What happened? What is happening?	Did we make a profit last year? Did return on assets improve over the past year? Did the airline company's on-time departures improve this past month? How much did we pay in federal taxes last year? How long have the existing accounts receivable been outstanding? Which product is the most profitable one for the company?	Counts, totals, sums, averages, financial statements, histogram, pivot tables
Diagnostic	Why did it happen? What are the root causes of past results? Can we explain why it happened?	Why did advertising expense increase, but sales fall? Why did sales, general and administrative expenses increase relative to the industry? Why did overall tax increase while net income did not? Can our variance analysis help explain why the labor expenses increased over the past year?	Hypothesis Testing, Variances, Differences from expectations, outliers/ anomalies, Correlations, Drill-downs and roll-ups to get detail when needed; PivotTables
Predictive	Will it happen in the future? What is the probability something will happen? Is it forecastable?	What is the chance the company will go bankrupt? Do we extend credit or not to customers based on customer background (credit score, employment record, existing debt)? Can we forecast earnings?	Classifications, regressions, simulation, Times series
Prescriptive	What should we do, based on what we expect will happen? How do we optimize?	If we have all 12/31 year-end audit clients, how will we organize our audit work in the new year? How can revenues be maximized (or costs be minimized) if there is a trade war with China? What is the level of sales that will allow us to breakeven? Should the company rent or lease their headquarters office? Should the company make its products or outsource to Indonesia?	Optimization, what-if scenarios, simulation; machine learning; cash flow analysis; goal-seek, etc.

Master the Data

Mastering the data requires two main skills:

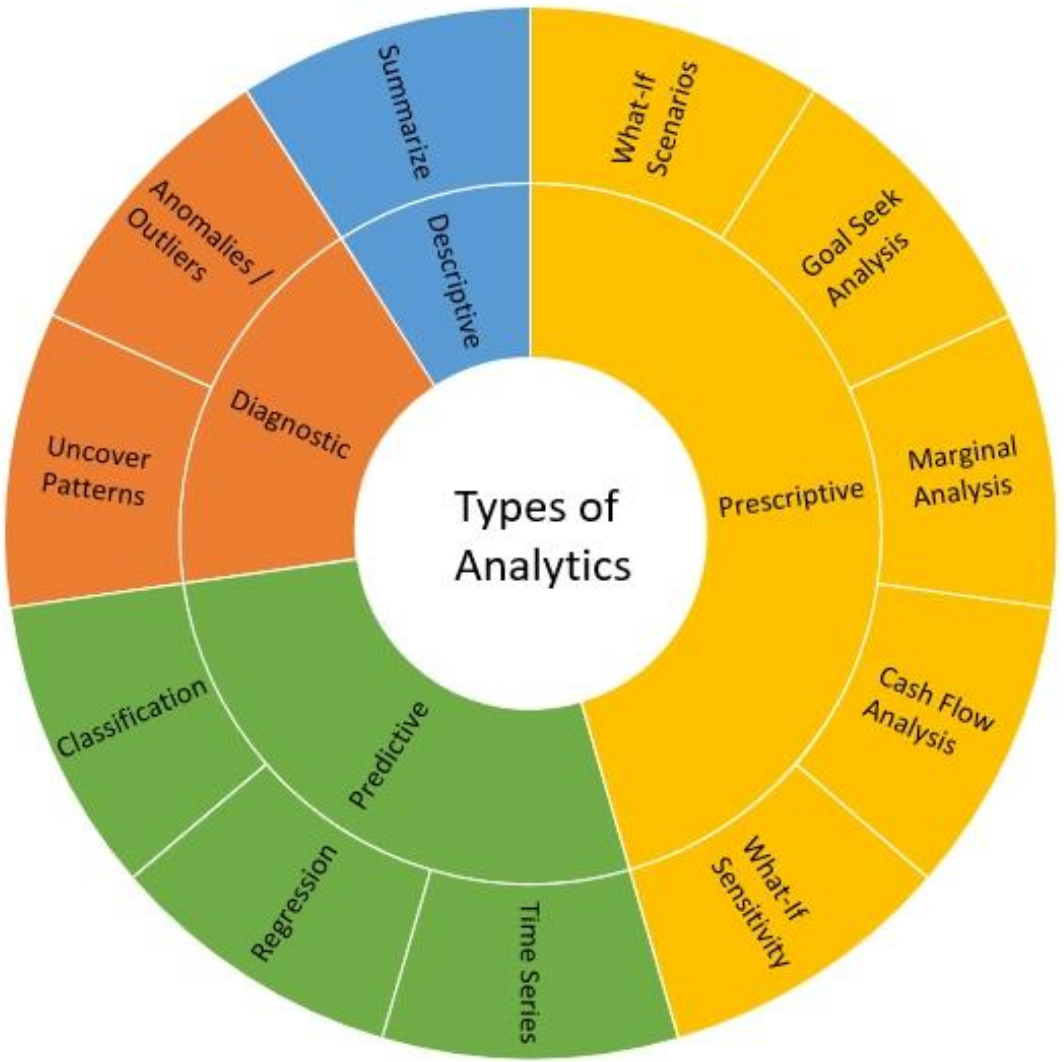
1. An understanding of what data is available to you and where it is stored

- Is it the right data? Is it of high enough quality? Will it answer the question?

2. Extracting, Transforming, and Loading (ETL) the data in preparation for data analysis

- 50-90% of the data analysts time is spent cleaning the data

Perform the Analysis



Perform the Analysis

More than 50 Labs

Benford's Law
- Refund Transactions

Altman's Z
- Predict Bankruptcy
- Use real-world companies

Estimate ABC Cost Drivers
- How do we allocate overhead?

Estimate Cost Behavior
- Fixed and Variable Costs

Outliers
- Variance Analysis, Controls testing

Gap Detection
- Sequence Checks
- Duplicate Checks

Forecasting
- Sales and Earnings
- Cash Flows
- Use Forecast Sheet

Goal Seek
- Breakeven Sales or Grade needed on Final!

Scenario Analysis
- Impact of Different Costs of Capital

Fuzzy Matches
- Names/Addresses of Employees and Vendors Similar?

Hypothesis Test
- Predict Sales Returns – Holidays vs. Non-Holidays

Operations
- Sell more when using Dillard's Credit Card?

Assigning and Using Labs to Teach Concepts

- Each lab has two data sets
- Each dataset requires a screen shot and answering five MC questions
- First Dataset, lots of handholding, let them take quiz as many times as they like
- Second Dataset, no handholding, quiz counts toward grade

Example of Step-by-Step Lab Directions

EXHIBIT 8.31

	G	H	I	J
1	Overhead Cost per Delivery	Miles per Delivery	Time per Delivery	Weight per Delivery
2	=B2/C2	=D2/C2	=E2/C2	=F2/C2
3	=B3/C3	=D3/C3	=E3/C3	=F3/C3
4	=B4/C4	=D4/C4	=E4/C4	=F4/C4

After entering the formulas in cells G2:J2, copy the formulas down to G3:J123. After entering these formulas, your cells should look as appears in Exhibit 8.32. Sometimes the number of decimal points will vary on your version of Excel.

EXHIBIT 8.32

	G	H	I	J
1	Overhead Cost per Delivery	Miles per Delivery	Time per Delivery	Weight per Delivery
2	72.67094114	22.375	23.5	113.125
3	56.49759646	12	21	519
4	60.90377209	22.25	18.25	476.25
5	70.46445039	19.3125	27.5	110.0625
6	71.78638105	24.55555556	26.05555556	143.0555556
7	72.42008428	28.5	22.1	310.1

Format the accounts, by highlighting columns G:J, right clicking on those columns, and selecting Format Cells.

Select Number under Category, and two decimal places (as shown in Exhibit 8.33).

Predictive analytics: Predict Bankruptcy

Altman (1969) Bankruptcy Prediction

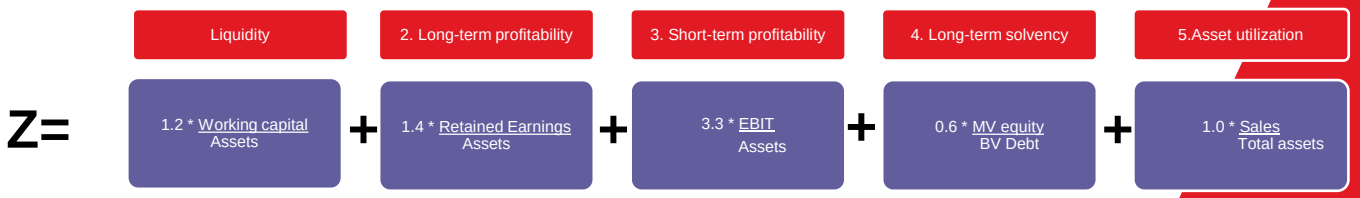
Altman considered many variables (22 in total) and combinations of variables, but this set did the “best overall job.”

Altman used Discriminant Analysis to determine the following coefficients:

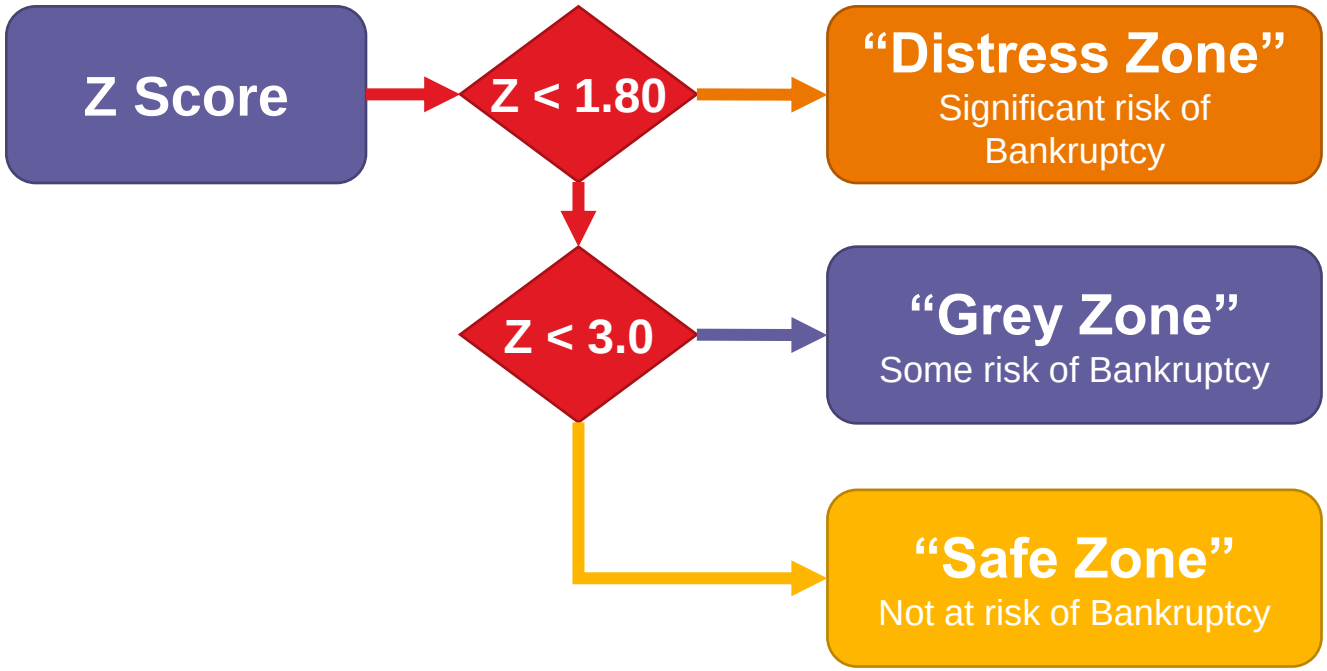
$$ZScore_t = 1.2\left[\frac{NWC_t}{TA_t}\right] + 1.4\left[\frac{RE_t}{TA_t}\right] + 3.3\left[\frac{EBIT_t}{TA_t}\right] + 0.6\left[\frac{MVE_t}{TL_t}\right] + 1.0\left[\frac{Sales_t}{TA_t}\right]$$

NWC – net working capital (current assets minus current liabilities)
TA – total assets
RE – retained earnings
EBIT – earnings before interest and taxes
MVE – market value of equity
TL – total liabilities

Ratios used in the model:



Lab 8-1 Predict Bankruptcy



Lab 8-6 Forecast Earnings

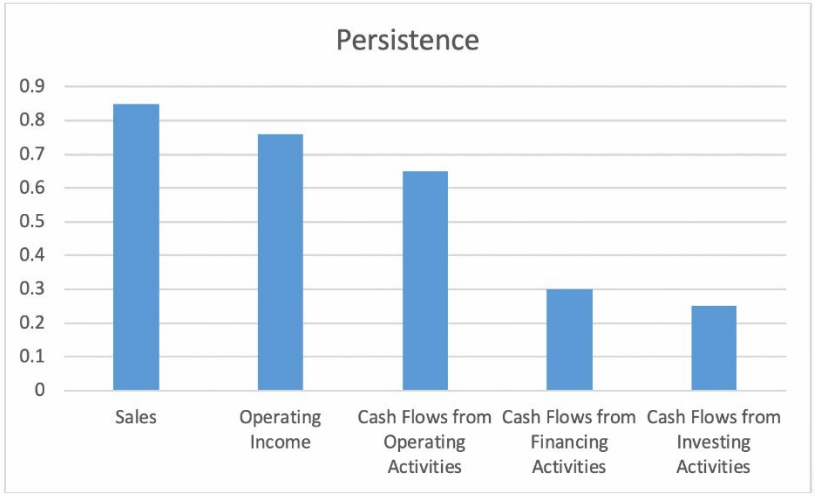
One of the key objectives of financial accounting is to help present and potential investors and creditors and other users in assessing the amounts, timing, and uncertainty of prospective cash receipts.

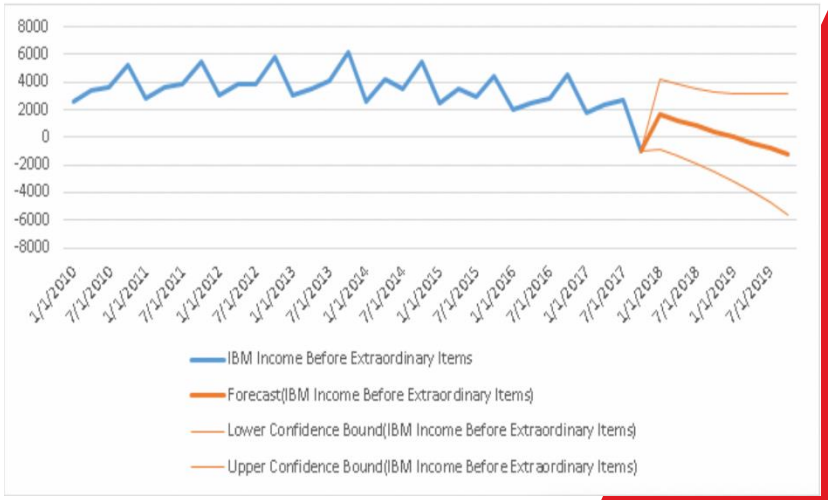
Accountants spend a lot of time meticulously recording past transactions, to help forecast future.

(Source SFAC 1: https://www.fasb.org/resources/ccurl/816/894/aop_CON1.pdf, accessed 2/14/2019).

Lab 8-6 Forecast Earnings

Persistence and Time Series of Real-World Companies (IBM):
Excel Forecast Sheet





Source: Dechow and Schrand, 2004

Share the Story

How can we communicate the findings?

Visualizations

Charts

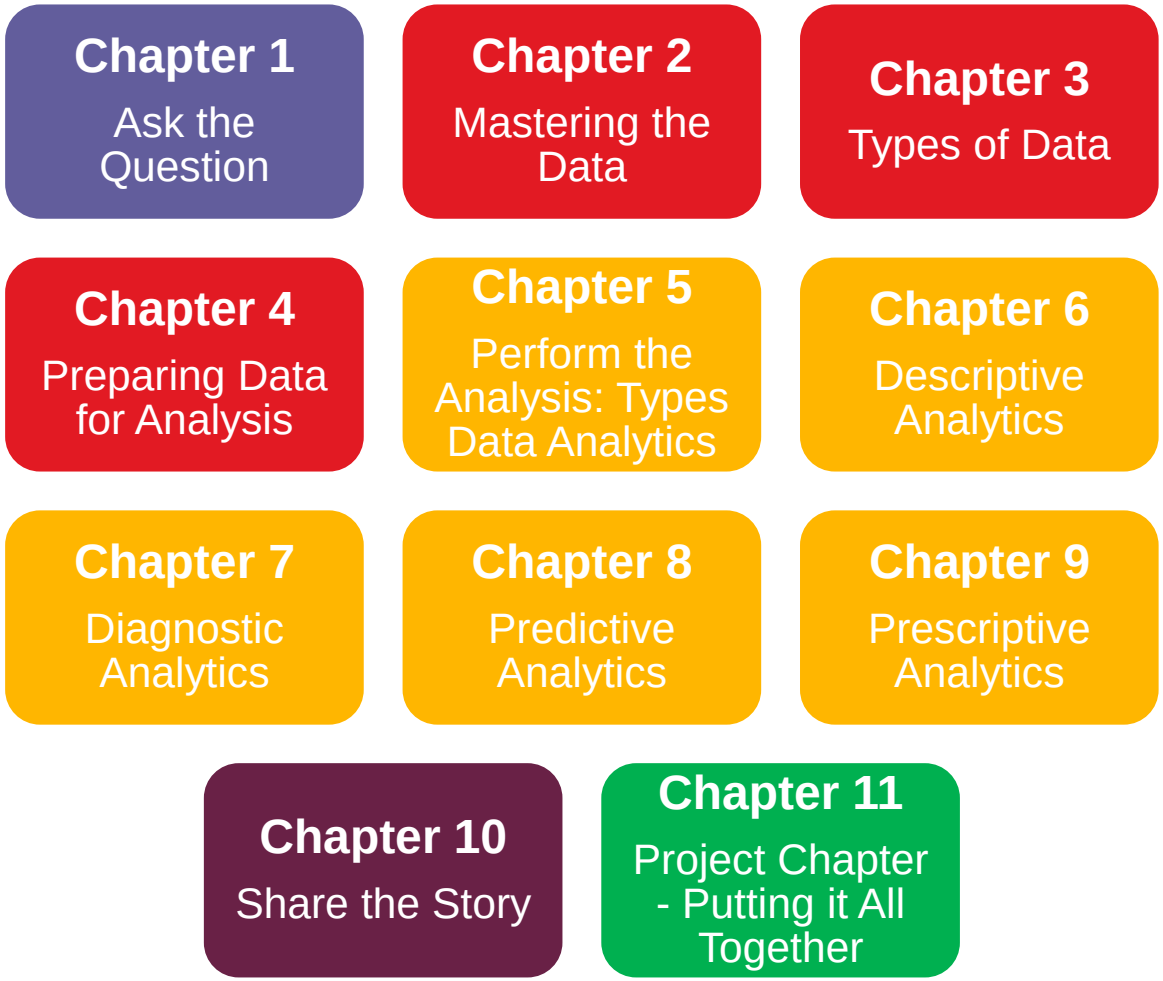
Graphs

Reports

Introduction to Data Analytics for Accounting

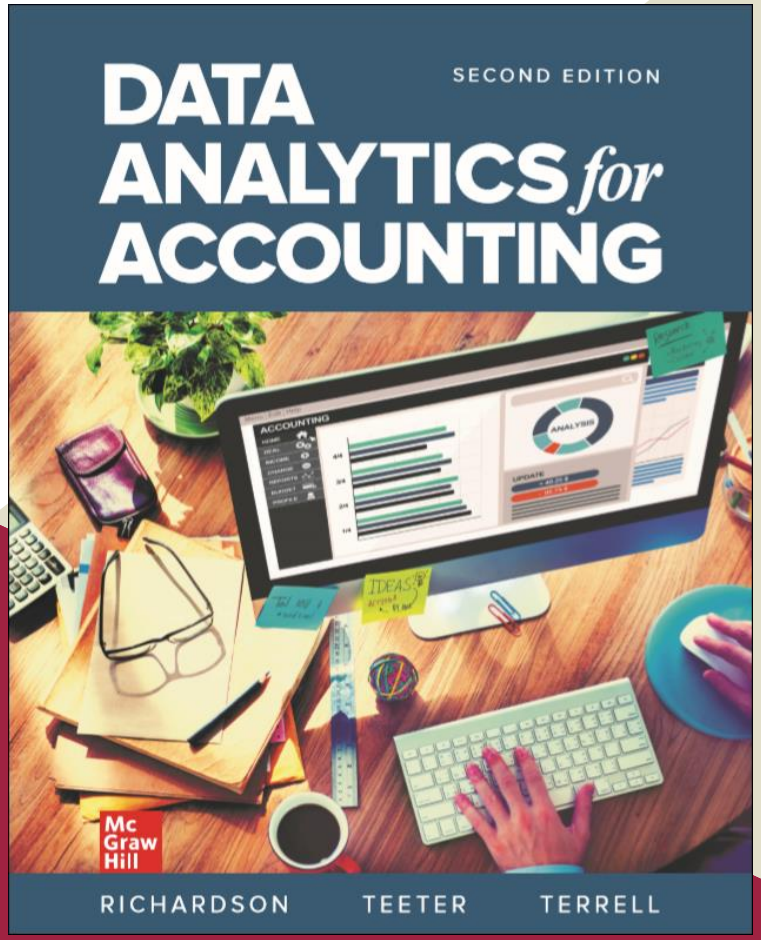
Course/Text Layout

Follows AMPS Model



Data Analytics for Accounting 2e

Published January 2020



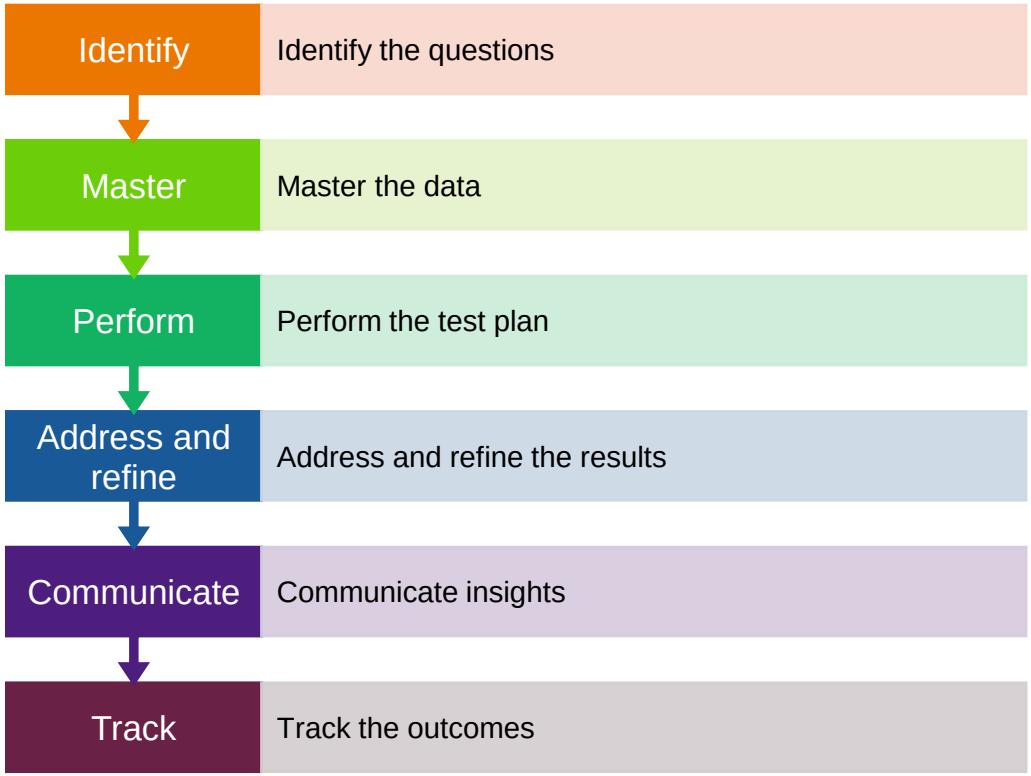
Dedicated Data Analytics Courses/Texts

	Intro to Data Analytics for Accounting, 1e	Data Analytics for Accounting, 2e	Advanced Data Analytics for Accounting
Available from McGraw Hill?	May 2020	January 2020	
Level	Sophomore/Junior Year Undergrad	Senior/Masters in Accounting	Masters in Accounting
Prerequisites	Intro Financial and Intro Managerial	Intermediate, Systems, Audit, Cost Accounting	Data Analytics for Accounting
Tools Used	Excel, Tableau	Excel, Tableau, SQL Server, Remote Desktop, Access, Weka, XBRL, Python, IDEA	R, Python, Visualizations, Machine Learning
Extract, Transform and Load	None	Extensive (remote desktop), Dillard's Data	Extensive
Focus of Class	AMPS Model- Emphasis on "Asking the Question" and "Performing the Analysis"	Full IMPACT Model – Emphasis on "Mastering the Data", Use of multiple tools	ETL, Manipulating Large Data Sets, Visualizations
Type of Instruction	Chapters and Labs both step by step	Chapter conceptual, labs to address open-ended questions	

Dedicated Data Analytics Courses/Texts

	Intro to Data Analytics for Accounting, 1e	Data Analytics for Accounting, 2e	Advanced Data Analytics for Accounting
Available from McGraw Hill?	May 2020	January 2020	
Level	Sophomore/Junior Year Undergrad	Senior/Masters in Accounting	Masters in Accounting
Prerequisites	Intro Financial and Intro Managerial	Intermediate, Systems, Audit, Cost Accounting	Data Analytics for Accounting
Tools Used	Excel, Tableau	Excel, Tableau, SQL Server, Remote Desktop, Access, Weka, XBRL, Python, IDEA	R, Python, Visualizations, Machine Learning
Extract, Transform and Load	None	Extensive (remote desktop), Dillard's Data	Extensive
Focus of Class	AMPS Model- Emphasis on "Asking the Question" and "Performing the Analysis"	Full IMPACT Model – Emphasis on "Mastering the Data", Use of multiple tools	ETL, Manipulating Large Data Sets, Visualizations
Type of Instruction	Chapters and Labs both step by step	Chapter conceptual, labs to address open-ended questions	

Our book prepares students using the IMPACT model:

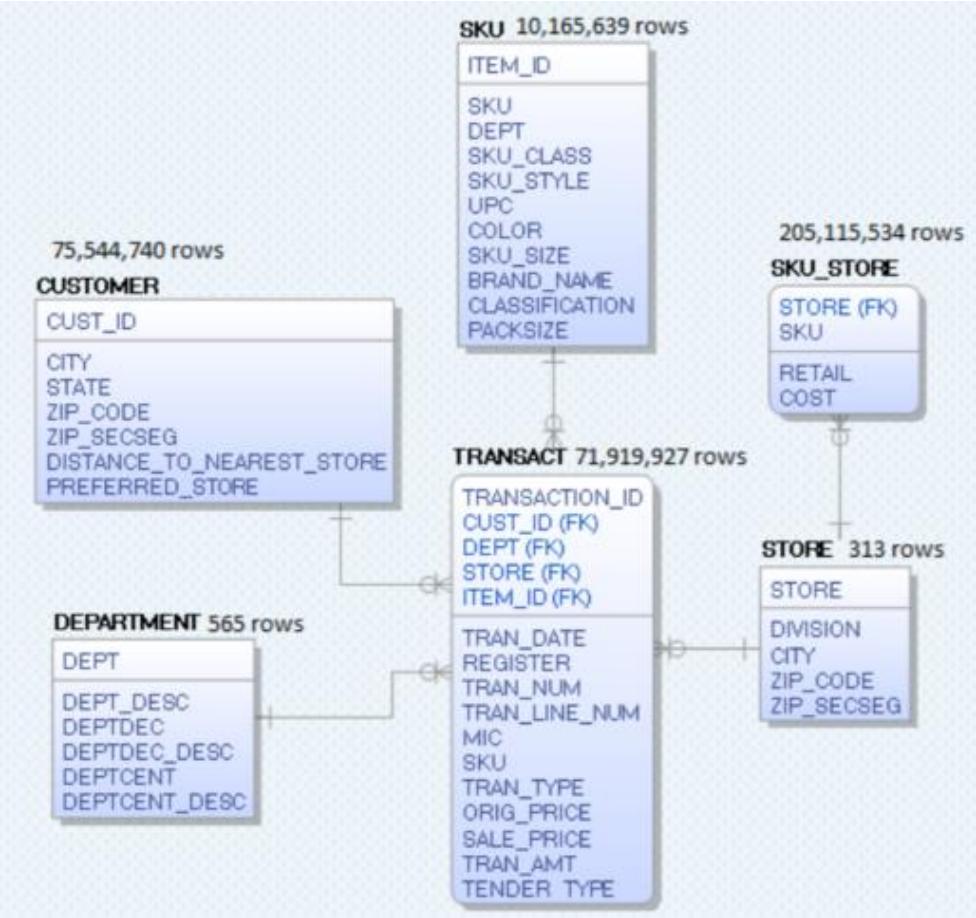


Comprehensive cases have the students explore Dillard's 2016 sales data

Remote Desktop hosted by Walton College at the University of Arkansas
6 tables with more than 360 million records

Expose students to real world data integrity problems

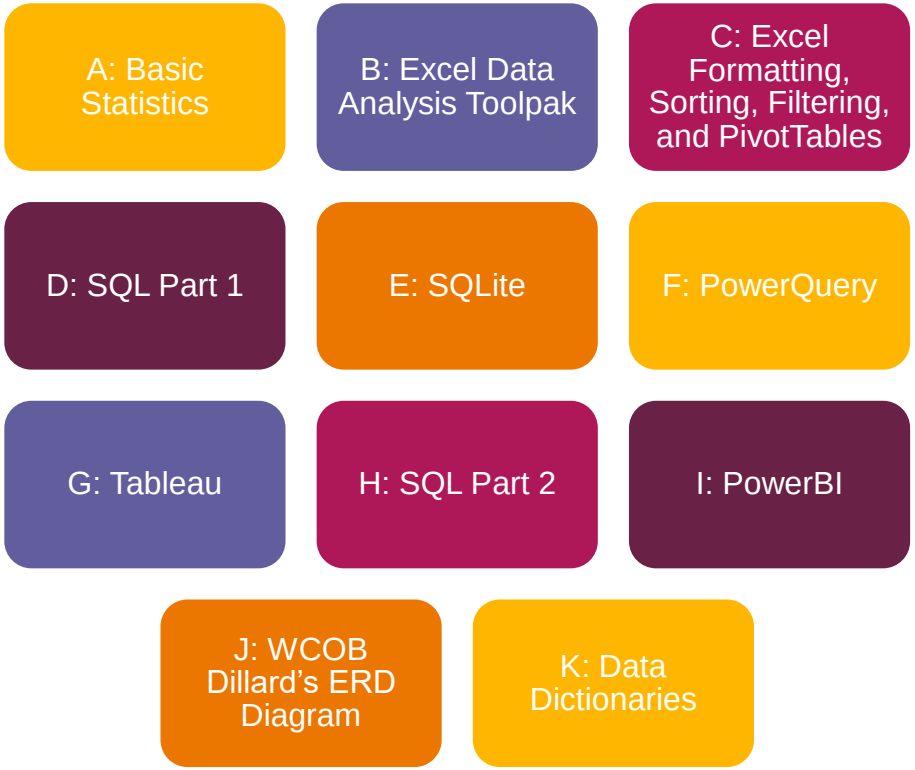
Each comprehensive lab in the textbook details different data cleaning, analysis, modeling, and visualization techniques



Chapter Breakdown

Foundation						
Chapter 1 Data Analytics in Accounting and Identifying the Questions	**Chapter 2** Mastering the Data	**Chapter 3** Performing the Test Plan and Analyzing the Results	**Chapter 4** Communicating Results and Visualizations			
General	**Auditing**	**Managerial**	**Financial**	**Tax**	**Capstone**	
Chapter 5 The Modern Accounting Environment	**Chapter 6** Audit Analytics	**Chapter 7** Managerial Analytics	**Chapter 8** Financial Statement Analytics	**Chapter 9** Tax Analytics	**Chapter 10** Project Chapter Basic	**Chapter 11** Project Chapter Advanced

Appendices


A: Basic Statistics
B: Excel Data Analysis Toolpak
C: Excel Formatting, Sorting, Filtering, and PivotTables
D: SQL Part 1
E: SQLite
F: PowerQuery
G: Tableau
H: SQL Part 2
I: PowerBI
J: WCOB Dillard's ERD Diagram
K: Data Dictionaries

Both Books Online/ Connect Ready!

- Software installation guide
- Remote access connection guide
- Lab troubleshooting and tips
- Sample course outlines and slides
- Video instruction on labs
- Video chapter lectures

Questions? Contact us!

McGraw-Hill Accounting Team →
AccountingTeam@mheducation.com

Vern Richardson→

- **Email:** VRichardson@walton.uark.edu

Ryan Teeter→

- **Email:** ryan.teeter@pitt.edu

Katie Terrell→

- **Email:** KTerrell@walton.uark.edu