Data Analytics for Accounting 1st edition Richardson Solutions Manual

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Instructor's Resource Manual

Data Analytics for Accounting
1st Edition

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TO THE INSTRUCTOR

This guide includes suggested assignment schedules, topical outlines, chapter comments and observations, and suggested team exercises based on the authors experience teaching data analytics.

Assignment Suggestions. This textbook is not designed to be a survey of data analytics in accounting. Instead, it is intended to develop student skills to support accountant's roles as data analysts. Consequently, we recommend that the assignments include the problems and labs that will develop these skills and require critical thinking. Different instructors will teach this course differently, some choosing to only use the labs or only include the text. Others hoping to cover this textbook in eight weeks, instead of a full fifteen-week period. The assignment suggestions assume that this material will be covered over fifteen-week period.

Brief Topical Outlines. These outlines are designed to assist instructors in coordinating classroom discussions with material covered in the textbook and the PowerPoints. The Brief Topical Outlines identify topics that we believe are important enough to merit some classroom discussion. The outlines also include references to illustrations in the textbook, PowerPoints, questions, problems, and cases that may serve as useful supplements to your class presentations.

Comments and Observations. You will probably find that our comments and observations suggest coverage of more topics than your time will allow. This is because our comments are drawn from the experiences of three instructors over many semesters. Therefore, we suggest that you borrow from our comments that which appeals to you and discard that which does not.

Course Description and Objectives.

For information only, we use the following course description and objectives:

Course Description

Data Analytics is changing the business world - data simply surrounds us! With so much data available about each of us (i.e., how we shop, what we read, what we've bought, what music we listen to, where we travel, who we trust, etc.), arguably, there is the potential for analyzing that data in a way that can answer fundamental business and accounting questions and create value.
According to the results of 18th Annual Global CEO Survey conducted by PwC, many CEOs put a high value on Data Analytics, and 80% of them place data mining and analysis as the second-most important strategic technology for CEOs. In fact, per PwC's 6th Annual Digital IQ survey of more than 1,400 leaders from digital businesses, the area of investment that tops CEOs' list of priorities is business analytics.1

This textbook addresses what we believe will be a similar impact of data analytics on accounting and auditing. For example, we argue that data analytics will play an increasingly critical role in the future of audit. In a recent Forbes Insights/KPMG report "Audit 2020: A Focus on Change", the vast majority of survey respondents believe both that:

[1] "Data Driven: What students need to succeed in a rapidly changing business world," by PwC, http://www.pwc.com/us/en/faculty-resource/assets/PwC-Data-driven-paper-Feb2015.pdf, posted February 2015, extracted January 9, 2016.

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1. auditors must better embrace technology and

2. technology will enhance the quality, transparency and accuracy of the audit.

No longer will auditors be simply checking for errors, misstated accounts, fraud, and risk in the financial statements, or merely report their findings at the end of the audit. Through the use of data analytics, audit professionals will be collecting and analyzing the company's data similar to the way a business analyst would to help management make better business decisions. In our textbook, we emphasize audit data analytics and all the testing that can be done to perform audit testing.

Data analytics also potentially has an impact on financial reporting. With the use of so many estimates and valuations in Financial Accounting, some believe that employing Data Analytics may substantially improve the quality of the estimates and valuations. Likewise, the use of XBRL data gives accountants access to more timely and more extensive accounting data for financial analysis.

This textbook recognizes that accountants don't need to become data scientists – they may never need to build a data repository or do the real hardcore data analytics or machine learning – however, we do emphasize seven skills that we believe analytic-minded accountants should have, including the following:

1. Developing an Analytics Mindset - recognize when and how data analytics can address business questions
2. Data Scrubbing and Data Preparation – comprehend the process needed to clean and prepare the data before analysis
3. Data Quality – recognize what is meant by data quality, be it completeness, reliability or validity
4. Descriptive Data Analysis – perform basic analysis to understand the quality of the underlying data and its ability to address the business question
5. Data Analysis through Data Manipulation – demonstrate ability to sort, rearrange, merge and reconfigure data in a manner that allows enhanced analysis.
6. Defining and Addressing Problems through Statistical Data Analysis – identify and implement an approach that will use statistical data analysis to draw conclusions and make recommendations on a timely basis
7. Data Visualization and Data Reporting – report results of analysis in an accessible way to each varied decision maker and their specific needs

Consistent with these skills we desire in all accountants, we recognize that Data Analytics is a process. The process begins by identifying business questions that can be addressed with data, and then test the data, refine our testing and finally, communicate those findings to management. We describe our data analytics process by using an established data analytics model called the IMPACT Cycle, by Isson and Harriott:

1. Identify the Question
2. Master the Data
3. Perform Test Plan
4. Address and Refine Results
5. Communicate Insights
6. Track Outcomes

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Course Objectives

After completing this course, students should be able to:

1. Describe in detail the purpose of data analytics and how it can create value for accountants.
2. Describe the IMPACT model and how it can be used to address most accounting issues that can be addressed by accountants.
3. Demonstrate proficiency in multiple software tools to manage data, perform test analyses, communicate findings through text, tables and visualizations.
4. Explain how data analytics can be used in accounting, auditing, managerial accounting and financial accounting to find patterns, errors, and anomalies and find insights useful to decision making.
5. Describe and demonstrate different types of test approaches that can be used to gather insights in decision making.

Note to Instructors who plan on Using Comprehensive Labs with Dillard's data:

The use of Dillard's data requires gaining access to the data housed at the University of Arkansas. For your students to gain access, you will need to follow the procedures outlined below. Please allow up to one week for full access.

For instructors, we recommend that you request student accounts in advance to your first lab using the Comprehensive Case which uses Dillard's data. One you have a remote access account, you can log in to access the University of Arkansas server using one of the following systems: Windows 10 App, Windows, or Mac. Guidelines for logging in with each of these systems can be found below:

Requesting Remote Desktop Accounts

Logging into UARK Remote Desktop – Window 10 App
Logging into UARK Remote Desktop – Mac
Logging into UARK Remote Desktop – Windows Legacy

Still have Questions? UARK Remote Desktop FAQ

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ASSIGNMENT SCHEDULE INCLUDING ALL CHAPTERS—Assignments

Chapter	Topic	Written Assignment	Objective Questions
1	Data Analytics in Accounting and Business	Questions 1-8, 1-13, Problems 1-1, 1-2, 1-3, 1-4	MC 1-1 to 1-10
1	Labs (if time permits)	Lab 1-1 and 1-3	
2	Data Preparation and Cleaning	Problem 2-1, 2-3, 2-4, 2-5	MC 2-1 to 2-10
2	Labs (if time permits)	Lab 2-2 and 2-4	
3	Modeling and Evaluation: Going from Defining Business Problems and Data Understanding to Analyzing Data and Answering Questions	Problem 3-1, 3-3, 3-5. 3-6	MC 3-1 to 3-22
3	Labs (if time permits)	Lab 3-3 and 3-4	
4	Visualizations: Using Visualizations and Summaries to Share Results with Stakeholders	Problem 4-2, 4-3, 4-8 and 4-9	MC 4-1 to 4-15
4	Labs (if time permits)	Lab 4-2 and 4-3	
5	The Modern Audit and Continuous Auditing	Problem 5-4 and 5-5	MC 5-1 to 5-10
5	Labs (if time permits)	Lab 5-3 and 5-4	
6	Audit Data Analytics	Problem 6-3, 6-5, and 6-7	MC 6-1 to 6-10
6	Labs (if time permits)	Lab 6-3 and 6-4	
7	Generating Key Performance Indicators	Problem 7-1, 7-5 and 7-7	MC 7-1 to 7-10
7	Labs (if time permits)	Lab 7-2 and 7-3	
8	Financial Statement Analytics	Problem 8-1, 8-3, 8-5	MC 8-1 to 8-10
8	Labs (if time permits)	Lab 8-1 and 8-2	

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PRESENTATION SUGGESTIONS

CHAPTER 1

Data Analytics in Accounting and Business

Brief Topical Outline

A. Introduction

1. What is Data Analytics? (PowerPoints 1-5 – 1-8)
2. How does Data Analtyics Affect Business? (PowerPoints 1-9 – 1-11)
3. How does Data Analytics Affect Auditing? (PowerPoints 1-12, 1-13)
4. How does Data Analytics Affect Financial Reporting? (PowerPoint 1-14)
5. How does Data Analytics Affect Taxes? (PowerPoint 1-15)

B. Introduction to the IMPACT Model (PowerPoint 1-16 – 1-18)

1. Identify the Questions (PowerPoint 1-19)
2. Master the Data (PowerPoint 1-20)
3. Perform the Test Plan (PowerPoint 1-21)
4. Address and Refine Results (PowerPoint 1-22)
5. Communicate Insights (PowerPoint 1-23)
6. Track Outcomes (PowerPoint 1-24)

C. Data Analytics Skills Needed by Accountants (PowerPoints 1-26 – 1-29)

D. Hands-on Example of the IMPACT Model (PowerPoints 1-30)
1. Identify the Questions (PowerPoint 1-31)
2. Master the Data (PowerPoints 1-32, 33, 34)
3. Perform the Test Plan (PowerPoints 1-35 – 1-38)
4. Address and Refine Results (PowerPoints 1-39, 40)
5. Communicate Insights (PowerPoint 1-41)
6. Track Outcomes (PowerPoint 1-42)

E. Summary – (PowerPoint 1-44)

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Comments and Observations

In our first class meeting, we discuss not only about the role of accountants as information provider, but also how that role is steadily changing to become an interpreter of data. That is, to actively look to data and the interpretation of that data to help answer business problems by decide what questions need answering, what information needs to be collected, build or ensure that the information system is collecting it, analyze the collected information to meet its intended purpose.

We then start defining data analytics and how it creates value in business and then more specifically what data analytics has done and has the potential of doing in auditing, managerial accounting, financial reporting and taxes.

We then introduce the IMPACT model. The IMPACT model serves as a foundation for this chapter, and for each remaining chapter. We also use it as a foundation for each of the labs throughout the text. We discuss each of these steps, one by one and talk about what each step entails and why it is important.

We spend some time naming the skills needed by accountants and what we will do in the textbook to help get them there.

We wrap up the chapter by illustrating the IMPACT model with the real-world Lending Club data. We go through each step of the IMPACT model one by one, asking what types of questions Lending Club would likely want answered and focus in on the loan decision of whether to extend a loan or not. The discussion continues by asking what data could be used to answer these questions if we could get any data we wanted, etc. I then jump into the data with them to show them what is there. We talk about data cleaning, data transformation and what assumptions we would need to make to do that. We also do some pivot tables analysis and answer the question of why loans were rejected and inversely why loans are accepted.

While I haven't done it yet, I wondered how the class discussion would change if we started with illustrating the IMPACT model and the Lending Club data. There are always pros and cons of using a flipped classroom model, but it is something that you might consider.

One of the goals of chapter 1 is for the students to open their minds and really learn what data analytics can do for accountants. I believe this chapter provides a good introduction and foundation for what will be included in the textbook and start to address the skills needed.

Suggested Team Exercise

Just as the discussion of the questions that could be answered with data analytics, I have them think of auditing data and think what auditing issues/questions auditors have with sales and how that could they could be addressed with say, the complete sales journal. I think it is helpful for the students to meet in little groups and see if they can address that topic and then report their findings ready for a full class discussion.

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Solutions Manual – Chapter 1

Solutions to Discussion Questions

1. Data analytics is defined as the process of evaluating data with the purpose of drawing conclusions to address business questions. Indeed, effective Data Analytics provides a way to search through large structured and unstructured data to identify unknown patterns or relationships.
   A university might learn from the analyzing the demographics of its current set of students in order to attract its future student recruits. Did they come from cities or high schools that were close by? Were their parents alumni of the university? Did they score high on certain parts of the ACT? Were those offered a scholarship more likely to attend, etc.? Was social media effective in attracting students? By analyzing this type of data, previously unknown patterns will emerge that will make recruiting students more effective.
2. There are many potential answers. For example, Monsanto may use mathematical and statistical models to plot out the best times to plant both male and female plans and where to plant them to maximize yield. (https://www.cio.com/article/3221621/analytics/6-data-analytics-success-stories-an-inside-look.html#tk.cio_rs)
3. There are many potential answers. Accountants might use data analytics to learn more about their allowance for doubtful accounts by learning which customers pay or do not pay their receivable balances on a timely basis. This will help make a more accurate balance of net receivables.
4. There are many potential answers. For example, data analytics associated with financial reporting may help accountants determine if any of their inventory obsolete? It may also help the company benchmark on the financial statements and financial reporting of other similar companies and understand their accounting practices to help infer their own.
5. The impact cycle suggests an order of 1) Identifying the Questions; 2) Mastering the Data; 3) Performing the test plan; 4) Addressing and refining results; 5) Communicating insights and 6) Tracking outcomes. The cycle starts with a question and then identifying data and test plan that might address that question. The results of the data analysis are communicated and tracked which may lead to additional, possibly more refined questions that then restart the cycle.
6. Data analysis is most effective when a question is identified that needs to be addressed. That will focus the analysis on which data and which test method might be most effective in addressing or answering the question.
7. Mastering the data requires one to know what data is available and whether it might be able to help address the business problem. We need to know everything about the data, including how to access it, its availability, how reliable it is (if there are errors), and what time periods it covers to make sure it coincides with the timing of our business problem, etc.
8. Alibaba uses the profiling data approach to identify potential cases of fraud. Alibaba has worked to capture fraud signals directly from its extensive database of user behaviors and its network, then analyzes them in real-time using machine learning to accurately sort the bad users from the good ones.
9. Facebook uses link prediction to predict a relationship between two people when it suggests people that one likely knows due to similar other friends, high schools, college or work locations, etc.

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10. While sampling is useful, it is still just that, sampling. By looking at all of the transactions and testing them in a way that will highlight the ones that are the biggest dollar items, or are most unusual, that will allow auditors to focus on specific items that might be of material significance.
11. There are several correct answers. One data approach might be regression analysis where, given a balance of total accounts receivable held by a firm, how long it has been outstanding, if they have paid debts in the past all will help predict the appropriate level of allowance for doubtful accounts for bad debts.
12. The Debt-to-Income ratio might suggest to LendingClub that the person asking for the loan was simply asking for too big of a loan and they would have little ability to repay it. The lower the credit score, the less likely the loanee would be able to repay the loan.
13. There are many other potential predictors of whether the LendingClub would pay a loan. Here are a few possibilities: What other debt do they have? How much is their disposable income? Do they have a clean criminal record? Have they had a loan with LendingClub before and did they repay it?

Solutions to Problems

Problem 1-1

Here are the predictive attributes and whether they would be applicable to predicting which loans would be delinquent and which loans will ultimately be fully repaid.

Yes/No	Predictive Attributes
No	desc (Loan description provided by borrower)
Yes	dti (Monthly debt payments to monthly income Ratio)
Yes	grade (LC assigned loan grade)
Yes	home_ownership (values include Rent, Own, Mortgage, Other)
No	next_pymnt_d (Next scheduled payment date)
No	term (The number of payments on the loan)
Yes	tot_cur_bal (Total current balance of all accounts)

Problem 1-2

Potential attributes from the RejectStats data dictionary that might help predict loan acceptance or rejection include the following:

Amount Requested
Risk_Score
Debt-to-Income Ratio
Zip Code
State (Possibly)

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Employment Length

Problem 1-3

Percentage of total loans rejected that live in Arkansas = 1.219%

2,915,918 population in Arkansas divided by USA population of 308,745,538 = 0.9444%

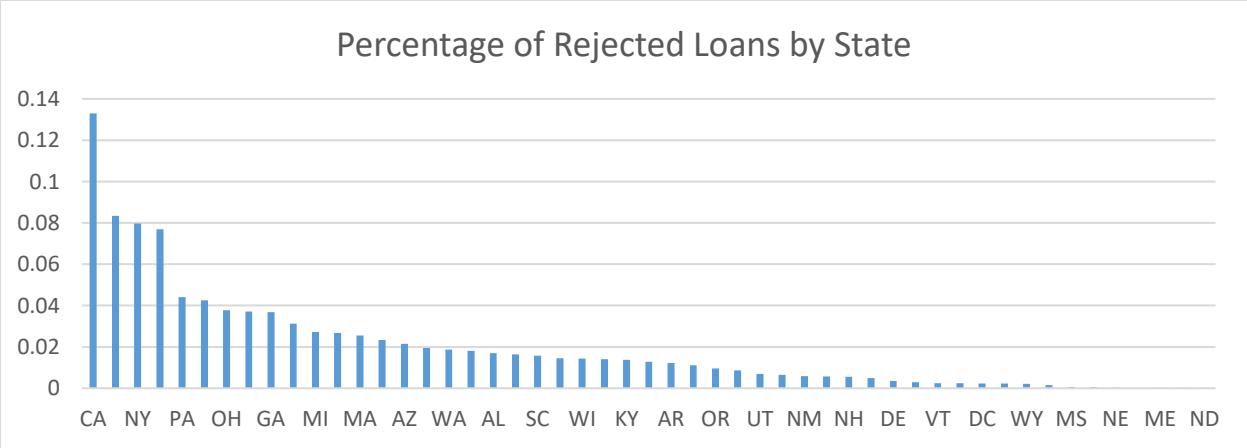
The loan rejection percentage is greater than the percent of the USA population that lives in Arkansas (per 2010 census), but is reasonably close.

Problem 1-4

State	Loan Rejection %
CA	0.13292708
TX	0.08344411
NY	0.0797736
FL	0.07688089
PA	0.04401981
IL	0.04246422
OH	0.03779744
NJ	0.03708008
GA	0.03683527
VA	0.03131478
MI	0.02718255
NC	0.02672393
MA	0.02547822
MD	0.02340048
AZ	0.02142811
MO	0.01954559
WA	0.0187585
CO	0.01812325
AL	0.0169798
CT	0.01640652
SC	0.01569535
LA	0.01450077
WI	0.01430865
MN	0.01407314
KY	0.01367649
NV	0.01275305
AR	0.01219062
OK	0.01103943

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OR	0.00954581
KS	0.00862547
UT	0.00692579
WV	0.00643153
NM	0.00590939
HI	0.005756
NH	0.00551739
RI	0.00498905
DE	0.00354346
MT	0.00284933
VT	0.00250537
AK	0.00249142
DC	0.00236128
SD	0.00223887
WY	0.00220479
IN	0.00149516
MS	0.00059962
TN	0.00055003
NE	0.00022311
IA	0.00017043
ME	0.0001379
ID	8.0568E-05
ND	4.6482E-05



The loan rejection percentage roughly corresponds with the population of each state. However, there is still substantial variation between the rejection percentage of each state.

Problem 1-5

Here is the pivot table by risk score grouping:

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Row Labels	Count of Loan Title
Excellent	2931
Fair	236669
Good	83543
Poor	189621
Very Bad	145322
Very Good	11907
Grand Total	**669993**

The Excellent category had the smallest group, whereas the Fair group had the biggest group. Arguably there is a greater population of Fair, even though Very Bad has a smaller count, it is clearly the worst of the group.

Problem 1-6

Here is the pivot table by Debt-to-Income (DTI) grouping:

Row Labels	Count of Amount Requested
High	340862
Low	159464
Medium	169667
Grand Total	**669993**

Low DTI is the smallest grouping whereas High DTI has the largest grouping.

Problem 1-7

Here is the pivot table for the loans with excellent risks but high debt-to-incomes, by years of employment:

Row Labels	Count of Amount Requested
Excellent	**2931**
High	**1190**
0	942
1	12
2	14
3	11
4	12
5	92
6	9
7	15
8	9
9	6
10	68

Perhaps those with excellent credit just asked for too big of a loan given their existing debt and that is why they are rejected. This PivotTable analysis suggests those with excellent credit asked for a larger loan given the debt they already had as compared to any of the others, suggesting a reason why even those potential borrowers with excellent credit were rejected. There weren't a lot of them, but there were certainly some!

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