

A BASIC COURSE IN DATA ANALYTICS

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Abstract

Big Data and Data Analytics continue to be hot topics in the business press and in marketing curriculum planning and revisions. However, few marketing undergraduate majors will graduate and move on to positions as data analysts or data scientists. Furthermore, few textbooks exist that are appropriate for a course in data analytics for the marketing undergraduate, especially considering many of them have an aversion to anything of a quantitative nature. This paper describes a course created to introduce such undergraduate students to the field of data analytics and allow them to succeed in the course while teaching and coaching them to acquire skills that they should find useful in the workplace.

Introduction

Marketing research has long been a required course in many undergraduate marketing programs. However, with the relatively recent rise of “big data” and consumer analytics, some marketing programs have begun to shift from the traditional marketing research course to one focusing at least partially, if not completely, on data analytics. Based on Viswanathan’s (2014) explanation, traditional marketing research is a field that evolved when data collection was expensive and therefore used statistics to analyze “small data;” data analytics on the other hand deals with much larger data sets collected through automation, or “big data.” Hauser (2007), suggests that marketing analytics, along with the more traditional research tools typically taught in marketing research courses, are all essential components of a student’s marketing research knowledge and taken together can provide a graduate with a career advantage.

In 2012 Harvard Business Review declared data scientist (a position that includes the skills of a data analyst, but also programming and other skills) as the sexiest job of the 21st century (Davenport and Patil, 2012). Furthermore, in 2014 an article in The Wall Street Journal entitled, “Get Familiar with Big Data Now or Face ‘Permanent Pink Slip’” suggested that managers need to update their skill sets to ensure that they remain relevant in the era of Big Data (Walker, 2014). The U.S. Department of Labor, Bureau of Labor Statistics predicts the nation will need 92,300 new market research analysts between 2014 and 2024, a 10-year growth rate of 19% for the profession, compared to an average growth rate of 7% for all professions (BLS, 2015). According to Aasheim et al. (2015) in a 2011 report McKinsey and Company went even further with the numbers, stating that the U.S. faced a shortage of 1.5 million managers and analysts to analyze big data and make decisions based on their findings. The market for data scientists and analysts certainly looks bright. So bright that as of early 2017, the website datascience.community lists 425 college and university data science programs in the U.S., including 91 certificate programs, 37 bachelor’s programs, 281 masters programs, and 16 doctoral programs.

It is important to realize that while it seems that there will be many data analyst jobs available in the coming years, some feel the hype for data scientists and analysts may be overblown, tempering the demand for such workers. Roland Cloutier, Vice President and Chief Security Officer at ADP suggested that young people should avoid data science as a career as software will do more and more of the analysis in the future (Darrow, 2015). Furthermore, the Bureau of Labor Statistics states that job candidates for market research analyst positions must have strong math and analytical skills (BLS, 2015). Fortune takes those qualifications a step further for data scientists and notes that data scientist practitioners are expected to know statistical analysis, predictive modeling, and programming (Darrow, 2015). According to Wymbbs (2016) in a 2015 report by Burning Glass Technologies for the Business-Higher Education Forum skill sets for data analytics job positions in the New York financial services industry were identified. Needed skills include balanced knowledge of statistical packages (SAS, SPSS, R), Microsoft Office (Excel and PowerPoint), some computer programming, specialized financial knowledge, critical thinking, and an

ability to communicate results. It is not hard to imagine that data analytics positions in the marketing field would require the same skill set, with “specialized financial knowledge” replaced with “knowledge of marketing web analytics, retail scanner data, and audience measurement data.” If marketing faculty decide that offering a course in data analytics is right for their institution, they will still face many of the challenges found as when teaching traditional marketing research. Two of these challenges are first, the idea that few undergraduate marketing students will move into marketing research or data analyst positions right out of college (lessening the interest level of students), and second, the quantitative nature of the research or analytics course (disliked by many marketing students). As alluded to by Schibrowsky et al., (2015) quantitative topics are not particularly interesting for many marketing students. Furthermore, based on the requirements listed above, few if any marketing students will be able to land a data analyst position with only one or two courses in statistics and data analytics typically included in the undergraduate marketing curriculum.

Even with the above drawbacks in mind, in an attempt to modernize the marketing curriculum, some colleges and universities are moving away from the traditional marketing research course to a course in data analytics. The purpose of this paper is to detail one such course that was created with the issues discussed above in mind; a lack of desire on many students’ parts to excel in a quantitatively-based course, and that most, if not all of the students in the course, will not graduate and become data analysts, as least not without further training at the graduate level. Students in the course discussed in this paper enter with a course in statistics and a course in basic productivity software under their belts.

Data Analytics – Learning by Doing

Results of recent surveys have found that many employers think colleges and universities need to consider increasing real-life learning experiences. Grasz (2015) reported that 46 percent of employers who participated in a survey conducted by CareerBuilder believe that colleges do not put enough emphasis on real-world learning by including relevant experience in classwork. This percentage was even higher in a recent Gallup poll where 88 percent of the business leaders surveyed thought higher-education institutions needed to include more learning activities that mimic real-world scenarios rather than testing students on abstract principles (Alssid, 2014).

With the above in mind, along with the idea of making a quantitatively-based course less intimidating for students, exams are de-emphasized in this course, while hands-on and project-based activities with “coaching” from the instructor are the basis for most of the learning that occurs in the course. The course is taught in a classroom that includes a computer workstation for each student, though some students prefer to work on their own, personal laptops. Along with longer homework assignments or projects, several short, in-class, assignments are used during the term to get students to immediately practice the concepts covered in class. These assignments usually take 20-40 minutes for the students to complete. The course described below was designed to be modular in nature and flexible when taught so that the level of the material covered can be increased or decreased depending on the preexisting knowledge of the students and the interests of the audience and instructor. The course is first described as it is currently taught; a three-credit required course for all marketing and management majors at small university. Ideas for replacement or additional modules that can be used when teaching the course are then briefly discussed in the concluding comments.

Course Objectives

As stated in the course syllabus, the basic course objectives are as follows:

In this course students will be exposed to basic concepts related to data analytics, some analysis techniques, and the practice and use of data analytics in several areas. Having a grasp

of the basic data analysis terms and techniques is imperative for a student of any area of business and for new managers. Therefore, this course aims to:

- Familiarize the student with a set of commonly used terms and techniques in the area of “big data” and data analytics that are in use today.
- Develop within the student knowledge that can separate the fact from fiction in the environment of data analytics.
- Develop within the student an appreciation of how data and data analytics can be used by managers to make better decisions.
- Have the student gain perspective and practice by applying data analysis techniques in several settings.
- Have the student gain an understanding of, and a familiarity with, using Excel to perform data analysis and build data-based presentations.

These objectives are easily tailored to the level of knowledge outcomes desired. For instance, if an instructor wishes to teach students a more advanced statistical software package such as SPSS or SAS, this can easily be substituted for Excel in the above objectives.

Learning Activities

Review of Basic Statistical Concepts

Based on past experience when teaching a more traditional marketing research course, while students enter this course with a prerequisite course in basic business statistics completed, many of the students in class have not retained a high level of statistics knowledge. Therefore, the first two class periods are used to review the basic statistical concepts that students may have forgotten from their business statistics course. This review covers the use of descriptive statistics, frequency tables, and basic visual data presentation tools. While a textbook is not used in this course on data analytics, students are provided with PowerPoint slides and readings they can refer to regarding these basic statistical concepts. Conducting statistical analyses in Excel is also covered in this first section of the course along with an explanation of dashboards as a tool to convey information to managers. On the day dashboards are discussed, students complete one of the short, in-class assignments to practice building a very simple dashboard. In addition to two days of statistics review and learning about dashboards in lecture formatted classes, a third day of review is carried out playing Statistics Jeopardy. Professor recorded videos showing how to conduct basic analyses in Excel are also made available to students so that they can refer to them as needed. The videos are simple video screen captures with voice over by the instructor built using Camtasia Studio software. Based on the statistics review and discussion on dashboards, the first homework assignment used in the course is one where students have to analyze a set of data using basic statistics and present their findings on a static dashboard built using Excel. While students need to work on this assignment outside of class, one class day is also devoted to this assignment where students are coached on how to complete this assignment.

Introduction to Big Data and Data Analytics

During the next week of the course, students are introduced to the concepts of big data and data analytics, along with the ethics of big data. Up-to-date readings from the popular business press are fairly easy to find and are incorporated into the course along with videos found online from YouTube and other sources such as Harvard Business Review. Basic explanations of big data are given along with a discussion of the differences between traditional data collection (small data) and the collection and use of big data. The ethics of big data collection and use are also covered at this point in the course and can lead to good class discussions. The material in this section of the course is easy to bring to life with examples found in the popular business press and videos found on YouTube and other sources. After the above coverage is complete, students take their first and only exam in the course.

The U.S. Census and Census Data

The next section of the course covers the U.S. Census and census data. Data collection for the decennial census is discussed and contrasted with both traditional marketing research data collection and the collection of big data. The politics of the census are also covered along with the data that is made available by the U.S. Census Bureau. Supplemental readings on the census are provided to the students. Training in using the free, vast amounts of census data is provided by both the instructor and through the use of online tutorials and training provided on the U.S. Census website (census.gov). A short, in-class assignment is used in this section of the course, along with a longer assignment in which students have to analyze the appropriateness of a U.S. city as a potential site for a fictional restaurant business expansion. Each student is assigned a different city so that they have to do their own work while completing the assignment. Several days of class are devoted to this long assignment so that students can be appropriately coached on the collection and use of data from the census.gov website to write their reports. Students are required to use the basic analysis tools discussed earlier in the course in order to complete their city analyses.

Digital Marketing Simulation

While the course described here is required of both marketing and management majors at the university where it is taught, a digital marketing simulation is still deemed appropriate for use in the class. This is not because all students in the course have to understand the basics of digital marketing (though the marketing students in the class should), but because digital and online marketing are sources of vast amounts of data for firms in the age we are currently in, and such a simulation offers an excellent way for students to have to use data properly in their decision making. This section of the course starts with two days of overview on digital marketing and the simulation used in the course, Mimic Pro, by Stukent. During the course of the simulation section of the class students work individually on and are coached in their simulation decisions during class periods and complete several, short, in-class assignments. Therefore, it is essential that all students keep up with the simulation and move along at about the same speed in the simulation as their peers. Once the simulation is complete (all ten periods of Mimic Pro are run), students write a report summarizing their results and discussing their data-based decision making used while they completed the simulation. Students need to use the analysis tools covered earlier in the course to complete their final simulation report.

Survey Data Analysis

As a final project in the course, students complete the analysis of data from a customer satisfaction survey of either students or faculty for an entity on campus. The final course output is the client report based on the students' analysis of this survey data. This project is completed in groups and is the only group project in the class. Students are not involved in the data collection effort and are brought into the project once data collection is complete. Students are provided with those sections of the final research report for which they were not involved (objectives, methodology, etc.). This project gives the students a chance to experience writing a data-based, client report and brings a service-learning aspect into the course. With the service-learning aspect used in the course, two additional learning objectives can be added to the list provided earlier:

As an academic service-learning course, this course also aims to:

- Have the student gain an appreciation of how consumer-based research can be used to create better service within a not-for-profit organization through participation in a class data analysis project and the academic service learning process.
- Have the student attain an appreciation of the intrinsic rewards available through community engagement.

As with all parts of this course, the survey data project requires students to use those analysis tools covered earlier in the semester when completing their reports. Students are also given the opportunity to use more advanced analysis tools while being coached as they complete their reports during class time.

Concluding Remarks

The above course learning activities were chosen based on the level of student knowledge and capabilities at the university where the course is taught. Time allotted to each activity was also determined at least partially based on the same factors. Students in the course seem to be pleased with the course and seem to be less stressed out about the course work than they did when the course was taught as a traditional marketing research course or as a course in applied research methods (the title of the course when management majors were added to the mix of students). Other instructors in a similar course may want to include more advanced analysis techniques than were used in the above projects, adjust the time spent on each activity, and/or include different activities based on their needs and personal experience. Other activities or sources of data that might be used in such a course include basic information literacy; television (Nielsen), web, or multi-screen ratings; geographical data (such as the data and software offered by firms like ERSI); check-out scanner data; and true big data sets.

References Available upon Request.