HOW I LEARNED TO STOP WORRYING ABOUT IT AND JUST TEACH MBA 5800 (WITH APOLOGIES TO DR. STRANGELOVE)

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This course is a requirement for the MBA students at Wright State University who have not studied statistics previously. It is taught in order to allow these students to attain the level of competence of those students who have taken two semesters of undergraduate statistics. By completing MBA 5800, students will be able to understand the more complex statistical concepts contained in their other graduate courses. What has been developed is a methodology that includes a set of procedures that utilize lecture, discussion and problem solving that uses software demonstration techniques to teach the concepts of the two undergraduate courses in one course. In the spirit of the theme of the 2009 USCOTS conference, "Letting Go to Grow," and also in the spirit of the theme of the 2013 USCOTS conference, "Making Change Happen," a paper will be presented concerning how the course is taught in order to best educate the students.

INTRODUCTION

MBA 5800 is a course that is part of the Masters of Business Administration curriculum in the Raj Soin College of Business at Wright State University. It is a course designed for graduate students who either never have taken any coursework at the undergraduate level in statistics or for those who may have taken some coursework in the discipline, but the amount of study that has been completed has not been judged to be sufficient. This course may also be required of students who have not performed adequately in the previous statistics courses they have taken. Students are permitted to attempt to show proficiency in the discipline on the basis of prior work or study and exempt themselves from having to take the course, but this option is not selected by many. For the few that choose this option, an extremely small number actually attain the proficiency that would allow them to waive this program requirement.

Most of the students who are enrolled in the course majored in a discipline other than a business related one as undergraduates. The course has been taught to engineers, scientists, mathematicians, educators, and liberal arts majors. In an attempt to have the students understand that there is a tremendous amount of diversity in their preparation for the study of the discipline, students are asked to introduce themselves to each other and provide relevant information about their backgrounds, motivations, and preparations during the first class meeting. This exercise serves to relax them and eliminate the anxieties they bring to the class. They observe commonalities in past experiences between and among themselves, thus allowing for a degree of comfort on their part.

The students bring to the classroom a wide variety of skill sets and preparations. Not all are interested in the course material upon enrollment, and not all are confident that they will succeed. It is the responsibility of the instructor to educate the students concerning the importance of the discipline and to the usefulness of the material in the workplace of which they may already be a part or the one in which they hope to enter. This produces a set of challenges that must be met. Many of these students never envisioned studying statistics at any level of their education prior to choosing to enter our MBA program. The aim of this paper is to describe the procedures I use to best educate the MBA students at Wright State University who are enrolled in this class.

THE COURSE AND ITS PEDAGOGY

MBA 5800 is a one semester, fifteen week, three credit hour course meeting weekly for two and a half hours that is designed to cover the concepts of a two semester undergraduate statistics sequence. The material consists of the undergraduate statistics core topics repackaged so that it can be presented in an efficient manner that allows coverage of the most important areas of study for our students. Both descriptive and inferential statistical concepts are covered as is

In K. Makar, B. de Sousa, & R. Gould (Eds.), *Sustainability in statistics education. Proceedings of the Ninth International Conference on Teaching Statistics (ICOTS9, July, 2014), Flagstaff, Arizona, USA.* Voorburg, The Netherlands: International Statistical Institute. iase-web.org

regression analysis. Because two semesters of undergraduate material cannot adequately be covered in one semester, a different approach from that which is used at the undergraduate level is used. In addition, the student population is different, further justifying the use of a different approach on the part of the instructor. It was discovered some time ago that the approach that would work most effectively had to be different from what is used at the undergraduate level. While the thought process concerning the necessary pedagogical change began years ago, attendance at the 2009 USCOTS conference confirmed the feeling that the path that was needed had to be a different one. The theme of this conference, "Letting Go to Grow", concerned itself with the necessary curricular choices that, while not always easy to make, were necessary. The theme of the 2013 USCOTS conference, "Making Change Happen", further illustrated the importance of revolutionizing the manner in which MBA 5800 would be taught. In order to do justice to the topics that were judged to be most important to the population enrolled in the course, certain ones would have to be eliminated from consideration. In doing so, quality instruction and pursuit of excellence could not and would not be sacrificed.

CONTENT MATERIAL

The material emphasized is the content which is judged to be most important for the target audience, aspiring and current business professionals. What is focused upon are these ideas:

- Basic descriptive statistics
- Statistical estimation
- Statistical decision making
- Regression analysis

It is felt that this set of topics constitutes the preponderance of what is important for business professionals to be able to understand and utilize. Basic descriptive statistics is covered to the extent necessary so that students are able to understand the importance of analyzing a data set mainly from a numerical perspective. The two broad areas of inferential statistics, estimation and decision making, are foundations of the course, as these ideas are very important for business professionals to study and learn. The ability to utilize knowledge in these areas can enhance the worth of a business professional. Their proper use can impact positively the health of a business organization. Finally, if there is one set of statistical tools that is most important to the business practitioner, it is the area of regression analysis. Thus, coverage in this area is emphasized as well.

The set of topics that are not stressed include the following:

- pictorial and tabular analysis of data sets (with the exception of frequency distributions)
- probability concepts
- probability distributions
- sampling distributions

Pictorial analysis of data sets is a topic with which many of the students are familiar because many of them are employed in the private and public sectors while enrolled in the MBA program. Students have indicated that they regularly make presentations using these techniques as a part of their work responsibilities. Others are familiar with them because they participate in meetings and briefings. Most have some prior knowledge in this area. Probability and probability distributions are covered minimally mainly using an outline format so that students understand that the important topics that will be covered later, namely the inferential topics, are based upon probabilistic concepts. There is no study of specific distributions other than some reference to the binomial distribution as a precursor to the study of proportions and reference to the importance of the normal distribution to inference. Other distributions are minimally covered from a theoretical perspective later as needed in the study of inference. The theory of sampling distributions is introduced to illustrate the importance of the central limit theorem and sample statistics as random variables as a precursor to the study of inferential statistics. The study of statistical theory is minimal with the necessary time devoted to this body of knowledge only as it pertains to the understanding of why certain procedures are used in certain situations and why certain others are

not applied in a given situation. Finally, preconditions surrounding the use of inferential procedures are discussed.

SPECIFIC TEACHING METHODOLOGIES

The manner in which the topics are presented follows:

- No problems are worked by hand by either the student or the instructor. Formulas, tables and statistical calculators are unnecessary in this course.
- While a textbook is required, it is used as a study guide and reference for the students as they study the course material outside of class.
- All example problems have been created by the instructor as examples of the topics that are covered in the class. Students are given access to this set of problems via the university library's electronic reserve site. They are also given access to the solutions to these problems.
- The software package known as MegaStat is used in order to demonstrate and accomplish problems in class. Students are expected to learn how to use this package in order to solve problems similar to those that are discussed in class. MegaStat is an Excel add-in that allows for easy input of data and also allows for solutions to be readily displayed and interpreted. It is primarily an educational statistical tool, but it is powerful enough for students to be able to use in the workplace later if they so desire. It is a template program that allows students to use Microsoft Excel more effectively
- Focus is also on the interpretation of the statistical outputs that are created. This includes explanations of the meaning of the problem solutions and business implications of the results that have been generated.

STUDENT EVALUATION

The college requires that this course be subjected to the traditional grading process. The manner in which students are evaluated is shown below:

- Exams are accomplished by students as out of class exercises with the aid of MegaStat. Students are required to solve the test problems, submit the printouts for evaluation, provide explanations of the meanings of their solutions and provide business implications of their results.
- The final test in the course (not a comprehensive exercise) is sometimes administered in class during exam week. The only thing different about this test as compared to the out of class tests is that the solutions to the test problems are provided. Students must answer the test questions by interpreting and explaining their printouts.
- Quality of writing is included in the evaluation process in an attempt to teach students the importance of the effective communication of statistical results.
- Short in-class quizzes are given during most class periods forcing students to review previously studied class material. These quizzes consist of short answer questions designed to test knowledge of statistical terminology and the interpretation of printouts pertaining to problems that have been accomplished in previous classes.
- No specific homework problems are assigned. The review of previously covered material constitutes the necessary out of class preparation.

CONCLUSION

It is believed that this approach is successful in teaching students what they need to know in order to apply the discipline of statistics effectively in the workplace. It is also believed that this approach to teaching and learning prepares students for the study of topics that utilize statistical reasoning in other courses that are part of the MBA program. The most important topics contained in an elementary statistics curriculum are covered. The traditional in-class lecture and discussion format is used, but it is augmented extensively by the use of the software to arrive at and demonstrate solutions to problems. Upon completion of the course, it is believed that the students will have acquired the requisite knowledge to understand the role of statistics and statistical techniques and utilize these concepts in the business world.