# Lessons from a Discussion-based Course on the History of Statistics

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**Abstract**

A special-topics undergraduate course about the history of statistics which was taught in Spring 2023 at the University of South Carolina is described. We review other similar courses (past and current) and explain the discussion-based nature of this course. The conception and planning of the course are detailed, and the unique experiences (activities, guest speakers, presentations, etc.) are described. The course emphasized substantial amounts of independent reading outside of class and lively discussions during class. Topics covered in the class include the early development of probability, the normal distribution, and the central limit theorem; the development of modern statistical science by British statisticians; the rise of formal mathematical statistics; and increasing specialization and modern computational and data-analytic advances. An assessment of the course's effectiveness based on qualitative student survey data is given. Students were highly complimentary of the course, with occasional comments that the amount of required reading was excessive. Based on this, suggestions for future offerings of the course are presented, including developing a more carefully curated set of readings.

KEY WORDS: Teaching; pedagogy; roundtable discussions; undergraduate course; historical content; honors course.

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# 1 Introduction

Any teacher knows the challenges of teaching a course that is a "new prep"; these challenges become more acute yet more intellectually invigorating when the course is to be taught in a completely different style than one has been accustomed to teaching. In the Spring 2023 semester, I had the opportunity to teach an undergraduate course called "History of Probability and Statistics" that was brand-new at the University of South Carolina, and this article describes some of the pedagogical choices I made, experiences that the students and I shared, and lessons we learned from this class.

Bakker (2003), in the context of middle-school education, argues that teaching the history of statistics prepares and inspires students to learn statistical concepts. Related to more advanced courses, Stanton (2001) described how teaching the history of the experiments of Karl Pearson and Francis Galton is valuable when teaching linear regression and correlation concepts. Ograjenšek (2005) suggested that teaching historical topics in statistics classes holds students' interest and removes the fear of data analysis via four ways: (1) assigning a face to a name; (2) discussing famous statistical blunders; (3) presenting up-to-date developments as a natural progression from historical beginnings; and (4) discussing the socioeconomic context of statistical findings. My course achieved all four of these goals at various times during the course.

Courses on the history of statistics are not especially common, but some excellent ones have been taught in the past and continue to be taught in the present day. We now review a selection (with no claim of being exhaustive) of such courses.

One of the earliest formal courses on the history of statistics must be one taught by Frank Anscombe at Yale around 1963. A history of the Yale statistics department (at `https://statistics.yale.edu/about-us/history`) relates Richard Olshen's memory of this course, quoting from Olshen's commemoratory note for Anscombe's memorial service: "Frank taught a course that was pure Frank: history of statistics with emphasis on Fisher."

Famously, Florence Nightingale David, who authored a major work on the history of probability (David 1962), taught a history of statistics course at Berkeley in the 1970s that met for two hours on Fridays, which Lehmann (2008) said eventually attracted 500 students. It must have been an amazing experience to hear a "lively and entertaining lecturer"

(Lehmann 2008, p. 119) speak about first-hand experiences with Gosset, Fisher, and Karl Pearson. However, Lehmann (2008) notes that the popularity of the course was also thanks to its ease: no homeworks, no exams, and only one essay assignment for which submissions, according to rumor, were often cribbed from past years (Lehmann 2008)). David herself said that the class was too popular and she couldn't keep the massive number of students under control, and that she "gave it up quite happily" (Laird 1989).

The world's leading expert of the history of statistics is universally acknowledged to be Stephen Stigler, so it is no surprise that Stigler has taught courses on the history of statistics at the University of Chicago. A recent such offering, STAT 26700(=STAT 36700), is called "History of Statistics" and focused on the period from 1650 to 1950. The course is taught using Stigler's own seminal textbooks *History of Statistics: The Measurement of Uncertainty Before 1900* (Stigler 1986) and *The Seven Pillars of Statistical Wisdom* (Stigler 2016).

Cornell University has a 4-credit course, STSCI 4010, taught by John Bunge called "Great Ideas in Statistics" which is described at

`https://courses.cornell.edu/preview_course_nopop.php?catoid=31&coid=497237`

as "an in-depth study of some of the principal ideas in the intellectual history of statistics, from the 18th century to the present day." The topics in the course description indicate a similar emphasis to my course.

Grand Valley State University regularly offers a 1-credit class (the course I taught was 3 credits) on the history of statistics developed by Kirk Anderson; the course description at

`https://www.gvsu.edu/catalog/course/sta-430.htm`

states, "Advancements in the 20th century are emphasized, as well as the mathematical geniuses who made them happen. Contributions of legendary figures such as Fisher, Pearson, Deming, Bayes, Cox, and Neyman are discussed." Anderson (2015) notes that the primary textbook is *The Lady Tasting Tea* by Salsburg (2001) along with additional and corrective material provided by the instructor.

Regarding history of statistics courses outside the U.S.: Rohan Alexander of University of Toronto has a detailed website at

`https://rohanalexander.com/history_of_the_data_sciences.html`

describing his course on the history of statistics; there are many similarities between his course and mine, although his focuses on the development of statistics through the early

1900s and then some modern topics, whereas my class had more coverage of the mid-20th century. The University of Helsinki lists a course, MAST32015, called "History of Statistics" for which I found little other information.

Two other examples of specialized history of statistics courses bear special mention because I drew on the expertise and experiences of the respective professors during my own course, as will be discussed later. Beth Johnson, a faculty member at the University of Florida, taught a summer study-abroad course in May 2022 for the first time (and again in May 2023) in which thirteen statistics and data science majors visited historical sites in England and Ireland. Students read relevant textbooks, particularly Salsburg (2001) and Stigler (2016), to gain additional insights about the places they saw and historical figures they learned about. A full description of this study-abroad experience is given by Johnson and Holmes (2022). Jim Berger taught a graduate-level course at Duke University that was especially focused on the history of Bayesian statistics.

While I cannot claim first-hand knowledge of the style of teaching used in all of these courses, it appears that one characteristic of my course that many of the other courses do not share was that my course was zealously discussion-based as opposed to lecture-based (Beth Johnson's study-abroad course was another style entirely, being primarily *experience-based*.) The various styles of teaching have their advantages and disadvantages, but this article presents my experiences with teaching the history of statistics in a discussion style in particular.

## 2 Conception of the Course

The origin of this course was serendipitous: A statistics major in the University of South Carolina's highly ranked Honors College, Lauren Young, approached me and suggested that I teach an Honors course in statistics. A natural topic would be the history of statistics, since I had an ongoing knowledge and research interest in the area, and this topic would be accessible to Honors students who were either experienced or relative novices in statistics coursework. Running it purely as an Honors course would have kept the class size small and allowed me to engage the sizable instructional and financial resources of the Honors College, opening up the possibility of cool experiences like an overnight field trip. I submitted a proposal

to the Honors College for such a course and we had some discussions during summer 2022 about specific plans for the course. Because of departmental constraints, in the end we ran the course as a special topics (non-honors) statistics elective which had an Honors College section which met with it. The combined enrollment was 25 students; this proved quite workable, but I would not have wanted it to be any larger.

Since Honors College classes are traditionally discussion-based rather than lecture-based, and since a course on the history of statistics is the kind of course that lent itself to a non-traditional teaching style, I was convinced that a discussion-oriented classroom style would be best, even with a slightly larger class than originally planned. From the outset, my plan was that once class started we would put our desks in a circle and that I would sit down in the circle with them rather than stand in the front of the room as in a traditional lecture. To encourage class participation, I made it 10% of the course grade, grading the students on their class participation at the four quarter-points of the semester, adapting the rubric from Prof. Martha L. Mazneveski of the University of Virginia, described at
`https://sites.tufts.edu/teaching/a-to-z/index-of-teaching-challenges/grading-class-participation/`.
To avoid having a few students dominate the class discussion, I asked students to raise their hands and let me serve as a moderator and call on them to speak, which allowed me to simultaneously reward those who were eager to participate yet also spread around the opportunity to participate, based on whom I called on first. In all, everyone had ample opportunity and encouragement to speak in class.

After one or two class periods, I realized that to keep things fresh and keep everyone's attention during the 75-minute class periods, I would have to mix things up with hands-on activities and fresh voices where possible, and I worked hard to prepare such experiences throughout the semester.

Some of the students' favorite parts of the course came from guests' participation. I was remarkably fortunate to have several statistician friends, including some very prominent ones, lend their hands. The most obvious person for me to ask for help was Alan Agresti, who had been my professor at the University of Florida, whom I had remained friends with over the years, and who I knew had an interest in the history of statistics (as befitting a former Ph.D. student of Stephen Stigler, although both of them developed their interest in

stat history after Alan's Ph.D. studies).

Two other guests were statisticians I met at a conference the previous October where they were plenary speakers: Jim Berger from Duke University and Narayanaswamy Balakrishnan from McMaster University. All three of these guests volunteered before the semester to join the class via Zoom and speak about aspects of the history of statistics. Opportunities for a few other special guest appearances arose during the semester.

# 3 Implementation of the Course

Having decided on a discussion-based course, it was critical to ensure that the students had consumed some material before class for us to discuss during the class session. For the most part, this material took the form of readings that the students were required to do in preparation for each class period. To provide an incentive to read the assigned materials, I gave multiple-choice quizzes (10 questions, on paper) at the beginning of each class; i.e., before the class discussed the topics. The students initially feared these (and admittedly I wanted to instill a healthy fear in them), but eventually got used to the rhythm of doing the readings and quizzes. To reinforce the quiz material and give students a chance to improve any poor performance of the in-class quizzes, I copied the quiz questions into Blackboard (our university's course management software) and had them answer the questions in Blackboard after class; the in-class quiz scores and the Blackboard quiz scores were weighted equally in the course grading.

The reading materials themselves were varied, but there were a few sources that I relied on regularly. The students read a number of historical articles from *Significance* magazine and *The American Statistician*. The "conversations" with famous statisticians in *Statistical Science* (which the Institute of Mathematical Statistics provides freely on its website) were fantastic resources for learning about the careers of the more modern statisticians. Erich Lehmann's memoir, *Reminiscences of a Statistician: The Company I Kept* (Lehmann 2008) was a fertile source of informative essays. The MacTutor Biography site at `https://mathshistory.st-andrews.ac.uk/` gave detailed biographies of many probabilists and statisticians, especially the early pioneers. In addition, web searches guided me to many relevant publicly available historical articles that I asked the students to read. Truly,

there was a surfeit of available material; the trick was deciding which to assign. In fact, one of the few criticisms students had about the course was that I occasionally assigned too much reading material, which I don't disagree with. With this being the first time I taught the course, I was choosing the materials as I went, but in the future, a set of readings that is organized from the beginning (possibly curated professionally with the aid of the university library) would be a potential improvement.

The coverage of topics is the course proceeded mostly chronologically, with any deviations from historical ordering done to fit guest speakers' schedules. Table 1 gives an overview of the topics covered (a more detailed outline is provided in the Supplementary Material). Most classes revolved around roundtable discussions of the day's topic: I would toss out open-ended questions and students would offer their thoughts, often informed by their newfound knowledge from the readings. When possible, I would expand on the discussion with some anecdotes from my previous knowledge or some extra reading I had done. Occasionally I would play devil's advocate about some topic to push the conversation forward. I was surprised at how little dead time there was in the conversations; during many days, I felt like we could have talked for an hour longer if the class period didn't have to end. This was partly because often the insights expressed by the students allowed the class to explore in our discussions some areas of statistical methodology used in current practice. We also had discussions about historical topics lead to opinionated banter about modern scientific and societal issues. One of the most memorable class periods involved our exploration of the ties to eugenics of R.A. Fisher and other early British statisticians, the renaming of the Fisher Lecture, and how historical legacies and the statistics profession are affected by the controversial views of major figures. I was a bit apprehensive of having such a discussion, but I knew it was an important topic to talk about, and the students were wonderful about respectfully listening to and offering well-considered opinions.

One heartening thing I found was that while the class focused on the history of statistics, there were plenty of chances to discuss and even demonstrate statistical theory and methods. I was surprised how much this course turned into a survey not merely of historical people, but of the most common statistical methods. (Of course, we discussed these at a more superficial level than traditional theory or methods courses would; this course isn't a replacement for those, but it can crystallize or whet the appetite for the study of theory and methods.)

I. Early Development of Probability

(A) Pascal and Fermat and their correspondence

(B) Laplace and Bernoulli and Formalization of Probability Rules

(C) Normal Distribution and the Central Limit Theorem (de Moivre, Laplace, Gauss, Quetelet)

II. The Early British Statisticians

(A) Correlation and Regression (Galton, Edgeworth)

(B) Karl Pearson and his advances and errors

(C) Gosset and the Groundbreaking Early Work of Fisher

(D) The Incredible Legacy of Fisher

(E) The Unpleasant Side of Fisher's Legacy

III. The Rise of the Formal Mathematical Side of Statistics

(A) Decision Theory, Testing, and Formal Inference (Neyman, E. Pearson, Wald, Stein)

(B) Optimal Point Estimation (Rao, Blackwell, Lehmann, Scheffé)

(C) Practical Applications of Mathematical Statistics (Box, D.R. Cox, Wilks)

(D) The Importance of Indian Statisticians (ISI and Mahalanobis, Rao, Bose, Roy)

(E) The Rise of Statistics Departments in American Universities (G. Cox, Snedecor, Cochran, Hotelling)

(F) Early Female Statisticians Blazing a Trail for others to Follow (Nightingale, Scott, David)

IV. Increasing Specialization in Statistics and Dissension Among Factions

(A) Development of Bayesian Statistics (Laplace/Bayes, de Finetti, Savage, Lindley)

(B) Renewed Focus on Exploratory Data Analysis and Graphics (Tukey, Mosteller, Cleveland, Wilkinson)

(C) The Rise of Computationally Intensive Methods (MCMC, Bootstrap, EM, and their developers)

(D) The Two Cultures of Statistics (Breiman)

(E) Attempts to Increase Diversity in Statistics

Table 1: Basic outline of topics covered in the course. A more detailed outline is in the Supplementary Material.

Some of the learning occurred via hands-on activities. Since I couldn't assign readings to be done on the first day of class, I chose an activity related to a famous early event in the history of probability. After we watched a YouTube video about the "Problem of Points" discussed by Pierre de Fermat and Blaise Pascal in their correspondence that began the formal study of probability, I handed out dice, paired up the students, and had them complete the unfinished dice game about which Fermat and Pascal had corresponded. Each pair of students finished the game a few times, we collected the results, and the empirical probability we obtained turned out to be remarkably close to the true probability that we had seen derived in the video. Throughout the semester, we performed numerous other hands-on class activities: We replicated Buffon's needle-throwing experiment (with matches) to approximate the number $\pi$; we collected the heights of students and their parents and did regression analyses to mimic Galton's original "regression to the mean" data analysis; later in the semester, we used the same height data to calculate bootstrap confidence intervals. Not all of the hands-on activities turned out perfectly: A demonstration of the Central Limit Theorem with student dice rolls didn't have enough replications to convincingly demonstrate the theory. But an R simulation based on Canal and Micciolo (2014) to show Karl Pearson's error with the degrees of freedom of his $\chi^2$ test worked out great. And students enjoyed estimating M & M color proportions using a Bayesian prior and real candies, and using a Monte Carlo approach with actual playing cards to approximate a complicated probability. Almost all of these classroom activities are familiar to many statistical educators; in this class, the tie-in to the historical aspects was the primary motivation for the activities.

Videos on YouTube were prominently used to freshen up the classes and motivate discussion. In addition to the video on Fermat and Pascal's "Problem of Points", we watched videos on Gosset ("Student") and his development of the t-test at the Guinness brewery; Wald and his analysis of bullet holes in World War II and survivorship bias; and videos on Blackwell, Tukey, and Mosteller. The number of YouTube videos on history of statistics topics is vast; the key was carefully choosing the right video to fit the class time, based in length and content.

A favorite element of the course for students was the guest lectures I arranged. We had Zoom visits from three prominent statisticians: Alan Agresti gave a presentation on the history of early statistics textbooks and some of the statisticians whose textbooks pushed

the field of statistics in certain directions. Jim Berger presented a history of Bayesian statistics from Laplace and Bayes through the mid-20th century. And Narayanaswamy Balakrishnan talked about his statistical training in India, his career in statistics, and some of the prominent statisticians he has met, especially his close friend C.R. Rao. I organized the course topics so that we would be covering historical topics related to the guests' specialties at around the times of the guest's appearances. In addition, before the visits I assigned readings (e.g., published interviews with Agresti and Berger) so that the students would have a sense for their careers, accomplishments, and personalities even before meeting them virtually.

We were fortunate in that these guests were all personable and highly entertaining speakers. But perhaps even more enjoyable than the presentations were the question-and-answer sessions afterward in which students asked the guests a wide-ranging set of questions about historical topics, famous statisticians, and about the guests' own careers, experiences, and life lessons from their times as statisticians. It was a wonderful chance for the class to get to know highly decorated statisticians as friendly, down-to-earth people and was a great advertisement for the statistical community.

My former colleague Beth Johnson, now a faculty member at the University of Florida, provided a different sort of guest appearance when she visited our class in person during her spring break. Dr. Johnson and her husband, David Holmes, have organized a fantastic ongoing history-of-statistics-themed study abroad program for students at Florida. Beth and David showed pictures from their trip and described their tours of Bletchley Park Trust, Rothamsted Research, Royal Statistical Society, National Archives, Florence Nightingale Museum, Cambridge University, and the Science Museum in London. It was a fascinating class that made my students quite jealous and perhaps encouraged some of them to plan similar statistics-related travels of their own.

Another highlight of the semester arose from more serendipity. A visitor to our department, Pingfu Fu of Case Western University, mentioned that he knew a former student of R.A. Fisher named Robert Elston, a former colleague of Pingfu's who was now retired at age 90 after a long and prominent career in biostatistics. I reached out to Dr. Elston, and he graciously agreed to what turned out to be a delightful 45-minute phone interview about his life and career. I recorded this and played some utterly fascinating excerpts to the class

about Elston's time as Fisher's student at Cambridge in the 1950s. To get a sense for what Fisher was like as a teacher, researcher, and person, there's nothing like hearing first-hand from someone who interacted personally with him. At various points in the semester, I also played excerpts detailing Elston's recollections of Oscar Kempthorne, Sam Wilks, George Box, and David Cox. Dr. Elston proved himself a charming raconteur, and the students loved listening to him, telling me that "it sounded like a podcast" — high praise from a Gen Z audience, I suppose.

At various points of the semester, discussion turned to the life and work of C.R. Rao, and my class shared my admiration for this amazing 102-year-old legend. This was the time when he was awarded the 2023 International Prize for Statistics, whose announcement the class followed closely. During my correspondence with Agresti, I learned that Alan and another former professor of mine, Randy Carter, had nominated Rao for this prestigious prize. I reached out to Dr. Carter and he also agreed to do an hour-long phone interview, which focused substantially on Rao but also on several other prominent statisticians that Randy had met; he told some lovely stories about times he met George Box and Brad Efron. The Zoom visit with Balakrishnan, Rao's dear friend and travel companion, provided more additional insights about Rao and his personality. By the end of the semester, my students felt like they were almost buddies with C.R. Rao, and I even sent Balakrishnan a photo of the class to show C.R. Rao when he visited Rao the following month.

The fact that the class was discussion-based allowed me to try some different and memorable things, like having a few classes outdoors occasionally on blankets on a campus quad. Perhaps because the atmosphere was more relaxed, those classes produced some of the most stimulating discussions of the semester. The students also liked that on the "outdoor" days, I let them work in teams answering the quiz questions.

The final three class periods of the semester were devoted to students' oral presentations of their group projects that they had researched over the last month of the course. Some of these projects related to historical topics or people we had not previously covered during the course; others took the form of a deeper dive into a topic or statistician that we had discussed briefly during the course. For example, I was pleased to see one group present their project on W. Edwards Deming, who is undeniably historically important but whom I had not covered in the course proper. Table 2 gives a full list of the presentation topics. The

projects were a highlight of the course: Students seemed to enjoy learning from their peers in class, and independent research, putting together a presentation, and expressing thoughts orally in front of others are all invaluable skills to put into practice.

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|---|
| A History of Latin Squares and their Mathematical and Statistical Usage |
| The Life and Importance of William Edwards Deming |
| Francis Galton: Biographical Background, Study of Eugenics, and Statistical Innovations |
| Harold Hotelling: His Life, Beliefs, and Fundamental Work in Statistics and Economics |
| Charles Stein's Career, Foundational Discoveries, and Political Activism |
| The Mathematics behind Abraham Wald's World War II Aircraft Analysis and Survivorship Bias |
| Bill James and the Historical Development of Sabermetrics in Baseball |
| Important Developments and People in the Application of Statistics to Social Sciences |

Table 2: Descriptions of the topics chosen by students for their group presentations.

Aside from the quizzes every class period, I did not have any midterm exams, but I did have a final exam. Since we covered a massive amount of names and topics, the students were worried about this, but I provided a study outline and kept the questions on the final exam fairly big-picture. The final exam was mostly a safeguard to ensure that a student who really hadn't gained fundamental knowledge of the key concepts in the history of statistics wouldn't be given an A. As it turned out, grades on the final exam were fine, with a mean score of 94%.

# 4 Assessment of Course Effectiveness

Beyond describing what was accomplished in a course, it is important to assess the effectiveness of the course in educating the students. To this end, I collected some data from the students via survey forms that they filled out after taking the final exam. One page of the survey consisted of six multiple-choice items; these were anonymous. Table 3 lists these survey questions and answer choices. A second page of the survey (collected separately to preserve the anonymity of the first page's responses) provided a space for optional free-response comments about "what you found useful or what you would change or improve about the course." Students could put their name on this second page but were not required to, and students were ensured that their comments would not be read until after course grades were submitted.

The survey revealed, as expected, a positive effect of the class on increasing knowledge of the history of probability and statistics: Every person indicated an improvement in this knowledge (see Table 4). Six of 25 students indicated a one-category improvement in knowledge (from minimal to moderate or moderate to extensive), while the other 19 claimed a two- or three-category improvement (the modal type of improvement was "from minimal to extensive"). These trends appeared fairly consistent regardless of the number of previous statistics classes taken.

Less obviously, most (17 of 25) students reported that the course "substantially" improved knowledge, understanding, and appreciation of common statistical methods and theory, although this is perhaps only a secondary goal of a history of statistics class. The other eight students reported "moderate" improvement. Whether a student reported substantial or moderate improvement was independent of the response to the "time spent working" question. Nor was there a significant association between the level of this type of improvement and the number of previous statistics classes, although there was a mild indication that students with 3-5 previous statistics courses were less likely to report substantial improvement than students with very few or very many previous stat courses (see Table 5).

Students chose which of eight aspects of the course they found beneficial to their learning. Of the 25 students, 19 found at least six aspects beneficial and 9 found all eight aspects beneficial. Table 6 lists percentages of "yes" responses for the eight aspects; the aspects most commonly selected as beneficial were the required readings and the in-class discussions (probably the two most fundamental aspects of the course). A bit surprisingly, only 64% found the group projects and presentations beneficial; this could reflect an inherent aversion to groupwork and oral presentations on the part of some students.

A complete list of the free response comments provided by the students is in the Supplementary Material. A couple of insightful representative comments included one by Silas Scribner (a double major in Statistics and Chemistry); "This is by far the most interesting and relevant history class that I have ever taken. I took a chemistry equivalent of this class as well, and was so excited to hear about a stat version being offered. History of math/science is so rarely taught, but such an important part of a well-rounded education in STEM." Heather Bruck, a biological sciences major from the Honors College, commented on the influence of learning statistical history of the practice of statistical methods: "I had taken a Statistics

for Biology course where all we learned were the basic statistical tests ... I didn't realize how many other methods of statistical analysis there were until this class. From learning the history of these methods and of their developers, I no longer want to simply plug and chug data from my own experiments into the first statistical test I know." The most frequent negative comment was that the readings tended to be too long.

| |
|---|
| 1. Before taking this class, the number of formal statistics classes I had taken in college (not counting AP or IB, etc.) was<br>(A) 0 (B) 1 to 2 (C) 3 to 5 (D) 6 or more |
| 2. Before I took this class, my knowledge of the history of probability and statistics was<br>(A) none (B) minimal (C) moderate (D) extensive |
| 3. After taking this class, my knowledge of the history of probability and statistics is<br>(A) none (B) minimal (C) moderate (D) extensive |
| 4. Taking this class on the history of statistics has<br>(A) had little to no effect on my knowledge, understanding, and appreciation of common statistical methods and theory<br>(B) moderately improved my knowledge, understanding, and appreciation of common statistical methods and theory<br>(C) substantially improved my knowledge, understanding, and appreciation of common statistical methods and theory |
| 5. All in all, and in comparison to your other college courses, how much time did you spend working on this course outside of the classroom?<br>(A) much less than my typical college course<br>(B) somewhat less than my typical college course<br>(C) about the same as my typical college course<br>(D) somewhat more than my typical college course<br>(E) much more than my typical college course |
| 6. Which aspects of this class did you find beneficial to your learning of the history of statistics? (please circle ALL that you found beneficial)<br>(A) required readings for every class<br>(B) quizzes every day<br>(C) guest speakers<br>(D) in-class discussions<br>(E) in-class hands-on activities<br>(F) watching short videos in class about statistical topics or people<br>(G) listening to audio excerpts from instructor's interviews with statisticians<br>(H) group projects and presentations |

Table 3: Questions and answer choices from multiple choice survey.

# 5 Discussion

My overall conclusion from this course is that a discussion-based course in the history of statistics is not only possible but, with the right mix of students, can be both entertaining and illuminating.

| | | Post-class knowledge of history of statistics | | | |
|---|---|---|---|---|---|
| | | None | Minimal | Moderate | Extensive |
| Previous Knowledge | None | 0 | 0 | 4 | 2 |
| | Minimal | 0 | 0 | 4 | 13 |
| | Moderate | 0 | 0 | 0 | 2 |
| | Extensive | 0 | 0 | 0 | 0 |

Table 4: Self-reported post-class knowledge of history of statistics, cross-tabulated with previous knowledge.

| | | Effect of class on knowledge/understanding/ appreciation of stat methods/theory | | |
|---|---|---|---|---|
| | | Little to No Effect | Moderately Improved | Substantially Improved |
| Previous Statistics Courses | 1-2 | 0 | 1 | 4 |
| | 3-5 | 0 | 3 | 3 |
| | 6+ | 0 | 4 | 10 |
| | Total | 0 | 8 | 17 |

Table 5: Self-reported effect of this class "on my knowledge, understanding, and appreciation of common statistical methods and theory", cross-tabulated with number of statistics classes previously taken.

| | |
|---|---|
| required readings for every class | 96 |
| quizzes every day | 80 |
| guest speakers | 84 |
| in-class discussions | 92 |
| in-class hands-on activities | 84 |
| watching short videos in class about statistical topics or people | 72 |
| listening to audio excerpts from instructor's interviews with statisticians | 76 |
| group projects and presentations | 64 |

Table 6: Percentage answering that the respective aspect of the course was beneficial to their learning the history of statistics, for eight different aspects.

Students recommended that this history of statistics course be taught more often in the future, although limitations on instructional staff and the need to teach courses required for degree programs always puts "Special Topics"-type courses near the back of the priority list. I do hope to be able to teach the course again, and it would be exciting to teach it as a pure Honors College course as originally planned, in order to have a smaller class size and take advantage of the support of the Honors College for things like travel, outside-the-classroom experiences, etc. Allowing non-Honors statistics majors and minors to take the course had advantages, however, and tended to raise the overall level of statistical knowledge of the class.

The student comments reinforced my impression that the class was very well-received. In terms of potential changes to the course based on the comments: Despite the less-than-universal response of the students to the projects, I would not forgo the project aspect of the course, but perhaps the lukewarm (72%) response to the short videos indicates they were more placeholders than educationally crucial. The occasional complaints about the amount of reading are perhaps well-founded: I set up the workload to mimic the substantial amount of pre-class reading that I recalled being assigned in my own college history classes. Some of the students, not being history students themselves, may have balked at the amount. In addition, many of them anecdotally related waiting until the night before or the day of the class to do the reading rather than spreading it out over several days. While this had the advantage of keeping the facts fresh in their heads for the quizzes, it probably made the workload seem more onerous than was intended. One tool that I used more as the semester went on, to ease the burden of the readings, was to annotate the readings myself ahead of time, boxing selections that they should focus on and adding my own comments in the margins. Students found this to be helpful in allowing them to narrow their focus while reading, possibly with the drawback of having my own interpretations and insights be more "forced" on them. In future iterations of the class, I will likely have a better sense for the right amount of reading to assign.

From my perspective, teaching this class was a highlight of my 19-year faculty career. I believe many of the students found it to be one of their favorite classes as well. Statistics units should strongly consider mixing in courses on the history of statistics, and instructors may well find that teaching such courses in a discussion-based format is highly rewarding.

# References


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