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# TEACHING TRENDS IN DATA, TECHNOLOGY, AND SOCIETY – FINDING A NEW BALANCE

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**Abstract:** In the Fall of 2020, a First-Year Seminar that discussed various trends in the applications of data and technology to society was taught at Stetson University for the first time. It covered exciting trends in data analytics in identity theft, marketing, fraud detection, and accounting. Data visualization of large data sets was explored. The course also covered aspects of ethics related to data privacy and data governance, especially social media and medical records. Companies such as Cambridge Analytica and their ability to use personal data to target specific ads at small groups of individuals and the ensuing impact on voters were investigated. Machine learning and its potential to automate processes previously only able to be performed by humans and its potential to disrupt various job markets were considered. The implications of data usage in generative adversarial networks and the application to “deep fakes” were also explored. This class was also taught in a modified form in the Fall of 2021.

This paper will briefly discuss some of the topics covered in those classes. Additionally, the ongoing process of developing the course, along with lessons learned related to student engagement, an “overcorrection” between the first and second time teaching the classes, along with a plan to attempt a “flipped classroom” structure next fall to improve student engagement will be discussed.

**Key Words:** *First-Year Seminar; Trends in Data; Deep Fakes; Cambridge Analytica*

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## 1. INTRODUCTION

In the Fall of 2020, a First-Year Seminar entitled “Data, Technology and Society,” which discussed trends in the applications of data and technology to society, was taught at Stetson University for the first time. The course was divided into three main areas, which allowed the students to explore the basics of data, some applications of data, and how personal data was used.

The course covered the basics of data analysis and visualization trends in data analytics in a variety of fields. Basic tools of data analysis, including some concepts in statistics, data visualization, and Excel, were explored to allow students to better appreciate some of the later material in the course. The students were also required to read and write about an old classic book, “How to lie with Statistics.”

The course progressed into some applications of data that are used throughout the world today. Students reflected on aspects of machine learning and the automation of processes that were previously thought to reside entirely in the domain of human abilities.

The course moved into issues related to personal data, including identity theft and microtargeted advertisements. The Cambridge Analytica scandal was a topic that received very positive feedback from the students. The book “Social Physics” by Alexander Pentland was also read and discussed.

Changes have been made to various aspects of this course in the two times that it has been taught. Reflection on what has been effective and engaging to students has been made, as has much consideration to future directions for the next time this course will be taught.

## **2. BACKGROUND ON FIRST-YEAR SEMINARS AT STETSON UNIVERSITY**

First-Year Seminars at Stetson University were developed to fulfill a number of goals, including introducing students to university life and resources through a course on an exciting topic that requires the students to think critically, interpret primary sources, and communicate both in written and oral form. The class includes a significant writing component, in-class and online discussions, mentorship with individual meetings throughout the semester, and a final project that includes a presentation.

## **3. DATA AND DEEP FAKES**

The instructor participated in a group discussion some years prior to the first presentation of the class in which three images were displayed. Two pictures were researchers, and one was an artificially generated image of a face using a generative adversarial network. The participants in the discussion then chose which picture they thought was fake. About one-third of the participants chose each of the three pictures. To introduce one application of data that had significant implications for our society, the instructor created a set of 10 images using the site [thispersondoesnotexist.com](http://thispersondoesnotexist.com) which used StyleGAN2 developed by Keras et al. (2019), and put them on a PowerPoint slide to display for the class. The students were told the story of the three images and then were asked to determine which if any of the images were fake. The students also were unable to determine which of the images were fake and were surprised to find out that all of them were generated using an algorithm that used the data from many images to create new faces. The students were then asked to reflect on the implications of deep fake technology to society in a written essay.

## **4. THE CAMBRIDGE ANALYTICA SCANDAL**

One of the most popular topics in the personal data section of the class was the Cambridge Analytica scandal. After having discussed some of the basics of online personal data and issues with identity theft previously, the class discussed the alleged misuse of data by the marketing firm Cambridge Analytica. The students were able to watch statements from the CEO, Alexander Nix, from just before the 2016 US election. They then watched media coverage from when the scandal broke in 2018, followed by an interview by Christopher Wylie. They then were able to watch a rebuttal in an interview with Nix after the alleged data misuse was public knowledge. The students were then encouraged to research the topic further and reflect on issues related to how personal data online was used to micro-target niche groups and potentially influence voters' decisions. The student responses varied greatly on their opinions as to whether the data was properly acquired and used ethically in their reflection essays.

## **5. REFLECTIONS ON CLASS FORMAT AND FUTURE DIRECTIONS**

With the advent of COVID-19, and the precautions that were taken, the Fall 2020 version of the course was taught in a hybrid format but with a more typical lecture style than had been initially planned. Student engagement was challenging as half of the class was watching online on a typical day. During that semester, students seemed to give more positive feedback on the days that had some online videos related to the course material, with the students sent off to research related material after the presentation.

The Fall 2021 course version spent more time with the students independently researching topics after the class lecture material. This could be seen as somewhat of an overcorrection to the initial presentation of the material. Unfortunately, since the student would often be more focused on the independent research aspect, the in-class material was “tuned out” by some. While encouraging their independent research was a good thing, their inability to tie the class material to their writing was sometimes evident.

In Fall 2022, the instructor is hoping to create a set of videos that the students would be required to watch before attending class (a flipped-classroom approach). Then a “Think-Pair-Share” activity where the students pair up, discuss the material briefly in pairs, then have the small groups of students present

the material to the larger group. The instructor hopes that this form of classwork will encourage the student to think more deeply about the material before they then move on to independently researching the topic they would be writing about that day. The instructor also hopes that this will give the students more of a balance between the learning material and the graded activities.

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