Teaching Philosophy

I aim to serve as a bridge to connect various disciplines through developing statistical methods and models and spread the concepts of statistics to the public. I would love to focus on developing students' interests on statistical thinking and making advanced statistical methods and models reachable for students from other disciplines or students without solid mathematics background. I would love to teach introduction-level courses for undergraduate students, such as probability, regression analysis, and mathematics statistics. I also want to teach advanced topics such as hierarchical models, Bayesian statistics, and generalized linear regression.

I obtain the opportunity to teach STA210: Regression Analysis during summer. It is a 6-week course required for students minor in statistics. It is a small class with 8 students and most students come from other disciplines, such as political science, economics, computer science and mathematics. According to students' aptitude, I design the course emphasizing more on comprehension of statistical methods, ability to apply statistical methods and models using R, and capability to interpret and communicate with others.

To enhance students' comprehension of knowledge, I emphasize on forming curiosity and cognitive learning. I would use the heredity of height to motivate the idea of regression model. I would explain the intuition behind the ordinary least square estimator in regression analysis. I will explain multicollinearity from geometric aspect. To enhance students' memory of knowledge, I would introduce new information by analogy and comparison. For example, I would analogize the interpretation of coefficients in a multiple linear regression to a single linear regression, analogize the logistic regression to linear regression. Through learning cognitively, students can memorize the previous knowledge and learn new knowledge quickly and efficiently by connecting it to previous existing methods. Before each quiz, I will lead a review session to process and synthesize knowledge. For example, I would introduce geometric interpretation of coefficients in a regression in different situations, for continuous and nominal variables, for a single variable and multiple variables, for a linear regression and a logistics model. During the review session, question-driven learning is very helpful when combined with collaborative learning. I would use questions to drive students participate and review the previous materials. Almost everyone participated actively even for students previously sitting behind and prefer not engaging. Another important method I found to enhance students' comprehension is application. I will also encourage students to apply what they have learned to solve real-world problems, such as analogize hypothesis testing to a court case, evaluate covid-19 rapid test kit by interpretating its specificity and sensitivity. Through practicing in life situations, students are able to understand statistical results when reading scientific report and think in a statistical way.

Another important objective for this course is application using R and communicate results to others. During the labs, students are exposed to various real datasets and are asked to using R programming to conduct regression analysis to solve the real-world problems. I found cooperative learning will be most effective since half of the class major in computer science. According to students' aptitude, I allocate the team based on their background to encourage students with little programming background learn from those students skilled at programming. In the final project, students are asked to analyze a data-driven research question and present the findings in a report and a video. Through learning collaboratively, students are able to get trained

in how to propose a statistical question and write a formal scientific report to communicate with others. The final project also helps students to synthetic what they have learned in the class and put into practice, and question themselves on the model evaluation. This transformative process can not only encourage mastery and transmit information, but also develop critical thinking skills and self-motivation and self-governing.

Through course design, I would love to encourage students to think in statistical way, transmit what they have learned to real-world practice, interpret and communicate of these statistical models and methods. I would encourage cognitive learning, collaborative learning and cooperative learning. From the feedback from students and observation experience of other teachers' class, I realize I emphasize on delivering knowledge from my end but ignore absorbing knowledge from students' end. During the office hour, I usually discuss with students to lead them find the answer. I would first ask a student about his answer and reasoning. Then I would provide other possible thoughts to question his answer. If he is unsure about the answer, I will conduct a simulation to validate the answer and make him fully participate into the thinking process. Since the course is very intense, I hardly have a chance to guide students to think actively. In future, I would love to try some question-driven pedagogic methods to encourage actively learning.