

Teaching Statement - Abhilash C. Singh

■ Teaching philosophy

As a teaching assistant at Imperial College London, I have had the opportunity to teach undergraduates, graduates, and professionals a variety of subjects ranging from Transport Demand and Economics to Discrete Choice Modelling. While the courses and students have differed, the feedback for my teaching has remained consistently excellent. My teaching philosophy grew out of my reflections on my experiences – both as a student and as a teaching assistant – in classrooms across four universities in the departments of Civil Engineering, Economics, Mathematics and Statistics. I believe that active student engagement is essential for an interdisciplinary education that effectively addresses contemporary issues. I aim to empower students to take ownership of their learning experience. I integrate real-world scenarios into my lessons, utilize a diverse range of teaching techniques, celebrate the diversity in the classroom, and work to foster an inclusive atmosphere where every student can flourish. My classroom teaching incorporates the idea of constructing knowledge, one step and one concept at a time. I adhere to three principles: working methodically, actively engaging students, and delivering consistent feedback. These principles guide the following strategies for achieving academic excellence.

Firstly, a methodical approach to teaching incorporates a clear pattern of concepts, examples, and questions. After introducing a concept, I take a short break and observe the class to give students time to process the material, absorb the details, and ask any questions. This approach allows me to gauge the level of understanding, interest, and engagement of the class and adapt my teaching to better meet their needs. I use presentation slides, writing on the blackboard, and solving examples to present the material. During the first section, I clearly explain what the students can expect from the course and what is expected of them. Early in the semester, I ask my students to fill out an anonymous early feedback form with questions such as "What do you want me to start/stop/keep doing?" As the course progresses, I identify students who are struggling and tailor my support accordingly. By involving the students, I share the ownership of the learning experience with them. I encourage student participation in class by writing and giving verbal or nonverbal responses such as raising their hands, giving a thumbs up, or other gestures. I incorporate exercises using Microsoft Excel and editing simulation codes in open-source software such as Biogeme, R, and Python. I also use questions to stimulate critical thinking and collaboration, such as asking students to consider the next step in a problem, provide alternative examples, and explain the concept to their peers.

Secondly, the feedback for learning is divided into formative and summative assessments. The tutorial questions solved in the classroom form the formative assessment, where the students are encouraged to attempt the tutorial questions in real time and discuss the process among themselves. This also involves coursework presentations, which are provided feedback on before final submission. The coursework report and examination form the summative assessment, where I place equal weight on both the thought process used in deriving a solution and arriving at the correct solution. Outside the classroom, I strive to provide students with ample resources to succeed in the class. This involves sharing vetted open-source lectures from MIT, NPTEL, and Coursera. I believe that access to a variety of lecture materials can only enhance the learning experience.

Thirdly, I acknowledge that students in my classroom come from diverse backgrounds, experiences, identities, and expectations. As a teacher, I aim to create an inclusive and welcoming community for everyone. To understand my students, I distribute a "Getting to Know You" survey asking questions about their mathematical background, concerns about the class, and expectations. For example, I have previously arranged individual meetings with first-generation college students outside of regular office hours to provide guidance on how to study for a university course and offer relevant resources. I also encourage students who lack self-confidence to complete extra credit assignments to improve their understanding of the key concepts and boost their confidence. Additionally, I hold review sessions and practice exams to familiarize students who are taking a university class for the first time with what to expect on exams.

As a student, I found that taking notes was an effective way for me to learn. However, I understand that some students may find taking notes to be a distraction. To accommodate this, I provide detailed

handouts that summarize the important themes of my lectures and expand upon them to include related topics that may not be covered in the lecture. I also believe that being available and approachable is a crucial aspect of being a teacher. Despite the challenges posed by the COVID-19 pandemic, I found ways to stay connected to my students. In addition to offering standard office hours, I made myself accessible to students by encouraging them to reach out to me via Teams and email at their convenience.

■ Teaching experience

In the fall of 2022, I served as a Graduate Teaching Assistant to Drs. Aruna Sivakumar and Dan Graham for the course "Transport Demand and Economics" (undergraduate level). My focus was on the section on discrete choice modelling techniques and their connection to transport economics and network models. The course was designed for advanced undergraduate students in Civil Engineering, but it was also available to other students with similar interests as an elective. Every week, I led the tutorial session on coursework assignments, and provided the open-source software Biogeme tutorial to estimate choice models. The course was structured around real-world choice modelling, so I created a coursework module based on a simulated city dataset for the students to work on individually. This allowed them to apply the concepts they learned in class, as well as receive formative assessment during tutorial sessions. Since many of the students found the coursework challenging, I spoke and exchanged emails with several students in the class, often multiple times, to help them organize their ideas and provide support in developing their assignments. The higher-than-average marks earned by the class and the positive feedback I received for being accessible outside of class are a testament to my teaching approach. I also evaluated the coursework reports and the final examination. In the spring of 2020, 2021, and 2022, I served as a Graduate Teaching Assistant to Drs. Aruna Sivakumar and Fangce Guo for the course "Advanced Transport Modelling" (graduate level). My focus was on the course project, which examined different model structures that might be used to describe travel choices in travel survey data. In addition to leading tutorials on software development for the analysis, I also examined the coursework.

■ Teaching interests

I have a broad set of teaching interests in addition to my core research focus on discrete choice methods and transportation planning. I am interested in developing a course, "Data Science for Behavioural Modelling," which would concentrate on advanced topics of structural estimation from the perspective of data science and analytics, following previous courses on probability, statistics, and linear regression. The goal of this course is to offer an in-depth understanding of the common structural estimation methods in modern empirical economics and the technical ability to apply these methods to one's own application or research problem. The course will focus on the application of econometric methods to linear, non-linear and limited dependent variable problems, leading up to simulation-based inference.

Here's a list of the courses I am interested in contributing towards at the **Department of Civil Engineering core curriculum**: Urban Transportation Planning, Transport Demand and Economics, and Advanced Travel Behaviour Methods. Beyond the core-curriculum I would also like to develop the following courses to enhance the department's curriculum: Probability Theory, Statistical Inference, Multivariate Statistics, Advanced Statistical Methods and Computing, Maximum Likelihood Estimation Statistics, Mathematical Statistics, Consumer Demand Modelling, and Discrete Choice Modelling.

■ Teaching references

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