

Teaching portfolio

1. Formal educational training

I. Lecturer Training Programme at the University of Southern Denmark.

II. I have attended the following courses.

(a) Questioning – how it can support learning, teaching and assessment (the Spring 2022 semester at the University of Southern Denmark, 1 ECTS, taught by Donna Hurford).

(b) Oral examination in HE in Denmark (March 24, 2022, the University of Southern Denmark, 0.25 ECTS, taught by Vibeke Damlund).

(c) PhD Supervision – Regulation, Recruitment and Expectations (October 13, 2021, the University of Southern Denmark, taught by Suba Shanmugarajah Lindholm).

(d) Online Workshop in ItsLearning (August 18, 2021, the University of Southern Denmark, taught by Søren Sten Hansen).

III. I was mentored by Professor Wolfgang Polonik while I was a Visiting Assistant Professor at the Department of Statistics of the University of California, Davis, USA.

2. Administrative tasks relating to education

I proposed and designed the course ST821: Time Series that I am responsible for at the Department of Mathematics and Computer Science of the University of Southern Denmark.

3. Experience of study programmes, supervision and examinations

I. The following are the courses that I have taught.

University of Southern Denmark, Denmark (language of instruction: English)

– ST821: Time Series (the instructor of the 5 ECTS graduate course);

– ST522/ST816: Computational Statistics (the instructor of the 10 ECTS undergraduate course);

– DS826/ST819: Multivariate Regression Analysis (the instructor of the 5 ECTS graduate course).

University of California, Davis, USA

– STA 106 Applied Statistical Methods: Analysis of Variance (the instructor of the undergraduate course);

– STA 131C Introduction to Mathematical Statistics (the instructor of the undergraduate course);

– STA 141A Fundamentals of Statistical Data Science (the instructor of the undergraduate course);

– STA 209 Optimization for Big Data Analytics (the instructor of the graduate course).

Ruhr-Universität Bochum, Germany (language of instruction: English)

– Mathematical statistics (the teaching assistant of the undergraduate course);

– Numerical methods and stochastics (one of the two instructors of the graduate course);

– Probability theory and statistics (the teaching assistant of the undergraduate course).

Vilnius University, Lithuania (language of instruction: Lithuanian)

– Mathematical analysis (the teaching assistant of the undergraduate course); – Statistics (the teaching assistant of the undergraduate course).

II. Most of my supervision experience comes for the University of Southern Denmark. In particular, I have supervised/co-supervised 3 bachelor's projects, 4 master's theses, 3 company projects, and 1 individual study activity.

III. I have been involved in a number of courses at the University of Southern Denmark as an internal co-examiner.

4. Methods, materials and tools

I. I have taught a number of courses at different levels. I have taught lectures, discussions sessions, tutorials, computer labs. I have also held office hours. I have experience teaching remotely as well. As forms of assessment, I have used take-home exams, written exams, oral exams, projects, multiple choice questions, quizzes and possibly some other forms of assessment too. I have used Canvas, Piazza, Blackboard, itslearning, Campuswire, Gradescope, Zoom (including polls which are very similar to Poll Everywhere).

II. Currently, I use Beamer slides and interactive Jupyter Notebooks as digital teaching materials.

6. Reflections on your own teaching practice and future development including student evaluations

I think learning begins with being deeply interested in something and trying to understand how certain things work. My main goal as an instructor is to try to get my students interested in the topics that I teach hoping that they will continue learning and studying these topics even after the course ends.

The first thing that a good course needs is a clear and consistent structure. Everything has to make sense and the topics should logically follow one after another. It is important before beginning a new topic to step back and overview the topics covered up to this point and to show that the next topic naturally follows from the previous topics. I think it is important for the students not to lose track of the big picture and to anticipate the direction the course will take. For example, when I teach convex optimisation, I try to step back and overview the algorithms that we discussed and to explain that the idea of the next algorithm that we will discuss naturally follows from the previous algorithm. For instance, Newton's method in a certain sense naturally follows from gradient descent. Then the quasi-Newton methods naturally follow from Newton's method and so on. So it is very important that a course has a clear and logical structure.

I try to begin every topic by explaining why we study this particular topic, why this topic is interesting (at least in my opinion), why this topic is useful. I hope that this gives the students a certain perspective and understanding of a bigger picture. Very good examples that illustrate the usefulness of the topic are essential at this point. For instance, I begin with Anscombe's quartet when I teach data visualisation to illustrate the importance and usefulness of data visualisation. At first, we look at simple descriptive statistics which are almost identical and then I almost persuade the students that these four data sets are almost identical. However, once the students see visualisations of these four data sets, they realise that the data sets are entirely different and this is not what they expected. This is a good example because it not only illustrates the usefulness of data visualisation but it also raises some questions about sample mean, sample variance, correlation and linear regression: how can descriptive statistics be so similar if these four data sets are so different? In my opinion, Anscombe's quartet works really well. It gets students interested. The idea is not difficult to understand but the illustrated idea is counterintuitive so somehow it encourages students to try to understand how these descriptive statistics can be almost the same when the data sets are entirely different.

In my opinion, it is very important for students to be able to explore data, find answers to some questions and learn on their own. For example, I design homework assignments in such a way that certain parts of the homework assignments are not discussed in class. The idea is that students have to use what they have learned in class but they also have to study a little bit on their own. For instance, when I teach linear regression, I cover most of the topics in class but I give students a programming homework assignment about multicollinearity where they are asked to simulate data sets, describe their findings and suggest possible solutions. I answer their questions if they have any but I want students to go a little bit beyond lecture slides and lecture material and to learn on their own. Eventually, students will graduate and they will have to learn new things on their own so I want them to practice these skills while they are still at the university. I hope such assignments encourage students to explore certain topics independently and maybe even learn more than they are asked to. I want them to understand that they are able to explore data and learn statistics and make some discoveries on their own.

Teaching really motivates me to improve my knowledge of a certain subject and improve my lectures. I always try to collect good problems that could be interesting for students and if I come up with or if I find some nice intuitive explanation of some statistical or mathematical result, I try to write it down so that I do not forget it and I can use it when I teach. I think teaching helps to improve my ability to express statistical and mathematical ideas clearly and concisely. In my opinion, being a good teacher is a big part of being a good statistician and mathematician.

The way teaching evaluations are communicated with the instructors at the University of Southern Denmark makes it somewhat difficult to combine them all into one place and give a brief overview but generally my teaching evaluations are positive. The students have some good suggestions in the teaching evaluations which I later incorporate into my teaching. For example, the tutorials and computer labs of ST522/ST816 Computational Statistics were scheduled right after the lectures previously but the students indicated in the teaching evaluations that they did not have enough time to go over the lecture material and the exercises to prepare for the tutorials and the computer labs. So the schedule has been changed now and there is one day between the lectures and the tutorials as well as the computer labs.