Formal pedagogical education

The 2014 Lecture Training Program at the University of Southern Denmark

Administrative tasks relating to education

Course coordinator of PhD course: Analysis of microarray gene expression data.
Course coordinator of PhD course: Design and analysis of epigenome-wide association studies.

Experience of study programmes, supervision and examinations

1. Since 2001, I have been teaching multiple PhD courses or graduate courses at University of Southern Denmark, University of Copenhagen, etc.

•PhD course: Analysis of genetic association data
•PhD course: ”Omics” - applied in health sciences
•PhD course: Analysis of Twin Data in Health Research - Epigenetic studies using twins
•PhD course: Genetic Analysis of Multiple SNP data
•PhD Graduate School of Metabolism and Danish Cardiovascular Research Academy:
Molecular mechanisms in the metabolic syndrome
•The CIM and AMBEHR PhD Course on “Inflammation and Metabolism”
•Experimental Bioinformatics, University of Southern Denmark
•PhD course at PhD Graduate School of Metabolism, University of Southern Denmark
•Genetic epidemiology course for PhD students at the Faculty of Health Science, Copenhagen University.

2. Function as examinor for master students from the Department of Public Health and master students from Department of Mathematics and Computer Science, SDU.

3. Supervised/cosupervised a total of 7 PhD and 6 Master students at SDU.

4. Serving as member of Phd committee (chair or referee) for 6 PhD defenses.

5. Currently as main supervisor for 3 PhD and 2 master students at SDU.

Methods, materials and tools

Methods: The multiple disciplinary situation creates an extra layer of student heterogeneity which challenges the teaching practice. My approach to facilitate the teaching is through figurative teaching which helps the students to simplify and then to understand abstract terms. My teaching practice showed that the approach is especially useful in introducing complex concepts in genetic analysis. For example, SNP imputation is an important step in genome-wide association studies (GWAS). It makes use of existing information provided freely by the Human Genome Project to infer extra genotype information for our collected samples based on their limitedly observed genotype data. The combination of both observed and inferred genotype data largely extends coverage of GWAS with increased power in mapping disease genes. Students usually get lost after focusing on the intricate process of imputation and become confused with the aim and usefulness of imputation practice. In my approach, the process is animated first by a scene of someone in the dark looking hard for a missing needle (stands for a disease gene) underneath a conventional street lamp. Then a second animation shows the same scene but with extra LED street lamps powered by solar energy that help to easily locate the missing needle. Here I use the conventional lamp to mean genotype data at hand, the LED lamps to mean imputed extra genotype information obtainable free of charge. In my experience, this strategy easily inspired students’ interest in the topic and helped them to understand the process. Now everybody in the class understands the concept and learns the importance in it. In my teaching, this method is used whenever it is possible and necessary.
Likewise, I use concrete concepts to simplify and depict abstract concepts in my teaching. For example, in explaining the difference between linkage and association analyses, I state that linkage maps disease genes by assessing the co-transmission of allele and disease (vertically) across generations within families (thus linkage) while association analysis localize disease genes by assessing co-existence of disease and allele (horizontally) among individuals in a population (thus association). The key words I choose, “co-transmission”, “co-existence” together with “vertical” and “horizontal” vividly depict the nature of the two very important approaches in genetic epidemiology and give a clear and easily understandable explanation to the differences between them.

Strategies: My one more effort to improve teaching in a multidisciplinary class is to encourage student-student interaction on top of teacher-student interaction by arranging short student presentations followed by student discussion guided by the teacher. This is expected to be highly effective in breaking the barriers between disciplines and at the same time promoting innovative ideas conveyed from multiple angles. This strategy also helps to bring fresh air into the classrooms of intensive PhD courses.

Educational development

I strongly believe that the teaching practice is a continuous developmental process during which reflection is highly important. I keep assessing my teaching activity during my teaching practice through (1) self-reflection to think about what works and what doesn't in my classroom; (2) interacting with my students both in-class and after-class; and (3) at end of the courses using the students' evaluation system. For joint courses, I also reflect with other teachers to learn from their experiences and take their opinions. Finally, I keep tracking new teaching tools or new pedagogic courses that can help improving my teaching. All these measures have helped and will continue to help me with upgrading my teaching practice through continuous reflection and self-improvement.